

PROGRAMME REGULATIONS & CURRICULUM

2025-29

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

BACHELOR OF TECHNOLOGY (B.TECH.) IN COMPUTER SCIENCE AND ENGINEERING BLOCK CHAIN (CBC)

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PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

Program Regulations and Curriculum 2025-2029

BACHELOR OF TECHNOLOGY (B.Tech.) in

COMPUTER SCIENCE AND ENGINEERING

BLOCK CHAIN (CBC)

based on Choice Based Credit System (CBCS) and Outcome Based Education (OBE)



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1. Vision & Mission of the University and the School / Department

1.1 Vision of the University

To be a Value-driven Global University, excelling beyond peers and creating professionals of integrity and character, having concern and care for society.

1.2 Mission of the University

- Commit to be an innovative and inclusive institution by seeking excellence in teaching, research and knowledge-transfer.
- Pursue Research and Development and its dissemination to the community, at large.
- Create, sustain and apply learning in an interdisciplinary environment with consideration for ethical, ecological and economic aspects of nation building.
- Provide knowledge-based technological support and services to the industry in its growth and development.
- To impart globally-applicable skill-sets to students through flexible course offerings and support industry's requirement and inculcate a spirit of new-venture creation.

1.3 Vision of Presidency School of Computer Science and Engineering

To be a value-based, practice-driven Presidency School of Computer Science and Engineering, committed to developing globally competent engineers, dedicated to developing cutting-edge technology to enhance the quality of life.

1.4 Mission of Presidency School of Computer Science and Engineering

- Cultivate a practice-driven environment with computing-based pedagogy, integrating theory and practice.
- Attract and nurture world-class faculty to excel in teaching and research in the realm of computing sciences.
- Establish state-of-the-art computing facilities for effective teaching and learning experiences.
- Promote interdisciplinary studies to nurture talent for global impact.
- Instill entrepreneurial and leadership skills to address social, environmental and community needs.

2. Preamble to the Program Regulations and Curriculum

This is the subset of Academic Regulations and it is to be followed as a requirement for the award of B.Tech degree.

The Curriculum is designed to take into the factors listed in the Choice Based Credit System (CBCS) with focus on Social Project Based Learning, Industrial Training, and Internship to enable the students to become eligible and fully equipped for employment in industries, choose higher studies or entrepreneurship.

In exercise of the powers conferred by and in discharge of duties assigned under the relevant provision(s) of the Act, Statutes and Academic Regulations, of the University, the Academic Council hereby makes the following Regulations.

3. Short Title and Applicability



- a. These Regulations shall be called the Bachelor of Technology Degree Program Regulations and Curriculum 2025-2029.
- b. These Regulations are subject to, and pursuant to the Academic Regulations.
- c. These Regulations shall be applicable to the ongoing Bachelor of Technology Degree Programs of the 2025-2029 batch, and to all other Bachelor of Technology Degree Programs which may be introduced in future.
- d. These Regulations shall supersede all the earlier Bachelor of Technology Degree Program Regulations and Curriculum, along with all the amendments thereto.
- e. These Regulations shall come into force from the Academic Year 2024-2025.

4. Definitions

In these Regulations, unless the context otherwise requires:

- a. "Academic Calendar" means the schedule of academic and miscellaneous events as approved by the Vice Chancellor;
- b. "Academic Council" means the Academic Council of the University;
- c. "Academic Regulations" means the Academic Regulations, of the University;
- d. "Academic Term" means a Semester or Summer Term;
- e. "Act" means the Presidency University Act, 2013;
- f. "AICTE" means All India Council for Technical Education;
- g. "Basket" means a group of courses bundled together based on the nature/type of the course;
- *h.* "BOE" means the Board of Examinations of the University;
- *i.* "BOG" means the Board of Governors of the University;
- *j.* "BOM" means the Board of Management of the University;
- *k.* "BOS" means the Board of Studies of a particular Department/Program of Study of the University;
- *I.* "CGPA" means Cumulative Grade Point Average as defined in the Academic Regulations;
- *m.* "Clause" means the duly numbered Clause, with Sub-Clauses included, if any, of these Regulations;
- n. "COE" means the Controller of Examinations of the University;
- o. "Course In Charge" means the teacher/faculty member responsible for developing and organising the delivery of the Course;
- *p.* "Course Instructor" means the teacher/faculty member responsible for teaching and evaluation of a Course;
- *q.* "Course" means a specific subject usually identified by its Course-code and Course-title, with specified credits and syllabus/course-description, a set of references, taught by some teacher(s)/course-instructor(s) to a specific class (group of students) during a specific Academic Term;
- *r.* "Curriculum Structure" means the Curriculum governing a specific Degree Program offered by the University, and, includes the set of Baskets of Courses along with minimum credit requirements to be earned under each basket for a degree/degree with specialization/minor/honours in addition to the relevant details of the Courses and Course catalogues (which describes the Course content and other important information about the Course). Any specific requirements for a particular program may be brought into the Curriculum structure of the specific program and relevant approvals should be taken from the BOS and Academic Council at that time.



- s. "DAC" means the Departmental Academic Committee of a concerned Department/Program of Study of the University;
- t. "Dean" means the Dean / Director of the concerned School;
- u. "Degree Program" includes all Degree Programs;
- v. "Department" means the Department offering the degree Program(s) / Course(s) / School offering the concerned Degree Programs / other Administrative Offices;
- w. "Discipline" means specialization or branch of B.Tech. Degree Program;
- *x.* "HOD" means the Head of the concerned Department;
- *y.* "L-T-P-C" means Lecture-Tutorial-Practical-Credit refers to the teaching learning periods and the credit associated;
- z. "MOOC" means Massive Open Online Courses;
- aa. "MOU" means the Memorandum of Understanding;
- bb. "NPTEL" means National Program on Technology Enhanced Learning;
- cc. "Parent Department" means the department that offers the Degree Program that a student undergoes;
- *dd.* "Program Head" means the administrative head of a particular Degree Program/s;
- *ee.* "Program Regulations" means the Bachelor of Technology Degree Program Regulations and Curriculum, 2025-2029;
- ff. "Program" means the Bachelor of Technology (B.Tech.) Degree Program;
- gg. "PSCS" means the Presidency School of Computer Science and Engineering;
- hh. "Registrar" means the Registrar of the University;
- *ii.* "School" means a constituent institution of the University established for monitoring, supervising and guiding, teaching, training and research activities in broadly related fields of studies;
- *jj.* "Section" means the duly numbered Section, with Clauses included in that Section, of these Regulations;
- *kk.* "SGPA" means the Semester Grade Point Average as defined in the Academic Regulations
- II. "Statutes" means the Statutes of Presidency University;
- *mm.* "Sub-Clause" means the duly numbered Sub-Clause of these Program Regulations;
- *nn.* "Summer Term" means an additional Academic Term conducted during the summer break (typically in June-July) for a duration of about eight (08) calendar weeks, with a minimum of thirty (30) University teaching days;
- oo. "SWAYAM" means Study Webs of Active Learning for Young Aspiring Minds.
- pp. "UGC" means University Grant Commission;
- qq. "University" means Presidency University, Bengaluru; and
- *rr.* "Vice Chancellor" means the Vice Chancellor of the University.

5. Program Description

The Bachelor of Technology Degree Program Regulations and Curriculum 2025-2029 are subject to, and, pursuant to the Academic Regulations. These Program Regulations shall be applicable to the following ongoing Bachelor of Technology (B.Tech.) Degree Programs of 2025-2029 offered by the Presidency School of Computer Science and Engineering (PSCS):

1 B.Tech. Computer Science and Engineering



- 2. B. Tech. Computer Science and Technology (Big Data)
- 3. B. Tech. Computer Science and Engineering (Block Chain)
- 4. B. Tech. Computer Science and Technology (DevOps)
- 5. B. Tech. Computer Science and Engineering (Cyber Security)
- 6. B. Tech. Computer Science and Engineering (Internet of Things)
- 7. B. Tech. Computer Science and Engineering (Data Science)
- 8. B. Tech. Computer Science and Technology [Artificial Intelligence and Machine Learning]
- 9. B. Tech. Information Science and Technology [Artificial Intelligence and Data Science]
- 10. B. Tech. Computer Science and Information Technology
- 11. B. Tech. Computer Science and Engineering (Networks)
- 12. B. Tech. Computer Engineering
- 13. B. Tech. Information Science and Engineering [Artificial Intelligence and Robotics]

14. B. Tech. Computer Science and Engineering (Artificial Intelligence and Machine Learning)

- 15. B.Tech. Artificial Intelligence and Data Science
- 16. B.Tech. Robotics and Artificial Intelligence

5.1 These Program Regulations shall be applicable to other similar programs, which may be introduced in future.

5.2 These Regulations may evolve and get amended or modified or changed through appropriate approvals from the Academic Council, from time to time, and shall be binding on all concerned.

5.3 The effect of periodic amendments or changes in the Program Regulations, on the students admitted in earlier years, shall be dealt with appropriately and carefully, so as to ensure that those students are not subjected to any unfair situation whatsoever, although they are required to conform to these revised Program Regulations, without any undue favour or considerations

6. Minimum and Maximum Duration

- 6.1 Bachelor of Technology Degree Program is a Four-Year, Full-Time Semester based program. The minimum duration of the B.Tech. Program is four (04) years and each year comprises of two academic Semesters (Odd and Even Semesters) and hence the duration of the B.Tech. program is eight (08) Semesters.
- 6.2 A student who for whatever reason is not able to complete the Program within the normal period or the minimum duration (number of years) prescribed for the Program, may be allowed a period of two years beyond the normal period to complete the mandatory minimum credits requirement as prescribed by the concerned Program Regulations and Curriculum. In general, the permissible maximum duration (number of years) for completion of Program is 'N' + 2 years, where 'N' stands for the normal or minimum duration (number of years) for completion of the concerned Program as prescribed by the concerned Program as prescribed by the concerned Program Regulations and Curriculum.



- 6.3 The time taken by the student to improve Grades/CGPA, and in case of temporary withdrawal/re-joining (Refer to Clause 16.1 of Academic Regulations), shall be counted in the permissible maximum duration for completion of a Program.
- 6.4 In exceptional circumstances, such as temporary withdrawal for medical exigencies where there is a prolonged hospitalization and/or treatment, as certified through hospital/medical records, women students requiring extended maternity break (certified by registered medical practitioner), and, outstanding sportspersons representing the University/State/India requiring extended time to participate in National/International sports events, a further extension of one (01) year may be granted on the approval of the Academic Council.
- 6.5 The enrolment of the student who fails to complete the mandatory requirements for the award of the concerned Degree (refer Section 19. of Academic Regulations) in the prescribed maximum duration (Clauses 18.1 and 18.2 of Academic Regulations), shall stand terminated and no Degree shall be awarded.

7 Programme Educational Objectives (PEO)

After four years of successful completion of the program, the graduates shall be able to:

PEO1. Demonstrate success as Mechanical Engineer with innovative skills and moral and ethical values.

PEO2. Engage in lifelong learning through research and professional development,

PEO3. Serve as a leader in the profession through consultancy, extension activities or entrepreneurship.

8 Programme Outcomes (PO) and Programme Specific Outcomes (PSO)

8.1 Programme Outcomes (PO)

On successful completion of the Program, the students shall be able to:

- **PO1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2. Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3. Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4. Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5.** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6.** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.



- **PO7.** Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9.** Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11. Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

8.2 Program Specific Outcomes (PSOs):

On successful completion of the Program, the students shall be able to:

PSO 01: Problem Analysis: Identify, formulate, and analyze complex engineering problems related to Cyber Security principles and practices, Programming, and Computing technologies. Utilize research literature and apply first principles of mathematics, natural sciences, and engineering sciences to draw substantiated conclusions.

PSO 02: Design/Development of Solutions: Design innovative solutions for complex engineering challenges in Cyber Security principles and practices, Programming, and Computing technologies. Develop system components or processes that address specified needs while considering public health and safety, cultural, societal, and environmental factors.

PSO 03: Modern Tool Usage: Select, create, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to tackle complex engineering problems related to Cyber Security principles and practices, Programming in Cyber Security, and Computing & Analytics, with an understanding of their limitations.

9 Admission Criteria (as per the concerned Statutory Body)

The University admissions shall be open to all persons irrespective of caste, class, creed, gender or nation. All admissions shall be made on the basis of merit in the qualifying examinations; provided that forty percent of the admissions in all Programs of the University shall be reserved for the students of Karnataka State and admissions shall be made through a Common Entrance Examination conducted by the State Government or its agency and seats shall be allotted as per the merit and reservation policy of the State Government from time to time. The admission criteria to the B.Tech. Program is listed in the following Sub-Clauses:

9.1 An applicant who has successfully completed Pre-University course or Senior Secondary School course (+2) or equivalent such as (11+1), 'A' level in Senior School Leaving Certificate Course from a recognized university of India or outside or from Senior Secondary Board or equivalent, constituted or recognized by the Union or by the State Government of that Country for the purpose of issue of qualifying certificate on successful



completion of the course, may apply for and be admitted into the Program.

- 9.2 Provided further, the applicant must have taken Physics and Mathematics as compulsory subjects in the Pre-University / Higher Secondary / (10+2) / (11+1) examination, along with either Chemistry / Biology / Electronics / Computer Science / Biotechnology subject, and, the applicant must have obtained a minimum of 45% of the total marks (40% in case of candidates belonging to the Reserved Category as classified by the Government of Karnataka) in these subjects taken together.
- 9.3 The applicant must have appeared for Joint Entrance Examinations (JEE) Main / JEE (Advanced) / Karnataka CET / COMED-K, or any other State-level Engineering Entrance Examinations.
- 9.4 Reservation for the SC / ST and other backward classes shall be made in accordance with the directives issued by the Government of Karnataka from time to time.
- 9.5 Admissions are offered to Foreign Nationals and Indians living abroad in accordance with the rules applicable for such admission, issued from time to time, by the Government of India.
- 9.6 Candidates must fulfil the medical standards required for admission as prescribed by the University.
- 9.7 If, at any time after admission, it is found that a candidate had not in fact fulfilled all the requirements stipulated in the offer of admission, in any form whatsoever, including possible misinformation and any other falsification, the Registrar shall report the matter to the Board of Management (BOM), recommending revoking the admission of the candidate.
- 9.8 The decision of the BOM regarding the admissions is final and binding.

10 Lateral Entry / Transfer Students requirements

10.1 Lateral Entry

The University admits students directly to the second year (3rd Semester) of the B.Tech. Degree program as per the provisions and/or regulations of the Government of Karnataka pertaining to the "Lateral Entry" scheme announced by the Government from time to time. Further, the general conditions and rules governing the provision of Lateral Entry to the B.Tech./B.E./B.S Program of the University are listed in the following Sub-Clauses:

- 10.1.1 Admission to 2nd year (3rd Semester) of the B.Tech. Degree program shall be open to the candidates who are holders of a 3-year Diploma in Engineering (or equivalent qualification as recognized by the University), who have secured not less than fortyfive percentage (45%) marks in the final year examination (5th and 6th Semesters of the Diploma Program) in the appropriate branch of Engineering. Provided that, in case of SC / ST and OBC candidates from Karnataka the minimum marks for eligibility shall be forty percent (40%).
- 10.1.2 Provided further that, candidates seeking Lateral Entry may be required to complete specified bridge Courses as prescribed by the University. Such bridge Courses, if any, shall not be included in the CGPA computations.
- 10.1.3 All the existing Regulations and Policies of the University shall be binding on all the students admitted to the Program through the provision of Lateral Entry.



- 10.1.4 The Course requirements prescribed for the 1st Year of the B.Tech. Program shall be waived for the student(s) admitted through Lateral Entry and the duration of the B.Tech. Program for such students is three (03) years, commencing from the 3rd Semester (commencement of the 2nd Year) of the B.Tech. Program and culminating with the 8th Semester (end of the 4th Year) of the B.Tech. Program.
- 10.1.5 Provided that, if a Lateral Entry student misses any mandatory program specific courses that are typically offered in the 1st year (1st or 2nd semesters), then those courses must be cleared by the students as soon as possible, preferably during the Summer Term.
- 10.1.6 The existing Program Regulations of the concerned Program to which the student is admitted through the provision of Lateral Entry shall be binding on the student with effect from the 3rd Semester of the Program. i.e., the Program Structure and Curriculum from the 3rd to 8th Semesters of the Program concerned shall be binding on the student admitted through Lateral Entry. Further, any revisions / amendments made to the Program Regulations thereafter, shall be binding on all the students of the concerned Program.
- 10.1.7 All the Courses (and the corresponding number of Credits) prescribed for the 1st Year of the concerned B.Tech. Program shall be waived for the student(s) admitted to the concerned B.Tech Program through Lateral Entry. Further, the *Minimum Credit Requirements* for the award of the B.Tech. Degree in the concerned Program shall be prescribed / calculated as follows:

The *Minimum Credit Requirements* for the award of the Bachelor of Technology (B.Tech.) Degree prescribed by the concerned Bachelor of Technology Degree Program Regulations and Curriculum, 2025-2029, minus the number of Credits prescribed / accepted by the Equivalence Committee for the 1st Year (1st and 2nd Semesters) of the B.Tech. Program.

For instance, if the *Minimum Credit Requirements* for the award of the Bachelor of Technology (B.Tech.) Degree as prescribed by the Regulations for B.Tech. (Computer Science and Engineering-Block Chain) is "N" Credits, and, if the total credits prescribed in the 1st Year (total credits of the 1st and 2nd Semesters) of the Program concerned is "M" Credits, then the *Minimum Credit Requirements* for the award of the B.Tech. in (Computer Science and Engineering-Block Chain) for a student who joins the Program through the provision of the Lateral Entry, shall be "N – M" Credits.

10.1.8 Further, no other waiver except the Courses prescribed for the 1st year of the B.Tech.Program of the University shall be permissible for students joining the B.Tech.Program through the provision of Lateral Entry.



10.2 Transfer of student(s) from another recognized University to the 2nd year (3rd Semester) of the B.Tech. Program of the University

A student who has completed the 1st Year (i.e., passed in all the Courses / Subjects prescribed for the 1st Year) of the B.Tech. Four-Year Degree Program from another recognized University, may be permitted to transfer to the 2nd Year (3rd Semester) of the B.Tech. Program of the University as per the rules and guidelines prescribed in the following Sub-Clauses:

- **10.2.1** The concerned student fulfils the criteria specified in Sub-Clauses 10.1.1, 10.1.2 and 10.1.3
- 10.2.2 The student shall submit the Application for Transfer along with a non-refundable Application Fee (as prescribed by the University from time to time) to the University no later than July 10 of the concerned year for admission to the 2nd Year (3rd Semester) B.Tech. Program commencing on August 1 on the year concerned.
- **10.2.3** The student shall submit copies of the respective Marks Cards / Grade Sheets / Certificates along with the Application for Transfer.
- **10.2.4** The transfer may be provided on the condition that the Courses and Credits completed by the concerned student in the 1st Year of the B.Tech. Four Degree Program from the concerned University, are declared equivalent and acceptable by the Equivalence Committee constituted by the Vice Chancellor for this purpose. Further, the Equivalence Committee may also prescribe the Courses and Credits the concerned students shall have to mandatorily complete, if admitted to the 2nd Year of the B.Tech. Program of the University.
- **10.2.5** The Branch / Discipline allotted to the student concerned shall be the decision of the University and binding on the student.

11 Change of Branch / Discipline / Specialization

A student admitted to a particular Branch of the B.Tech. Program will normally continue studying in that Branch till the completion of the program. However, the University reserves the right to provide the option for a change of Branch, or not to provide the option for a change of Branch, at the end of 1st Year of the B.Tech. Program to eligible students in accordance with the following rules and guidelines: framed by the University from time to time.

11.1 Normally, only those students, who have passed all the Courses prescribed for the 1st Year of the B.Tech. Program and obtained a CGPA of not less than 6.50 at the end of the 2nd Semester, shall be eligible for consideration for a change of Branch.



- 11.2 Change of Branch, if provided, shall be made effective from the commencement of the 3rd Semester of the B.Tech. Program. There shall be no provision for change of Branch thereafter under any circumstances whatsoever.
- 11.3 The student provided with the change of Branch shall fully adhere to and comply with the Program Regulations of the concerned Branch of the B.Tech. Program, the Fee Policy pertaining to that Branch of the B.Tech. Program, and, all other rules pertaining to the changed Branch existing at the time.
- 11.4 Change of Branch once made shall be final and binding on the student. No student shall be permitted, under any circumstances, to refuse the change of Branch offered.
- 11.5 The eligible student may be allowed a change in Branch, strictly in order of *inter se* merit, subject to the conditions given below:
 - 11.5.1 The actual number of students in the 3rd Semester in any particular Branch to which the transfer is to be made, should not exceed the intake fixed by the University for the concerned Branch;
 - 11.5.2 The actual number of students in any Branch from which transfer is being sought does not fall below 75% of the total intake fixed by the University for the concerned Branch.

The process of change of Branch shall be completed within the first five days of Registration for the 3rd Semester of the B.Tech. Program.

12 Specific Regulations regarding Assessment and Evaluation (including the Assessment Details of NTCC Courses, Weightages of Continuous Assessment and End Term Examination for various Course Categories)

- **12.1** The academic performance evaluation of a student in a Course shall be according to the University Letter Grading System based on the class performance distribution in the Course.
- **12.2** Academic performance evaluation of every registered student in every Course registered by the student is carried out through various components of Assessments spread across the Semester. The nature of components of Continuous Assessments and the weightage given to each component of Continuous Assessments (refer Clause 8.8 of academic regulations) shall be clearly defined in the Course Plan for every Course, and approved by the DAC.
- **12.3** Format of the End-Term examination shall be specified in the Course Plan.
- **12.4** Grading is the process of rewarding the students for their overall performance in each Course. The University follows the system of Relative Grading with statistical approach



to classify the students based on the relative performance of the students registered in the concerned Course except in the following cases:

- Non-Teaching Credit Courses (NTCC)
- Courses with a class strength less than 30

Absolute grading method may be adopted, where necessary with prior approval of concerned DAC.

Grading shall be done at the end of the Academic Term by considering the aggregate performance of the student in all components of Assessments prescribed for the Course. Letter Grades (Clause 8.10 of academic regulations).shall be awarded to a student based on her/his overall performance relative to the class performance distribution in the concerned Course. These Letter Grades not only indicate a qualitative assessment of the student's performance but also carry a quantitative (numeric) equivalent called the Grade Point.



12.5 Assessment Components and Weightage

	Credit Structur	Percenta	C	CA	Mid	Term	End	-term	Proje	Tota	
	e [L-T- P-C]	ge/ Marks	Theor y	Practic al	Theor y	Practic al	Theor y	Practic al	ct	I	Exam Conducted by
1	3-0-0-3	Percentage	25%	-	25%	-	50%	-	-	100 %	Mid-Term & End Term by CoE
		Marks	50	-	50	-	100	-	-	200	
2	2-0-2-3	Percentage	12.50 %	12.50 %	12.50 %	12.50 %	25%	25%	-	100 %	Mid-Term & End Term by CoE * Except for full
		Marks	25	25	25	25		stack courses			
3	1-0-4-3	Percentage	-	25%	10%	40%	5%	20%	-	100 %	Mid-Term & End Term by School
		Marks	-	25	10	40	5	20	-	100	
4	2-0-4-4	Percentage	12.50 %	12.50 %	10%	15%	20%	30%	-	100 %	*Mid-Term & End Term by CoE
		Marks	25	25	20	30	40	60	-	200	
5	0-0-4-2	Percentage	-	50%	-	-	-	-	50%	100 %	Project evaluated by IC
		Marks	-	50	-	-	-	-	50	100	at School level
6	0-0-2-1	Percentage	-	100%	-	-	-	-	-	100 %	Only CA at School Level
		Marks	-	100	-	-	-	-	-	100	
7	3-0-2-4	Percentage	12.50 %	12.50 %	15%	10%	30%	20%	-	100 %	Mid-Term & End Term by CoE
		Marks	25	25	30	20	60	40	-	200	
8	2-0-0-2	Percentage	25%	-	25%	-	50%	-	-	100 %	Mid-Term & End Term by CoE
		Marks	50	-	50	-	100	-	-	200	

The exact weightages of Evaluation Components shall be clearly specified in the concerned PRC and respective Course Plan.

Normally, for Practice/Skill based Courses, without a defined credit structure (L–T–P) [NTCC], but with assigned Credits (as defined in Clause 5.2. of the Academic Regulations), the method of evaluation shall be based only on Continuous Assessments. The various components of Continuous Assessments, the distribution of weightage among such components, and the method of evaluation/assessment, shall be as decided and indicated in the Course Plan/PRC. The same shall be approved by the respective DAC.

2.1 Minimum Performance Criteria:

2.1.1 Theory only Course and Lab/Practice Embedded Theory Course



A student shall satisfy the following minimum performance criteria to be eligible to earn the credits towards the concerned Course:

- a. A student must obtain a minimum of 30% of the total marks/weightage assigned to the End Term Examinations in the concerned Course.
- b. The student must obtain a minimum of 40% of the AGGREGATE of the marks/weightage of the components of Continuous Assessments, Mid Term Examinations and End Term Examinations in the concerned Course.

2.1.2 Lab/Practice only Course and Project Based Courses

The student must obtain a minimum of 40% of the AGGREGATE of the marks/weightage of all assessment components in the concerned Course.

2.1.3 A student who fails to meet the minimum performance criteria listed above in a Course shall be declared as "Fail" and given "F" Grade in the concerned Course. For theory Courses, the student shall have to re-appear in the "Make-Up Examinations" as scheduled by the University in any subsequent semester, or, re-appear in the End Term Examinations of the same Course when it is scheduled at the end of the following Semester or Summer Term, if offered. The marks obtained in the Continuous Assessments (other than the End Term Examination) shall be carried forward and be included in computing the final grade, if the student secures the minimum requirements (as per sub Clauses 8.9.1 and 8.9.2 of academic regulations) in the "Make-Up Examinations" of the concerned Course. Further, the student has an option to re-register for the Course and clear the same in the summer term/ subsequent semester if he/she wishes to do so, provided the Course is offered.

13 Additional clarifications - Rules and Guidelines for Transfer of Credits from MOOC, etc. – Note: These are covered in Academic Regulations

The University allows students to acquire credits from other Indian or foreign institutions and/or Massive Open Online Course (MOOC) platforms, subject to prior approval. These credits may be transferred and counted toward fulfilling the minimum credit requirements for the award of a degree. The process of transfer of credits is governed by the following rules and guidelines:

- **3.1** The transfer of credits shall be examined and recommended by the Equivalence Committee (Refer ANNEXURE B of academic regulations) and approved by the Dean Academics.
- **3.2** Students may earn credits from other Indian or foreign Universities/Institutions with which the University has an MOU, and that MOU shall have specific provisions, rules and guidelines for transfer of credits. These transferred credits shall be counted towards the minimum credit requirements for the award of the degree.
- **3.3** Students may earn credits by registering for Online Courses offered by *Study Web of Active Learning by Young and Aspiring Minds* (SWAYAM) and *National Program on Technology Enhanced Learning* (NPTEL), or other such recognized Bodies/ Universities/Institutions as approved by the concerned BOS and Academic Council from time to time. The concerned School/Parent Department shall publish/include the



approved list of Courses and the rules and guidelines governing such transfer of credits of the concerned Program from time to time. The Rules and Guidelines for the transfer of credits specifically from the Online Courses conducted by SWAYAM/ NPTEL/ other approved MOOCs are as stated in the following Sub-Clauses:

- **3.3.1** A student may complete SWAYAM/NPTEL/other approved MOOCs as mentioned in Clause 17.3 (as per academic regulations) and transfer equivalent credits to partially or fully complete the mandatory credit requirements of Discipline Elective Courses and/or the mandatory credit requirements of Open Elective Courses as prescribed in the concerned Curriculum Structure. However, it is the sole responsibility of the student to complete the mandatory credit requirements of the Discipline Elective Courses and the Open Elective Courses as prescribed by the Curriculum Structure of the concerned Program.
- **3.3.2** SWAYAM/NPTEL/ other approved MOOCs as mentioned in Clause 17.3 (as per academic regulations) shall be approved by the concerned Board of Studies and placed (as Annexures) in the concerned PRC.
- **3.3.3** Parent Departments may release a list of SWAYAM/NPTEL/other approved MOOCs for Pre-Registration as per schedule in the Academic Calendar or through University Notification to this effect.
- **3.3.4** Students may Pre-Register for the SWAYAM/NPTEL/other approved MOOCs in the respective Departments and register for the same Courses as per the schedule announced by respective Online Course Offering body/institute/ university.
- **3.3.5** A student shall request for transfer of credits only from such approved Courses as mentioned in Sub-Clause 3.3.2 above.
- **3.3.6** SWAYAM/NPTEL/other approved MOOCs Courses are considered for transfer of credits only if the concerned student has successfully completed the SWAYAM/NPTEL/other approved MOOCs and obtained a certificate of successful/satisfactory completion.
- **3.3.7** A student who has successfully completed the approved SWAYAM/NPTEL/ other approved MOOCs and wants to avail the provision of transfer of equivalent credits, must submit the original Certificate of Completion, or such similar authorized documents to the HOD concerned, with a written request for the transfer of the equivalent credits. On verification of the Certificates/Documents and approval by the HOD concerned, the Course(s) and equivalent Credits shall forwarded to the COE for processing of results of the concerned Academic Term.
- **3.3.8** The credit equivalence of the SWAYAM/NPTEL/other approved MOOCs are based on Course durations and/or as recommended by the Course offering body/institute/university. The Credit Equivalence mapped to SWAYAM/ NPTEL approved Courses based on Course durations for transfer of credits is summarised in Table shown below. The Grade will be calculated from the



marks received by the Absolute Grading Table 8.11 in the academic regulations.

	Table 2: Durations and Credit Equivalence for Transfer ofCredits from SWAYAM-NPTEL/ other approved MOOC Courses									
SI. No.	Course Duration	Credit Equivalence								
1	4 Weeks	1 Credit								
2	8 Weeks	2 Credits								
3	12 Weeks	3 Credits								

- **3.3.9** The maximum permissible number of credits that a student may request for credit transfer from MOOCs shall not exceed 20% of the mandatory minimum credit requirements specified by the concerned Program Regulations and Curriculum for the award of the concerned Degree.
- **3.3.10** The University shall not reimburse any fees/expense; a student may incur for the SWAYAM/NPTEL/other approved MOOCs.
- **3.4** The maximum number of credits that can be transferred by a student shall be limited to forty percent (40%) of the mandatory minimum credit requirements specified by the concerned Program Regulations and Curriculum for the award of the concerned Degree. However, the grades obtained in the Courses transferred from other Institutions/MOOCs, as mentioned in this Section (13.0) included in the calculation of the CGPA.

PART B – PROGRAM STRUCTURE

14. Structure / Component with Credit Requirements Course Baskets & Minimum Basket wise Credit Requirements

The B.Tech. (Computer Science and Engineering-Block Chain) Program Structure (2025-2029) totalling 160 credits. Table 3.0 summarizes the type of baskets, number of courses under each basket and the associated credits that are mandatorily required for the completion of the Degree.

	Table 3: B.Tech. (Computer Science and Engineering Block Chain) 2025- 2029: Summary of Mandatory Courses and Minimum Credit Contribution from various Baskets										
SI. No.	Baskets	Credit Contribution									
1	Humanities and Social Sciences including Management Courses (HSMC)	10									
2	Basic Science Courses (BSC)	24									
3	Engineering Science Courses (ESC)	22									
4	Professional Core Courses (PCC)	64									



	Table 3: B.Tech. (Computer Science and Engineering Block Chain) 2025-2029: Summary of Mandatory Courses and Minimum Credit Contributionfrom various Baskets								
SI.BasketsCreditNo.CreditContribut									
5	Professional Elective Courses (PEC)	18							
6	Open Elective Courses (OEC)	06							
7	Project Work (PRW)	16							
8	Mandatory Courses (MAC)	0							
	Total Credits	160 (Minimum)							

In the entire Program, the practical and skill based course component contribute to an extent of approximately 57% out of the total credits of 160 for B.Tech. (Computer Science and Engineering Block Chain) program of four years' duration.

15. Minimum Total Credit Requirements of Award of Degree

As per the AICTE guidelines, a minimum of 160 credits is required for the award of a B.Tech. degree.



16.Other Specific Requirements for Award of Degree, if any, as prescribed by the Statutory Bodies,

- 16.1 The award of the Degree shall be recommended by the Board of Examinations and approved by the Academic Council and Board of Management of the University.
- 16.2 A student shall be declared to be eligible for the award of the concerned Degree if she/he:
 - a. Fulfilled the Minimum Credit Requirements and the Minimum Credits requirements under various baskets;
 - b. Secure a minimum CGPA of 4.50 in the concerned Program at the end of the Semester/Academic Term in which she/he completes all the requirements for the award of the Degree as specified in Sub-Clause 19.2.1 a of Academic Regulations;
 - c. No dues to the University, Departments, Hostels, Library, and any other such Centers/ Departments of the University; and
 - d. No disciplinary action is pending against her/him.

17.Curriculum Structure – Basket Wise Course List (not Semester Wise) List of Courses Tabled – aligned to the Program Structure (Course Code, Course Name, Credit Structure (LTPC), Contact Hours, Course Basket, Type of Skills etc., as applicable).

 Table 3.1 : List of Humanities and Social Sciences including Management

	Courses (HSMC)										
S.No	Course Code	Course Name	L	т	Р	С	Contact Hours	Type of skill	Pre Requisite		
1	ENG1002	Technical English	1	0	2	2	3	S			
2	PPS1001	Introduction to soft skills	0	0	2	1	2	S			
3	DES1146	Introduction to Design Thinking	1	0	0	1	1	F			
4	ENG2001/ FRLXXXX	Advanced English / Foreign Language courses	1	0	2	2	3	S	ENG1002		
5	PPS1012	Enhancing Personality Through Soft Skills	0	0	2	1	2	S			
6	BBA1055	Managerial Economics and Financial Analysis	3	0	0	3	3	S			
			Total I	No. of C	redits	10					



		Table 3.2 : Lis	t of Bas	sic Scie	nce Co	urses (E	BSC)		
S.No	Course Code	Course Name	L	т	Р	С	Conact Hours	Type of Skill	Pre- requisite
1	MAT2301	Calculus and Differential Equations	3	1	0	4	4	F	-
2	PHY2501	Optoelectronics and Quantum Physics	3	0	0	3	3	F	-
3	PHY2504	Optoelectronics and Quantum Physics Lab	0	0	2	1	2	F	-
4	MAT2402	Probability and Statistics	3	1	0	4	4	F	-
5	CHE2501	Chemistry of Smart Materials	3	0	0	3	3	S	-
6	CHE2502	Chemistry of Smart Materials Lab	0	0	2	1	2	S	-
7	MAT2303	Linear Algebra and Vector Calculus	3	1	0	4	4	EM	-
8	MAT2404	Discrete Mathematics	3	1	0	4	4	F	-
			Total N	o. of C	redits	24			

	Table 3.3 :	List of Engineering So	cience	Course	es (ES	C)			
S.No	Course Code	Course Name	L	Т	Р	С	Contact Hours	Type of Skill	Pre- requisite
1	MEC1006	Engineering Graphics	2	0	0	2	2	S	-
2	CSE1500	Computational Thinking using Python	2	0	2	3	4	S	-
3	ECE2022	Digital Design	2	0	0	2	2	F/S	-
4	ECE2052	Digital Design Lab	0	0	2	1	2	F/S	-
5	CIV1200	Foundations of Integrated Engineering	2	0	0	2	2	S	-
6	EEE1200	Basics of Electrical and Electronics Engineering	3	0	0	3	3	F/S	-
7	EEE1250	Basics of Electrical and	0	0	2	1	2	F/S	-



		Electronics Engineering Lab							
8	ECE1511	Design Workshop	1	0	2	2	3	S/EM	-
9	CSE2264	Essentials of Al	3	0	0	3	3	S/EM	-
10	CSE2265	Essentials of Al Lab	0	0	2	1	2	S/EM	-
11	CSE2274	Competitive Programming and Problem Solving	0	0	4	2	4	S/EM	-
	Total No. of Credits								

		Table 3.4 : List of P	rofessi	onal Co	ore Cou	ırses (F	PCC)		
S.No	Course Code	Course Name	L	Т	Ρ	С	Contact Hours	Type of Skill	Pre- requisite
1	CSE2200	Problem Solving using C	2	0	0	2	2	S	-
2	CSE2201	Problem Solving using C Lab	0	0	4	2	4	S	-
3	CSE2251	Data Communication and Computer Networks	3	0	0	3	3	S	-
4	CSE2252	Data Communication and Computer Networks Lab	0	0	2	1	2	S	-
5	CSE2253	Data Structures	3	0	0	3	3	S	-
6	CSE2254	Data Structures Lab	0	0	2	1	2	S	-
7	CSE2255	Object Oriented Programming Using Java	3	0	0	3	3	S/EM	-
8	CSE2256	Object Oriented Programming Using Java Lab	0	0	2	1	2	S/EM	-
9	CSE2257	Computer Organization and Architecture	3	0	0	3	3	S	-
10	CBC2000	Foundations of Blockchain Technology	3	0	0	3	3	S/EM	-
11	CSE2271	Software Design and Development	3	0	0	3	3	S	-
12	CSE2258	Web Technologies	3	0	0	3	3	S/EM	-
13	CSE2259	Web Technologies Lab	0	0	2	1	2	S/EM	-



14	CSE2260	Database Management Systems	3	0	ο	3	3	S	-
15	CSE2261	Database Management Systems Lab	0	0	2	1	2	S	-
16	CSE2262	Analysis of Algorithms	3	1	0	4	4	S	-
17	CSE2263	Analysis of Algorithms Lab	0	0	2	1	2	S	-
18	CSE2266	Theory of Computation	3	0	0	3	3	S	-
19	CSE2502	Cryptography and Network Security	3	0	0	3	3	S	CSE2051
20	CSE2269	Operating Systems	3	0	0	3	3	S	Nil
21	CSE2270	Operating Systems Lab	0	0	2	1	2	S/EM	Nil
22	CBC2500	Smart Contract and Solidity	3	0	0	3	3	S/EM	СВС2000
23	CBC2501	Smart Contract and Solidity Lab	0	0	2	1	2	S/EM	CBC2000
24	CBC2502	Distributed Ledger Technology	3	0	0	3	3	S/EM	CBC2000
25	CBC2503	Distributed Ledger Technology Lab	0	0	2	1	2	S/EM	CBC2000
26	CBC2504	Blockchain Security and Performance	3	0	0	3	3	S/EM	CBC2000
27	CBC2505	Blockchain Security and Performance Lab	0	0	4	2	4	S/EM	CBC2000
28	CBC2506	Blockchain Architecture Design	3	0	0	3	3	S/EM	CBC2000
		•	Total N	64					



Table 3.5 : List of course in Project Work basket (PRW)										
S.No	Course Name	L	Т	Р	С					
1	Capstone Project	0	0	0	10					
2	Internship	0	0	0	2					
3	Mini Project	0	0	0	4					
		т	otal No. o	of Credits	16					

18.Practical / Skill based Courses – Internships / Thesis / Dissertation / Capstone Project Work / Portfolio / Mini project

Practical / Skill based Courses like internship, project work, capstone project, research project / dissertation, and such similar courses, where the pedagogy does not lend itself to a typical L-T-P-C Structure as defined in Clause 5.1 of the Academic Regulations, are simply assigned the number of Credits based on the quantum of work / effort required to fulfill the learning objectives and outcomes prescribed for the concerned Courses. Such courses are referred to as Non-Teaching Credit Courses (NTCC). These Courses are designed to provide students with hands-on experience and skills essential for their professional development. These courses aim to equip students with abilities in problem identification, root cause analysis, problem-solving, innovation, and design thinking through industry exposure and project-based learning. The expected outcomes are first level proficiency in problem solving and design thinking skills to better equip B.Tech. graduates for their professional careers. The method of evaluation and grading for the Practical / Skill based Courses shall be prescribed and approved by the concerned Departmental Academic Committee (refer Annexure A of the Academic Regulations). The same shall be prescribed in the Course Handout.

18.1 Internship

A student may undergo an Internship for a period of 4-6 weeks in an industry / company or academic / research institution during the Semester Break between 4th and 5th Semesters or 6th and 7th Semesters, subject to the following conditions:

18.1.1 The Internship shall be in conducted in accordance with the Internship Policy prescribed by the University from time to time.

18.1.2 The selection criteria (minimum CGPA, pass in all Courses as on date, and any other qualifying criteria) as applicable / stipulated by the concerned Industry / Company or academic / research institution for award of the Internship to a student;

18.1.3 The number of Internships available for the concerned Academic Term. Further, the available number of internships shall be awarded to the students by the University on the basis of merit using the CGPA secured by the student. Provided further, the student fulfils the criteria, as applicable, specified by the Industry / Company or academic / research institution providing the Internship, as stated in Sub-Clause **18.1.2** above.

18.1.4 A student may opt for Internship in an Industry / Company or academic / research institution of her / his choice, subject to the condition that the concerned student takes the responsibility to arrange the Internship on her / his own. Provided further, that the Industry / Company or academic / research institution offering such Internship confirms to the University



that the Internship shall be conducted in accordance with the Program Regulations and Internship Policy of the University.

18.1.5 A student selected for an Internship in an industry / company or academic / research institution shall adhere to all the rules and guidelines prescribed in the Internship Policy of the University.

18.2 Mini Project

A student may opt to do a Mini Project for a period of 6-8 weeks in an Industry / Company or academic / research institution or the University Department(s) during the Semester Break between 4th and 5th Semesters or 6th and 7th Semesters or during the 5th / 6th / 7th Semester as applicable, subject to the following conditions:

18.2.1 The Mini Project shall be approved by the concerned HOD and be carried out under the guidance of a faculty member.

18.2.2 The student may do the project work in an Industry / Company or academic / research institution of her / his choice subject to the above mentioned condition (Sub-Clause 18.2.1). Provided further, that the Industry / Company or academic / research institution offering such project work confirms to the University that the project work will be conducted in accordance with the Program Regulations and requirements of the University.

18.3 Capstone Project

A student may undergo a Capstone Project for a period of 12-14 weeks in an industry / company or academic / research institution in the 7th / 8th Semester as applicable, subject to the following conditions:

18.3.1 The Capstone Project shall be in conducted in accordance with the Capstone Project Policy prescribed by the University from time to time.

18.3.2 The selection criteria (minimum CGPA, pass in all Courses as on date, and any other qualifying criteria) as applicable / stipulated by the concerned Industry / Company or academic / research institution for award of the Capstone Project to a student;

18.3.3 The number of Capstone Project available for the concerned Academic Term. Further, the available number of Capstone Project shall be awarded to the students by the University on the basis of merit using the CGPA secured by the student. Provided further, the student fulfils the criteria, as applicable, specified by the Industry / Company or academic / research institution providing the Capstone Project, as stated in Sub-Clause 18.3.2 above.

18.3.4 A student may opt for Capstone Project in an Industry / Company or academic / research institution of her / his choice, subject to the condition that the concerned student takes the responsibility to arrange the I Capstone Project on her / his own. Provided further, that the Industry / Company or academic / research institution offering such Capstone Project confirms to the University that the Capstone Project shall be conducted in accordance with the Program Regulations and Capstone Project Policy of the University.

18.3.1.5 A student selected for a Capstone Project in an industry / company or academic / research institution shall adhere to all the rules and guidelines prescribed in the Capstone Project Policy of the University.



18.4 Research Project / Dissertation

A student may opt to do a Research Project / Dissertation for a period of 12-14 weeks in an Industry / Company or academic / research institution or the University Department(s) as an equivalence of Capstone Project, subject to the following conditions:

18.4.1 The Research Project / Dissertation shall be approved by the concerned HOD and be carried out under the guidance of a faculty member.

The student may do the Research Project / Dissertation in an Industry / Company or academic / research institution of her / his choice subject to the above mentioned condition (Sub-Clause 18.4.1). Provided further, that the Industry / Company or academic / research institution offering such Research Project / Dissertation confirms to the University that the Research Project / Dissertation work will be conducted in accordance with the Program Regulations and requirements of the University.

19.List of Elective Courses under various Specialisations / Stream Basket

Table 3.6 : Professional Electives Courses/Specialization Tracks – Minimum of 12 credits is to be earned by the student in a particular track and overall 18 credits.
creates is to be earlied by the student in a particular track and over an 10 creates.
Track -1 Block Chain with Cryptocurrency

SI.No		Semester	New Course Code	Course Name	L	т	Ρ	С	Type of Skill	Prerequisite	Type of course
1	PEC-	Sem V	CBC3400	Cryptography and Security in Blockchain	3	0	0	3	S/ EM	Nil	PEC
2	PEC- II	Sem VI	CSE3426	Front End Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
2	PEC- III	Sem VI	CSE3427	Java Full Stack Development	2	0	2	3	S/ EM	CSE1514	PEC
3	PEC- III	Sem VI	CSE3428	.Net Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
	PEC- IV	Sem VII	CBC3401	Crypto Trading Strategies & Risk Management	3	0	0	3	S/EM	Nil	PEC
4	PEC- IV	Sem VII	CBC3402	Bitcoin and Ethereum Protocols	3	0	0	3	S/EM	Nil	PEC
	PEC- IV	Sem VII	CAI3427	Language Models for Text Mining	2	0	2	3	S/ EM	CSE2064	PEC
5	PEC- V	Sem VII	CBC3403	Blockchain for Digital Identity Management	3	0	0	3	S	Nil	PEC



			CH GHEATER HEIGHTS		-			-			
	PEC- V	Sem VII	CBC3404	Cryptocurrency Wallet Development	3	0	0	3	S	Nil	PEC
	PEC- V	Sem VII	CAI3428	Practical Deep Learning with TensorFlow	2	0	2	3	S/ EM	CSE2064	PEC
6	PEC- VI	Sem VII	CBC3405	Blockchain Security & Ethical Hacking	3	0	0	3	S/EM	Nil	PEC
0	PEC- VI	Sem VII	CAI3429	Deep Learning for Computer Vision	2	0	2	3	S/ EM	MAT2402	PEC
Track	-2 Bloc	ck Chain wi	th Al								
SI.No			New Course Code	Course Name	L	т	Ρ	с	Type of Skill	Prerequisite	Type of course
1	PEC- I	Sem V	CBC3406	Introduction to Artificial Intelligence in Block Chain	3	0	0	3	S/ EM	Nil	PEC
2	PEC- II	Sem VI	CSE3426	Front End Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
3	PEC- III	Sem VI	CSE3427	Java Full Stack Development	2	0	2	3	S/ EM	CSE1514	PEC
	PEC- III	Sem VI	CSE3428	.Net Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
	PEC- IV	Sem VII	CBC3407	Machine Learning for Cyber Threat Detection	3	0	0	3	S/EM	Nil	PEC
4	PEC- IV	Sem VII	CBC3408	Al-Powered Fraud Detection in Blockchain	3	0	0	3	S/EM	Nil	PEC
	PEC- IV	Sem VII	CAI3427	Language Models for Text Mining	2	0	2	3	S/ EM	CSE2064	PEC
	PEC- V	Sem VII	CBC3409	Optimizing Blockchain Networks with Al	3	0	0	3	S	Nil	PEC
5	PEC- V	Sem VII	CBC3410	Generative AI for Blockchain Applications	3	0	0	3	S	Nil	PEC
	PEC- V	Sem VII	CAI3428	Practical Deep Learning with TensorFlow	2	0	2	3	S/ EM	CSE2064	PEC
6	PEC- VI	Sem VII	CBC3411	Quantum Computing & Blockchain-Al Security	3	0	0	3	S/EM	Nil	PEC
	PEC- VI	Sem VII	CAI3429	Deep Learning for Computer Vision	2	0	2	3	S/ EM	MAT2402	PEC
Track	3 - De	centralized	l Finance (DeFi) for Block Chain							



SI.No			New Course Code	Course Name	L	т	Р	с	Type of Skill	Prerequisite	Type of course
1	PEC-	Sem V	CBC3412	Introduction to Decentralized Finance (DeFi)	3	0	0	3	S/ EM	Nil	PEC
2	PEC- II	Sem VI	CSE3426	Front End Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
3	PEC- III	Sem VI	CSE3427	Java Full Stack Development	2	0	2	3	S/ EM	CSE1514	PEC
	PEC- III	Sem VI	CSE3428	.Net Full Stack Development	2	0	2	3	S/ EM	CSE1504	PEC
	PEC- IV	Sem VII	CBC3413	Blockchain in Financial Services	3	0	0	3	S/EM	Nil	PEC
4	PEC- IV	Sem VII	CBC3414	Building Decentralized Applications (DApps) for Finance	3	0	0	3	S/EM	Nil	PEC
	PEC- IV	Sem VII	CAI3427	Language Models for Text Mining	2	0	2	3	S/ EM	CSE2064	PEC
	PEC- V	Sem VII	CBC3415	Smart Contracts for Financial Products	3	0	0	3	S	Nil	PEC
5	PEC- V	Sem VII	CBC3416	Decentralized Autonomous Organizations and Risk Management in Finance	3	0	0	3	S	Nil	PEC
	PEC- V	Sem VII	CAI3428	Practical Deep Learning with TensorFlow	2	0	2	3	S/ EM	CSE2064	PEC
6	PEC- VI	Sem VII	CBC3417	Regulatory and Compliance Challenges in DeFi	3	0	0	3	S/EM	Nil	PEC
	PEC- VI	Sem VII	CAI3429	Deep Learning for Computer Vision	2	0	2	3	S/ EM	MAT2402	PEC

Track -4 Mandatory Non Credited Course (** Offered for Lateral Entry students in higher semester whereever applicable in MOOC mode)

SI.No		Course Code	Course Name	L	т	Ρ	с	Type of Skill	Prerequisite
1		LAW1007	Indian Constitution and Professional Ethics for Engineers	1	0	0	0	F	-



2		CHE7601	Environmental Studies **	0	0	0	0	F	-
3		XXXXXXX	Universal Human Values **	0	0	0	0	F	-



20.List of Open Electives to be offered by the School / Department (Separately for ODD and EVEN Semesters.

No. Chemist 1 CH 2 CH 3 CH 4 CH 5 CH 6 CH 7 CH 3 CH 10 CH 11 CH	HE1004 HE1005 HE1006 HE1007 HE1008 HE1009 HE1010 HE1011	t Fundamentals of Sensors Smart materials for IOT Computational Chemistry Introduction to Nano technology Biodegradable electronics Energy and Sustainability 3D printing with Polymers Bioinformatics and Healthcare IT	L 3 3 2 3 2 2 2	T 0 0 0 0	P 0 0	3	Type of Skill/ Focus	Course Caters to ES ES	Core quisit es	requ	Future Course s that need this as a Prereq uisite
1 C⊢ 2 C⊢ 3 C⊢ 4 C⊢ 5 C⊢ 5 C⊢ 7 C⊢ 3 C⊢ 9 C⊢ 10 C⊢ 11 C⊢	HE1003 HE1004 HE1005 HE1006 HE1007 HE1008 HE1009 HE1010 HE1011	Fundamentals of Sensors Smart materials for IOT Computational Chemistry Introduction to Nano technology Biodegradable electronics Energy and Sustainability 3D printing with Polymers	3 2 3 2	0 0	0	3			-	-	
2 CH 3 CH 4 CH 5 CH 5 CH 7 CH 3 CH 9 CH 10 CH 11 CH	HE1004 HE1005 HE1006 HE1007 HE1008 HE1009 HE1010 HE1011	Smart materials for IOT Computational Chemistry Introduction to Nano technology Biodegradable electronics Energy and Sustainability 3D printing with Polymers	3 2 3 2	0 0	0	3			-	-	
3 C⊢ 5 C⊢ 5 C⊢ 7 C⊢ 3 C⊢ 9 C⊢ 10 C⊢ 11 C⊢	HE1005 HE1006 HE1007 HE1008 HE1009 HE1010 HE1011	Computational Chemistry Introduction to Nano technology Biodegradable electronics Energy and Sustainability 3D printing with Polymers	2 3 2	0			S	EC			
4 CH 5 CH 6 CH 7 CH 8 CH 9 CH 10 CH 11 CH	HE1006 HE1007 HE1008 HE1009 HE1010 HE1011	Introduction to Nano technology Biodegradable electronics Energy and Sustainability 3D printing with Polymers	3 2		0				-	-	-
5 CH 6 CH 7 CH 8 CH 9 CH 10 CH	HE1007 HE1008 HE1009 HE1010 HE1011	Biodegradable electronics Energy and Sustainability 3D printing with Polymers	2	0			S	ES	-	-	-
5 CH 7 CH 3 CH 9 CH 10 CH	HE1008 HE1009 HE1010 HE1011	Energy and Sustainability 3D printing with Polymers	2 2		0		S	ES	-	-	-
7 CH 3 CH 9 CH 10 CH 11 CH	HE1009 HE1010	3D printing with Polymers	2	0	0	2	S	ES	-	-	-
7 CH 3 CH 9 CH 10 CH 11 CH	HE1009 HE1010	3D printing with Polymers		0	0	2	S	ES	-	-	-
3 C⊢ Э C⊢ 10 C⊢ 11 C⊢	HE1010		2	0	0	2	S	ES	-	-	-
9 C⊢ 10 C⊦ 11 C⊦	HE1011		2	0	0	2	S	ES	-	-	-
11 CH		Chemical and Petrochemical catalysts	3	0	0		S	ES	-	-	-
	JE1012	Introduction to Composite materials	2	0	0	2	S	ES	-	-	-
		Chemistry for Engineers	3	0	0	3	S	ES	-	-	-
12 C⊢		Surface and Coatings technology	3	0	0		S	ES	-	-	-
		Waste to Fuels	2	0	0		S	ES	-	-	-
		Forensic Science	3	0	0		S	ES	_	-	-
	gineering		5	U	U	5	5	10	<u>i </u>		
		Disaster mitigation and			1						
1 CI	101001	management	3	0	0	3	S	-	-	-	-
2 CI	101002	Environment Science and Disaster Management	3	0	0	3	FC	-	-	-	-
	102001	Sustainability Concepts in Engineering	3	0	0		S	-	-	-	-
4 CI	IV2002	Occupational Health and Safety	3	0	0	3	S	-	-	-	
5 CI		Sustainable Materials and Green Buildings	3	0	0	3	EM	-	-	-	-
5 CI	IV2004	Integrated Project Management	3	0	0	3	EN	-	-	-	-
		Environmental Impact Assessment	3	0	0	3	EN	-	-	-	-
B CI	1/2006	Infrastructure Systems for Smart Cities	3	0	0	3	EN	-	-	-	-
Ə CI		Geospatial Applications for Engineers	2	0	2	3	EM	-	-	-	-
10 CI		Environmental Meteorology	3	0	0	3	S	-	-	-	-
		Project Problem Based Learning	3	0	0		S	-	_	-	-
	1/3020	Sustainability for Professional Practice	3	0	0		EN	-	-	-	-
Comme	rce Baske		1						I		
	CM2001	Introduction to Human Resource Management	2	0	0	2	F	HP/GS	-	-	-
2 CC		Finance for Non Finance	2	0	0	2	S	-	-	-	-
		Contemporary Management	2	0	0		F	-	-	-	-
		Introduction to Banking	2	0	0		r F	_	_	_	_
		Introduction to Insurance	2	0	0		F	-	_	-	_
		Fundamentals of Management	2	0	0		F	_	_	-	
		Basics of Accounting	2	0	0		F		-	_	
	ter Scienc		5	U	U	5	!		<u> </u>		



		REACH GHEATER HEIGHTS	_		-	_		and the second s			
1	CSE2002	Programming in Java	2	0	2	3	S/EM	-	-	-	-
2	CSE2003	Social Network Analytics	3	0	0	3	S	GS	-	-	-
3	CSE2004	Python Application Programming	2	0	2	3	S/ EM	-	-	-	-
4	CSE2005	Web design fundamentals	2	0	2	3	S/ EM/EN	-	-	-	-
5	CSE3111	Artificial Intelligence : Search Methods For Problem Solving	3	0	0	3	S/ EM/EN	-	-	-	-
6	CSE3112	Privacy And Security In Online Social Media	3	0	0	3	S/ EM/EN	-	-	-	-
7	CSE3113	Computational Complexity	3	0	0	3	S/ EM/EN	-	-	-	-
8	CSE3114	Deep Learning for Computer Vision	3	0	0	3	S/ EM/EN	-	-	-	-
9	CSE3115	Learning Analytics Tools	3	0	0	3	S/ EM/EN	-	-	-	-
Desid	an Basket					1				l	<u> </u>
1	DES1001	Sketching and Painting	0	0	2	1	S	-	-	-	-
2	DES1001	Innovation and Creativity	2	0	0	2	F	-	_	_	_
3	DES1002	Introduction to UX design	1	0	2	2	S	_	_	_	_
4	DES1121	Introduction to Jewellery Making	1	0	2	2	S			_	_
4 5			1	0	2 2	2 2	S	-	-	-	-
	DES1124	Spatial Stories	_		2	2		-	-	-	-
6	DES1125	Polymer Clay	1	0	2	2	S	-	-	-	-
7	DES2001	Design Thinking	3	0	0	3	S	-	-	-	-
8	DES1003	Servicability of Fashion Products	1	0	2	2	F	ES	-	-	-
9	DES1004	Choices in Virtual Fashion	1	0	2	2	F	ES, GS, HP	-	-	-
10	DES1005	Fashion Lifestyle and Product Diversity	1	0	2	2	F	ES, GS, HP	-	-	-
11	DES1006	Colour in Everyday Life	1	0	2	2	F	ES	-	-	-
12	DES2080	Art of Design Language	3	0	0	3	S	-	-	-	-
13	DES2081	Brand Building in Design	3	0	0	3	S	-	-	-	-
14	DES2085	Web Design Techniques	3	0		3	S	-	-	-	-
15	DES2089	3D Modeling for Professionals	1		4	3	S	-	-	_	-
16	DES2090	Creative Thinking for Professionals	3	0	0	3	S	-	-	-	-
17	DES2090	Idea Formulation	3	0	0	3	S	_	-	_	
-		1	5	U	U	5	5	-	_	_	
Elect		ectronics Basket		1		1			1		1
1	EEE1002	IoT based Smart Building Technology	3	0	0	3	S	-	-	-	-
2	EEE1003	Basic Circuit Analysis	3	0	0	3	S	-	-	-	-
3	EEE1004	Fundamentals of Industrial Automation	3	0	0	3	s	-	-	-	-
4	EEE1005	Electric Vehicles & Battery Technology	3	0	0	3	s	-	-	-	-
5	EEE1006	Smart Sensors for Engineering Applications	3	0	0	3	s	-	-	-	-
Flect	ronics and i	Communication Basket	\vdash	I	I	I	1	1	1	1	L
1	ECE1003	Fundamentals of Electronics	3	0	0	3	F	_	1_	_	
1 2	ECE1003		3	0	0	3	F	_		E	
2		Microprocessor based systems		0	0		r S	<u> </u>	-	<u> </u>	-
3	ECE3089	Artificial Neural Networks	3					-	-	-	
4	ECE3097	Smart Electronics in Agriculture	3	0			F/EM	-	-	-	-
5	ECE3098	Environment Monitoring Systems	3	0			F/EM	-	-	-	-
6	ECE3102	Consumer Electronics	3	0	0	3	F/EM	-	-	-	-
7	ECE3103	Product Design of Electronic Equipment	3	0	0	3	S/F/ EM / EN	-	-	-	-
8	ECE3106	Introduction to Data Analytics	3	0	0	3	F/EM	_		<u> </u>	
			3	0			F/EM	-	-	-	
9 5 m m li	ECE3107	Machine Vision for Robotics	5	U	U	٢	୮/ ⊏™	-	-	-	<u> -</u>
Engli	sh Basket										



		REACH GREATER HEIGHTS	_		-	_					
1	ENG1008	Indian Literature	2	0	0	2	-	GS/ HP	-	-	-
2	ENG1009	Reading Advertisement	3	0	0	3	S	-	-	-	-
3	ENG1010	Verbal Aptitude for Placement	2	0	2	3	S	-	-	-	-
4		English for Career Development	3	0	0	3	S	-	-	-	-
5		Gender and Society in India	2		0	2	-	GS/ HP	-	-	-
6		Indian English Drama	3	0	0	3	-	-	-	-	-
7	ENG1014	Logic and Art of Negotiation	2	0	2	3	-	-	-	-	-
		Professional Communication Skills									
8	ENG1015	for Engineers	1	0	0	1	-	-	-	-	-
	Basket										
1 1	-	Spirituality for Health	2	0	0	2	F	HP			
1			2	0	0	2	г S	HP	-	-	-
2		Yoga for Health			0		F	1	-	-	-
3		Stress Management and Well Being	2	0	0	Z	F	-	-	-	-
	ada Basket			-	-		-	1			
1		Kali Kannada	1	0	0	1	S	-	-	-	-
2	KAN1003	Kannada Kaipidi	3	0	0	3	S	-	-	-	-
3	KAN2001	Thili Kannada	1	0	0	1	S	-	-	-	-
4	KAN2003	Pradharshana Kale	1	0	2	2	S	-	-	-	-
5	KAN2004	Sahithya Vimarshe	2	0	0	2	S	-	-	-	-
6	KAN2005	Anuvadha Kala Sahithya	3	0	0	3	S	-	-	-	-
7		Vichara Manthana	3	0	0	3	S	-	-	-	-
8		Katha Sahithya Sampada	3	0	0	3	S	-	-	-	-
9		Ranga Pradarshana Kala	3	0	0	3	S	-	-	-	-
	gn Languag			Ŭ	Ŭ	0					1
1		Introduction of French Language	2	0	0	2	S	S	_	_	_
2	FRL1004	Fundamentals of French	2	0	0	2	S S	S	_	l_	_
2	FRL1009	Mandarin Chinese for Beginners	2	0	0	2	S	S	_		_
-	Basket	Manual III Chinese for Beginners	5	U	U	5	5	5	-	-	-
		Introduction to Conjulary	2	0	0	0	2	_			
1	LAW1001	Introduction to Sociology	2	0	0	0	2	F	HP	-	-
2	LAW2001	Indian Heritage and Culture	2	0	0	0	2	F	HP/G	-	-
									S		
3	LAW2002	Introdcution to Law of Succession	2	0	0	0	2	F	HP/G	-	-
			_					_	S		
4		Introduction to Company Law	2	0	0	0	2	F	HP	-	-
5		Introduction to Contracts	2	-	0		F	HP	-	-	-
6		Introduction to Copy Rights Law	2	0	0		F	HP	-	-	-
7		Introduction to Criminal Law	2	0	0	2	F	HP	-	-	-
8		Introduction to Insurance Law	2	0	0	2	F	HP	-	-	-
9	LAW2008	Introduction to Labour Law	2	0	0	2	F	HP	-	-	-
10	LAW2009	Introduction to Law of Marriages	2	0	0	2	F	HP/GS	-	-	-
11	LAW2010	Introduction to Patent Law	2	0	0	2	F	HP	-	-	-
12		Introduction to Personal Income		_	_	2	F	ЦБ			
12	LAW2011	Тах	2	0	0	2	F	HP	-	-	-
13	LAW2012	Introduction to Real Estate Law	2	0	0	2	F	HP	-	-	-
14		Introduction to Trademark Law	2	0	0	2	F	HP	-	-	-
15		Introduction to Competition Law	3	0	0		F	HP	_	-	_
16			3	0	0	3	F	HP	_	-	_
17	LAW2015		2	0	0	2	F	HP/GS	_	_	
18	LAW2010	Media Laws and Ethics	2	0	0	2	F	HP/GS	_	<u> </u>	
	ematics Bas		2	U	U	12	Ιi I	05	1-	I	-
			2	0	0	2	C				
1	MAT2008	Mathematical Reasoning	3	0	0	3 3	S	-	-	-	-
2	MAT2014	Advanced Business Mathematics	3	0	0		S	-	-	-	-
3	MAT2041	Functions of Complex Variables	3	0	0	3	S	-	-	-	-
4	MAT2042	Probability and Random Processes	3	0	0	3	S	-	-	-	-
5	MAT2043	Elements of Number Theory	3	0	0	3	S	-	-	-	-
6	MAT2044	Mathematical Modelling and	3	0	0	3	S	_	_	L	
9		Applications	<u>ر</u>	Ľ	Ľ	5	5				



Moch	anical Back	eet (not to be offered for Mechanical			-	-					
	rtment stud										
1	MEC1001	Fundamentals of Automobile Engineering	3	0	0	3	F	-	-	-	-
2	MEC1002	Introduction to Matlab and Simulink	3	0	0	3	S/EM	-	_	-	_
3		Engineering Drawing	1		4	3	S	-	-	-	-
<u> </u>	MEC2001	Renewable Energy Systems	3		0	3	F	ES	-	-	-
		Operations Research &						20			
5	MEC2002	Management	3	0	0	3	F	-	-	-	-
6	MEC2003	Supply Chain Management	3	0	0	3	S/ EM/ EN	-	-	-	-
7	MEC2004	Six Sigma for Professionals	3	0	0	3	S/EM	-	-	MEC 200 8	-
8	MEC2005	Fundamentals of Aerospace Engineering	3	0	0	3	F	-	-	-	-
9	MEC2006	Safety Engineering	3	0	0	3	S/EM	ES	-	-	-
10	MEC2007	Additive Manufacturing	3	0	0		F/EM	-	-	-	-
11	MEC3069	Engineering Optimisation	3		0	3	S/EM	-	-	-	-
12	MEC3070	Electronics Waste Management	3		0	3	F/S	ES	-	-	-
13	MEC3071	Hybrid Electric Vehicle Design	3	0	0	3	S/EM	ES	-	-	-
14	MEC3072	Thermal Management of Electronic Appliances	3		0		S/EM	-	-	-	-
15	MEC3200	Sustainable Technologies and Practices	3	0	0	3	S/EM	-	-	-	-
16	MEC3201	Industry 4.0	3	0	0	3	S/EM	-	-	-	-
	leum Baske			<u> </u>	U	5	0/ 211			1	
1	PET1011	Energy Industry Dynamics	3	0	0	3	FC	ES	_	NIL	_
2	PET1012	Energy Sustainability Practices	3	0	0 0	3	FC	ES	_	NIL	-
	cs Basket		5	<u> </u>	U	5		20			
	PHY1003	Mechanics and Physics of Materials	3	0	0	3	FC / SD				
2	PHY1004	Astronomy	3	0	0	3	FC				
3	PHY1005	Game Physics	2		2	3	FC / SD				
4	PHY1006	Statistical Mechanics	2	0	0	2	FC				
5	PHY1007	Physics of Nanomaterials	3	0	0	3	FC				
6	PHY1008	Adventures in nanoworld	2	-	0	2	FC				
<u> </u>	PHY2001	Medical Physics	2	0	0	2	FC	ES			
8	PHY2002	Sensor Physics	1		2	2	FC / SD				
9	PHY2003	Computational Physics	1	0	2	2	FC				
10	PHY2004	Laser Physics	3		0	3	FC	ES			
11	PHY2005	Science and Technology of Energy			0		FC	ES			
12	PHY2009	Essentials of Physics	2	0	0	2	FC				
Mana	igement Ba										
1	MGT2007	Digital Entrepreneurship	3	0	0	3	S/EM/E N	-	-	-	-
2	MGT2015	Engineering Economics	3	0	0	3	S	-	-	-	-
3		People Management	3	0	0	3	S/EM/ EN	HP	-	-	-
	igement Ba		_	6		-	E		1		
1		Introduction to Psychology	3	0	0	3	F	HP	-	-	-
2		Business Intelligence	3		0	3	EN	-	-	-	-
3		NGO Management	3		0	3	S	-	-	-	-
4	MGT1004	Essentials of Leadership	3	0	0	3		GS/ HP	-	-	-
5	MGT1005	Cross Cultural Communication	3	0	0	3	S/EM/ EN	HP	-	-	-
6	MGT2001	Business Analytics	3	0	0	3	S/ EM/EN	-	-	-	-
7	MGT2002	Organizational Behaviour	3	0	0	3	F	HP	-	-	-



					-	-			r	1	1
8	MGT2003	Competitive Intelligence	3	0	0	3	S	-	-	-	-
9	MGT2004	Development of Enterprises	3	0	0	3	S/EM/E N	-	-	-	-
10	MGT2005	Economics and Cost Estimation	3	0	0	3	S/EM	-	-	-	-
11	MGT2006	Decision Making Under Uncertainty	3	0	0	3	S	-	-	-	-
12	MGT2008	Econometrics for Managers	3	0	0	3	S	-	-	-	-
13	MGT2009	Management Consulting	3	0	0	3	S/EM/E N	-	-	-	-
14	MGT2010	Managing People and Performance	3	0	0	3	S/EM/E N	HP/GS	-	-	-
15	MGT2011	Personal Finance	3	0	0	3	F	-	-	-	-
16	MGT2012	E Business for Management	3	0	0	3	S/EM	-	-	-	-
17	MGT2013	Project Management	3	0	0	3	EN / EM	GS/HP/ ES	-	-	-
18	MGT2014	Project Finance	3	0	0	3	EN / EM	HP	-	-	-
19	MGT2016	Business of Entertainment	3	0	0	3	EM/ EN	-	-	-	-
20	MGT2017	Principles of Management	3	0	0	3	S/EM/ EN	-	-	-	-
21	MGT2018	Professional and Business Ethics	3	0	0	3	S/EM/ EN	HP	-	-	-
22	MGT2019	Sales Techniques	3	0	0	3	S/EM/ EN	HP	-	-	-
23	MGT2020	Marketing for Engineers	3	0	0	3	S/EM/ EN	HP	-	-	-
24	MGT2021	Finance for Engineers	3	0	0	3	S/EM/ EN	HP	-	-	-
25	MGT2022	Customer Relationship Management	3	0	0	3	S/EM/ EN	HP	-	-	-
Media	a Studies Ba	asket									
1	BAJ3050	Corporate Filmmaking and Film Business	0	0	4	2	EM	HP	-	-	-
2	BAJ3051	Digital Photography	2	0	2	3	EM	HP	-	-	-
3	BAJ3055	Introduction to News Anchoring and News Management	0	0	2	1	EM	-	-	-	-

Table 3.8 : List of Mandatory Courses (MAC)								
S.No	Course Code	Course Name	L	Т	Р	С		
1	CHE7601	Environmental Studies	-	-	-	0		
2	LAW7601	Indian Constitution -		-	-	0		
3	CIV7601	Universal Human Values and Ethics	-	-	-	0		
4	PPS1025	Industry Readiness Program - I	0	0	2	0		
5	PPS1026	Industry Readiness Program - II	0	0	2	0		
6	APT4002	Introduction to Aptitude		0	2	0		
7	APT4004	Aptitude Training - Intermediate 0		0	2	0		
8	APT4006	Logical and Critical Thinking	0	0	2	0		
	Total No. of Credits					0		

21.List of MOOC Courses

21.1 Presidency University students are given the opportunity to study abroad in International Universities through a selection process coordinated by the Office of International Affairs (OIA). Such



selected students need to complete their credits for the semester that they are abroad in the following way:

- **21.1.1** The student needs to study and complete School Core and Program Core Courses in offline mode only.
- **21.1.2** Massive Open Online Course (MOOC) courses maybe given for Open Elective and Discipline Elective Courses. These courses need to be approved by the concerned BOS and Academic Council from time to time.
- **21.1.3** SWAYAM/NPTEL/ other approved MOOCs shall be approved by the concerned Board of Studies and placed in the concerned PRC.
- **21.1.4** Student shall register for these courses in the ERP of Presidency University.
- **21.1.5** For these MOOC courses faculty coordinators are identified. These faculty should have undergone similar MOOC courses and therefore should be familiar with the mode of class conduction, types of assessments and evaluation procedures.
- **21.1.6** Study materials shall be provided to the students as video lectures shared by the MOOCs Coordinator(s), or the students may access the approved MOOCs Portal directly. The mode of class conduction is determined by the MOOCs coordinator(s) as detailed in the Course Catalogue and Course Plan.
- **21.1.7** The question paper shall be prepared by the MOOCs coordinator(s).
- **21.1.8** Students write the exams in online mode. These exams are scheduled and conducted by the School.
- **21.1.9** Results are evaluated by School and given to the Office of the Controller of Examinations (CoE).
- **21.1.10** The details of the duration, credits and evaluation are given below:

SI#	Duration	Credits	Evaluation
1.	12 weeks	3	Continuous Assessment –50 Marks
			Mid Term –50 Marks
			End Term-100 Marks
2.	8 weeks	2	Mid Term-50 Marks
			End Term-100 Marks
3	4 weeks	1	End Term-100 Marks

21.2 MOOC - Discipline Elective Courses for B. Tech. Computer Science and Engineering Block Chain



Table 3.9: MOOC Discipline Elective Courses

SI.N o	Course Code	Course Name	Credits	L-T-P-C
1	CSE311 1	Artificial Intelligence: Search Methods for Problem Solving	3	3-0-0-3
2	CSE311 2	Privacy and Security in Online Social Media	3	3-0-0-3
3	CSE311 3	Computational Complexity	3	3-0-0-3
4	CSE311 4	Deep Learning for Computer Vision	3	3-0-0-3
5	CSE311 5	Learning Analytics Tools	3	3-0-0-3
6	CSE502	Technical Skills in JAVA	3	0-0-6-3
7	CSE503	Technical Skills in Python	3	0-0-6-3
8	CSE504	Comprehensive Technical Skills	5	0-0-10-5
9	CSE505	The Joy of Computing Using Python	3	3-0-0-3
10	CSE311 9	Coding Skills in Python	3	3-0-0-3
11	CSE312 1	Parallel Computer Architecture	3	3-0-0-3
12	CSE312 4	Games and Information	3	3-0-0-3
13	CSE314 0	Introduction to Industry 4.0 and Industrial Internet of Things	3	3-0-0-3
14	CSE314 2	Affective Computing	3	3-0-0-3
15	CSE319 6	Foundations of Cyber Physical Systems	3	3-0-0-3
16	CSE319 7	Getting Started with Competitive Programming	3	3-0-0-3
17	CSE319 8	GPU Architectures and Programming	3	3-0-0-3
18	CSE319 9	Artificial Intelligence: Knowledge Representation and Reasoning	3	3-0-0-3
19	CSE320 0	Programming in Modern C++	3	3-0-0-3



20	CSE320 1	Circuit Complexity Theory	3	3-0-0-3
21	CSE320 2	Basics of Computational Complexity	3	3-0-0-3
22	CSE321 2	Introduction to Computer and Network Performance Analysis using Queuing	1	1-0-0-1
23	CSE321 3	C Programming and Assembly Language	1	1-0-0-1
24	CSE321 4	Python for Data Science	1	1-0-0-1
25	CSE321 5	Software Conceptual Design	1	1-0-0-1
26	CSE311 7	Industrial Digital Transformation	3	3-0-0-3
27	CSE311 8	Blockchain for Decision Makers	3	3-0-0-3
28	CSE334 9	Technology for Lawyers	3	3-0-0-3
29	CSE343 0	Deep Learning for Natural Language Processing	3	3-0-0-3
30	CSE343 1	Machine Learning for Engineering and Science Applications	3	3-0-0-3
31	CSE343 2	Algorithms in Computational Biology and Sequence Analysis	3	3-0-0-3
32	CSE343 3	Introduction to Large Language Models (LLMs)	3	3-0-0-3
33	CSE343 4	Quantum Algorithms and Cryptography	3	3-0-0-3

21.3 MOOC - Open Elective Courses for B. Tech. Computer Science and Engineering Block Chain

		Table 3.10: MOOC Open Elective Courses								
	Open Elective Courses Duration is 12 weeks									
SI. No.	Course ID	Course Name	Total Credits	L-T-P-C						
1	BBA2022	Supply Chain digitization	3	3-0-0-3						
2	BBA2021	E Business	3	3-0-0-3						



3	BBB2016	Business Analytics for Management Decisions	3	3-0-0-3
4	BBB2015	Artificial Intelligence for Investments	3	3-0-0-3

21. Recommended Semester Wise Course Structure / Flow including the Programme / Discipline Elective Paths / Options

First Year Cycle 1

SI. No.	Course Code	Course Name	L	Т	Р	С	Contac t Hours	Typ e of Skil l	Pre- requisit e	Baske t
Seme	ster I - PHYS	ICS Cycle (CSE-Allied (29 Sec))	1 5	1	8	1 9	24			
1	MAT2301	Calculus and Differential Equations	3	1	0	4	4	F	Nil	BSC
2	ENG1900	English for Technical Communication	2	0	0	2	2	S	Nil	HSM C
3	PHY2501	Optoelectronics and Quantum Physics	3	0	0	3	3	F	Nil	BSC
4	РНҮ2504	Optoelectronics and Quantum Physics Lab	0	0	2	1	2	F	Nil	BSC
5	MEC1006	Engineering Graphics	2	0	0	2	2	S	Nil	ESC
6	ECE2022	Digital Design	2	0	0	2	2	F/S	Nil	ESC
7	ECE2052	Digital Design Lab	0	0	2	1	2	F/S	Nil	ESC
8	DES1146	Introduction to Design Thinking	1	0	0	1	1	F	Nil	HSM C
9	CSE1500	Computational Thinking using Python	2	0	2	3	4	S	Nil	ESC
10	PPS1025	Industry Readiness Program – I	0	0	2	0	2	SS	Nil	MAC
Semo	ester I - CHEN	MISTRY Cycle (CSE (21 Sec + Engg 10 Sec))	1 6	1	8	1 9	25			
1	MAT2301	Calculus and Differential Equations	3	1	0	4	4	F	Nil	BSC
2	ENG1900	English for Technical Communication	2	0	0	2	2	S	Nil	HSM C
3	CHE2501	Chemistry of Smart Materials	3	0	0	3	3	S	Nil	BSC
4	CHE2502	Chemistry of Smart Materials Lab	0	0	2	1	2	S	Nil	BSC
5	CIV1200	Foundations of Integrated Engineering	2	0	0	2	2	S	Nil	ESC



6	EEE1200	Basics of Electrical and Electronics Engineering	3	0	0	3	3	F/S	Nil	ESC
7	EEE1250	Basics of Electrical and Electronics Engineering Lab	0	0	2	1	2	F/S	Nil	ESC
8	LAW7601	Indian Constitution	1	0	0	0	1	F	Nil	MAC
9	CSE1500	Computational Thinking using Python	2	0	2	3	4	S	Nil	ESC
10	PPS1025	Industry Readiness Program – I	0	0	2	0	2	SS	Nil	MAC

First Year Cycle 2

Semo	ester II - CHI	EMISTRY Cycle (CSE-Allied (29 Sec))	16	1	10	22	27			
1	MAT2402	Probability and Statistics	3	1	0	4	4	F	Nil	BSC
2	ENG2501	Advanced English	2	0	0	2	2	S	Nil	HSMC
3	CHE2501	Chemistry of Smart Materials	3	0	0	3	3	S	Nil	BSC
4	CHE2502	Chemistry of Smart Materials Lab	0	0	2	1	2	S	Nil	BSC
5	CIV1200	Foundations of Integrated Engineering	2	0	0	2	2	S	Nil	ESC
6	EEE1200	Basics of Electrical and Electronics Engineering	3	0	0	3	3	F/S	Nil	ESC
7	EEE1250	Basics of Electrical and Electronics Engineering Lab	0	0	2	1	2	F/S	Nil	ESC
8	LAW7601	Indian Constitution	1	0	0	0	1	F	Nil	MAC
9	CSE2000	Problem Solving using C	2	0	0	2	2	S	Nil	PCC
10	CSE2001	Problem Solving using C Lab	0	0	4	2	4	S	Nil	PCC
11	PPS1026	Industry Readiness Program – II	0	0	2	0	2	SS	Nil	MAC
12	ECE1511	Design Workshop	1	0	2	2	3	S/EM	Nil	ESC
13	CHE7601	Environmental Studies	0	0	0	0	0	F	Nil	MAC
Ser	nester II - Pl	HYSICS Cycle (CSE (21 Sec + Engg 10 Sec))	15	1	10	22	26			
1	MAT240	Probability and Statistics	3	1	0	4	4	F	Nil	BSC
2	ENG2501	Advanced English	2	0	0	2	2	S	Nil	HSMC
3	PHY2501	Optoelectronics and Quantum Physics	3	0	0	3	3	F	Nil	BSC
4	PHY2504	Optoelectronics and Quantum Physics Lab	0	0	2	1	2	F	Nil	BSC
5	MEC1006	Engineering Graphics	2	0	0	2	2	S	Nil	ESC



6	ECE2022	Digital Design	2	0	0	2	2	F/S	Nil	ESC
7	ECE2052	Digital Design Lab	0	0	2	1	2	F/S	Nil	ESC
8	DES1146	Introduction to Design Thinking	1	0	0	1	1	F	Nil	HSMC
9	CSE2000	Problem Solving using C	2	0	0	2	2	S	Nil	PCC
10	CSE2001	Problem Solving using C Lab	0	0	4	2	4	S	Nil	PCC
11	PPS1026	Industry Readiness Program – II	0	0	2	0	2	SS	Nil	MAC
12	ECE1511	Design Workshop	1	0	2	2	3	S/EM	Nil	ESC
13	CHE7601	Environmental Studies	0	0	0	0	0	F	Nil	MAC

Semester 3			57	5	22	25	30		
1	MAT2303	Linear Algebra and Vector Calculus	3	1	0	4	4	EM	
2	CSE2251	Data Communication and Computer Networks	3	0	0	3	3	S	
3	CSE2252	Data Communication and Computer Networks Lab	0	0	2	1	2	S	
4	CSE2253	Data Structures	3	0	0	3	3	S	
5	CSE2254	Data Structures Lab	0	0	2	1	2	S	
6	CSE2255	Object Oriented Programming Using Java	3	0	0	3	3	S/EM	
7	CSE2256	Object Oriented Programming Using Java Lab	0	0	2	1	2	S/EM	
8	CSE2257	Computer Organization and Architecture	3	0	0	3	3	S	
9	CBC2000	Foundations of Blockchain Technology	3	0	0	3	3	S/EM	
10	CSE2271	Software Design and Development	3	0	0	3	3	S	
11	CIV7601	Universal Human Values and Ethics	0	0	0	0	0	S	Nil
12	APT4002	Introduction to Aptitude	0	0	2	0	2	AT	Nil
Semester 4			18	2	8	24	28		
1	MAT2404	Discrete Mathematics	3	1	0	4	4	F	
2	CSE2258	Web Technologies	3	0	0	3	3	S/EM	
3	CSE2259	Web Technologies Lab	0	0	2	1	2	S/EM	
4	CSE2260	Database Management Systems	3	0	0	3	3	S	
5	CSE2261	Database Management Systems Lab	0	0	2	1	2	S	
6	CSE2262	Analysis of Algorithms	3	1	0	4	4	S	
7	CSE2263	Analysis of Algorithms Lab	0	0	2	1	2	S	
8	CSE2264	Essentials of AI	3	0	0	3	3	S/EM	Nil
9	CSE2265	Essentials of AI Lab	0	0	2	1	2	S/EM	Nil
10	FIN1002	Essentials of Finance	3	0	0	3	3	S	Nil
11	APT4004	Aptitude Training- Intermediate	0	0	2	0	2	AT	Nil



Semester 5			18	0	8	24	26		
1	CSE2266	Theory of Computation	3	0	0	3	3	S	
2	CSE2502	Cryptography and Network Security	3	0	0	3	3	S	CSE2051
5	CSE2269	Operating Systems	3	0	0	3	3	S	Nil
6	CSE2270	Operating Systems Lab	0	0	2	1	2	S/EM	Nil
7	CBC2500	Smart Contract and Solidity	3	0	0	3	3	S/EM	CBC2000
8	CBC2501	Smart Contract and Solidity Lab	0	0	2	1	2	S/EM	CBC2000
9	CBC2502	Distributed Ledger Technology	3	0	0	3	3	S/EM	CBC2000
10	CBC2503	Distributed Ledger Technology Lab	0	0	2	1	2	S/EM	CBC2000
11	CSEXXXX	Professional Elective – I	3	0	0	3	3	S/EM	Nil
12	CSE7000	Internship	0	0	0	2	0	S/EM	Nil
13	APT4006	Logical and Critical Thinking	0	0	2	1	2	S/EM	Nil
Semester 6			16	0	12	19	30		
1	CBC2504	Blockchain Security and Performance	3	0	0	3	3	S/EM	CBC2000
2	CBC2505	Blockchain Security and Performance Lab	0	0	4	2	4	S/EM	CBC2000
3	CBC2506	Blockchain Architecture Design	3	0	0	3	3	S/EM	CBC2000
4	CSE2274	Competitive Programming and Problem Solving	0	0	4	2	4	S/EM	Nil
5	CSEXXXX	Professional Elective – II	3	0	0	3	3	S	Nil
6	CSEXXXX	Professional Elective – III	3	0	0	3	3	S	Nil
7	XXXXXXX	Open Elective – I	3	0	0	3	3	S	Nil
8	APT4005	Aptitude for Employability	0	0	2	1	2	AT	Nil
Semester 7			12	0	0	16	12		
1	CSEXXXX	Professional Elective – IV	3	0	0	3	3	S	Nil
2	CSEXXXX	Professional Elective – V	3	0	0	3	3	S	Nil
3	CSEXXXX	Professional Elective – VI	3	0	0	3	3	S	Nil
4	XXXXXXX	Open Elective – II	3	0	0	3	3	S	Nil
5	CSE7100	Mini Project	0	0	0	4	0	S	Nil
Semester 8			0	0	0	10	0		
1	CSE7300	Capstone Project	0	0	0	10	0	S/EM	Nil
			117	5	54	160	176		

22. Course Catalogue

Course Catalogue of all Courses Listed including the Courses Offered by other School / Department and Discipline / Programme Electives – Course Code, Course Name, Prerequisite, Anti-requisite, Course Description, Course Outcome, Course Content (with Blooms Level, CO, No. of Contact Hours), Reference Resources.



Sample Catalogue is given below for reference:

Course Code: CSE7300	Course Title: Capstone Project	L- T-P- C	0	0	0	10
Version No.	1.0					
Course Pre- requisites	Knowledge and Skills related to all the course	es studied in	prev	ious s	semesto	ers.
Anti-requisites	NIL					
Course Description	Students observe science and technology in ac method of scientific experimentation, and often g operate sophisticated and costly equipmen implementation of the principles of management observe multidisciplinary teams of experts from operations research, and management deal with micro and macro levels. Finally, it enables them to communication and inter-personal skills, both by evaluation components, such as seminar, g preparation, etc. The broad-based core education, and rich in analytical tools, provides the found understand properly the nature of real-life probl pursue this course as either Project Work and Diss Work in an Industry/ Company/ Research Labor Industry/Company.	get an opportu t. They als they have leas n engineering techno-econ o develop and v its very natu group discus , strong in ma lation necessa lems. The stu sertation at the	inity to control learnt in control refinered refinered refinered sion, thema ary for dents e univ	to see arn class, nce, e probl e thei d by t proj atics a or the have gersity	, study about when teconom ems at r langu the var ect re und scie studen option r, or Pro	and the they nics, the age, ious port ence t to s to ject
Course Objectives	The objective of the course is to familiarize the lear Practice and attain Employability Skills through			-		
Course Outcomes	 On successful completion of this course the stude 1. Identify problems based on societal / 2. Apply Knowledge and skill to solve so 3. Develop interpersonal skills to work (Apply) 4. Analyze the inferences from available Experimental / Simulations. (Analyze) 5. Analyze the impact of solutions in s for sustainable development. (Analyze 6. Improve in written and oral communio 7. Demonstrate capabilities of self-lea lifelong learning. (Understand) 	research neo ocietal proble as member e results thro ocietal and e) cation. (Crea	eds. ems i r of a ough envir ate)	(Unde n a grou a grou theor	roup. (up or l etical , ental c	Apply) eader. / context

Course Code: CSE7100	Course Title: Mini Project	L- T-P- C	0	0	0	4
Version No.	1.0					



Course Pre- requisites	Knowledge and Skills related to all the courses studied in previous semesters.
Anti-requisites	NIL
Course Description	Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/ Company/ Research Laboratory, or Internship Program in an Industry/Company.
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Professional Practice and attain Employability Skills through Experiential Learning techniques.
Course Outcomes	 On successful completion of this course the students shall be able to: Identify the engineering problems related to local, regional, national or global needs. (Understand) Apply appropriate techniques or modern tools for solving the intended problem. (Apply) Design the experiments as per the standards and specifications. (Analyze) Interpret the events and results for meaningful conclusions. (Evaluate) Appraise project findings and communicate effectively through scholarly publications. (Create)

Course Code: CSE2274	Course Title: Competitive Programming and Problem Solving	L-T-P- C	0	0	4	2
Version No.	1.0				1	
Course Pre- requisites	NIL					
Anti-requisites	NIL					
Course Description	The Competitive Programming and Prok students with efficient problem-solving skills for world challenges. Starting with brute-force optimize time and space complexity using adva programming, greedy algorithms, and backtr	coding co solutions anced tech	ompe , stu nniqu	etitioi uden ues li	ns ar ts le ke d	nd real- earn to ynamic



F	The objective of the course is to familiarize the learners with the concepts of Competitive Programming and Problem Solving and attain Skill Development through Experiential Learning techniques.
	CO4: Creating efficient solutions of CP problems using the learnt algorithmic approaches.
	CO3 : Evaluating the applicability of suitable algorithmic approaches to solve relevant CP problems.
	CO2 : Analyzing the space and time complexity of brute force solutions and designing efficient solutions.
F	CO1 : Understanding the issues of online platforms and Competitive Programming (CP) and developing brute force coding for commonly asked CP problems.
urse Out	On successful completion of the course the students shall be able to:
n C c	number theory, data structures, and algorithmic paradigms. By understanding CP constraints and fostering a strategic mindset, students gain the confidence to excel in competitions, technical interviews, and practical applications.
-	platforms like CodeChef and Codeforces helps tackle problems

Module 1: Introduction to Competitive Programming

Overview of Efficient Coding for Problem Solving and CP: Introduction to competitive programming (CP); revisit of complexity analysis; introduction to online platforms such as codechef, codeforces etc and online submission; constraints during CP, online testing process and common errors such as TLE; use of STL

Module 2: Number Theory for Problem-Solving

Use of Number Theory for problem-solving: reducing time/space complexity of brute force coding solution of Sieve Method, Inverse Module, Euclidian Method of factorization; efficient coding

for Permutation Combination; XORing based and pattern-based solutions.

Module 3: Optimizing Time & Space Using Sequential Storage

Coding for Optimizing time and Space using Sequential Storage: two pointer approach; problem-solving using arrays and strings such as rotation on sorted arrays, duplicate removal, string

matching algorithms; Kadane's algo, stacks, priority-queues and hashing based efficient coding; median based problems and alternate solutions.

Module 4: Non-Linear Data Structures

Applying Non-Linear Data Structures for real-life problems: design of efficient solutions for problems such as finding loops in a linked list, memory efficient DLL, block reversal in LL; problem solving using trees and binary trees, Catalan numbers, applications of graphs, spanning tree and path

algos for CP problems with reduced time/space complexity.

Module 5: Problem Solving using Advanced Topics

CP Problem Solving using Advanced Topics: concept of disjoint sets and their efficient representation, algorithmic approaches such as Greedy, Backtracking, Dynamic Programming and applying them for CP problems using bottom-up dynamic programming.

List of Laboratory Tasks:



1. You are given the finishing times of 'N' runners in a marathon. Write a program to find the runner who finished in the third position. **Focus:** Basic data structures (arrays), sorting algorithms (e.g., insertion sort, selection sort), and basic input/output.

2. In the same marathon, you are given the finishing times of 'N' runners and their bib numbers. Write a program to efficiently find the top 10 runners and their corresponding bib numbers. **Focus:** Efficient sorting algorithms (e.g., merge sort, quick sort), data structures like priority queues, and optimizing for large datasets.

3. A library maintains a list of books with their unique IDs. Write a program to check if a given book ID is present in the library. Focus: Searching algorithms (linear search), basic data structures (arrays or lists).

4. The library wants to implement a system to quickly find books by their titles. Suggest an efficient data structure (e.g., a hash table or a trie) and explain how to implement it to achieve fast book lookups. Focus: Understanding the trade-offs between different data structures, choosing the most appropriate data structure for a specific problem, and implementing efficient search operations.

5. An online store sells products with different prices. Write a program to calculate the total cost of a given list of products. **Focus:** Basic arithmetic operations, working with arrays or lists to store product prices.

6. The online store offers discounts based on the total purchase amount. Design an algorithm to efficiently calculate the final cost of an order, considering different discount rules (e.g., percentage discounts, fixed amount discounts, tiered discounts). Focus: Algorithmic design, conditional statements, handling complex scenarios with multiple rules, and potentially using dynamic programming techniques for optimization.

7. You are given two integers, 'a' and 'm'. Calculate 'a' raised to the power 'm' modulo a large prime number 'p'. **Focus:** Basic modular arithmetic operations (modular exponentiation), understanding the modulo operator.

8. In a secure communication system, you need to efficiently compute the modular exponentiation for very large values of 'm'. Implement and analyze the efficiency of the binary exponentiation algorithm for this task. **Focus:** Efficient algorithms for modular exponentiation (binary exponentiation), time complexity analysis, and understanding the importance of efficient algorithms in cryptography.

9. You have a deck of 'N' cards. Calculate the total number of possible hands of size 'K' that can be drawn from the deck. **Focus:** Basic combinatorics (combinations), factorial calculations.

10. In a card game, you need to calculate the probability of drawing certain combinations of cards (e.g., a pair, a three-of-a-kind) from a shuffled deck. Design an efficient algorithm to calculate these probabilities. **Focus:** Advanced combinatorics (permutations and combinations with repetitions), probability calculations, and optimizing calculations to avoid overflows.

11. You are given a network of devices represented as a graph. Determine if there is a path between two given devices in the network. **Focus:** Graph traversal algorithms (depth-first search or breadth-first search).

12. In a secure network, you need to detect and isolate compromised devices. Design an algorithm that efficiently identifies devices that exhibit anomalous behavior (e.g., unusual traffic patterns) using XOR-based techniques for data comparison and pattern matching. **Focus:** Applying XOR operations for data comparison and pattern recognition, understanding the properties of XOR (e.g., commutative, associative), and designing algorithms for network anomaly detection.

13. You are given an array representing the speeds of cars on a highway. Find the minimum time required for all cars to pass a certain point. **Focus:** Basic array traversal, finding the minimum element in an array.



14. In a more realistic scenario, cars have different lengths. Implement a two-pointer approach to simulate the movement of cars and determine the minimum time for all cars to pass a given point. **Focus:** Two-pointer technique, simulating real-world scenarios with arrays, optimizing time complexity.

15. Given a string, find the number of occurrences of a specific substring within the string. **Focus:** Basic string manipulation, string matching (brute-force approach).

16. Implement the KMP (Knuth-Morris-Pratt) string matching algorithm to efficiently find all occurrences of a given pattern within a large text document. **Focus:** Advanced string matching algorithms, understanding the concept of the "next" array in KMP, optimizing for large input sizes.

17. An online auction platform receives bids for different items. Implement a data structure (e.g., a priority queue) to efficiently track the highest bid for each item. **Focus:** Priority queues, insertion and extraction operations on priority queues, basic implementation of a priority queue using an array or a suitable library.

18. The auction platform needs to handle a large number of bids concurrently. Design and implement a system that efficiently processes bids, updates the highest bid for each item, and handles potential race conditions. **Focus:** Concurrent data structures and algorithms, thread safety, handling race conditions, optimizing for high-throughput scenarios.

19. A social network can be represented as a graph where users are nodes, and connections between users are edges. Write an algorithm to find if two given users are connected in the network. **Focus:** Graph traversal algorithms (depth-first search or breadth-first search), basic graph representation (adjacency list or adjacency matrix).

20. In a large social network, efficiently finding the shortest path between two users is crucial. Implement Dijkstra's algorithm to find the shortest paths between users in the network, considering edge weights (e.g., representing the strength of connections). **Focus:** Shortest path algorithms (Dijkstra's algorithm), graph algorithms with weighted edges, optimizing for large graphs.

21. A file system can be modeled as a tree structure. Implement a function to traverse the file system and print the names of all files and directories. **Focus:** Tree traversal algorithms (depth-first search or breadth-first search), basic tree representation (using nodes and pointers).

22. Design and implement a file system that supports efficient operations like creating directories, deleting files, and finding files based on their names or paths. Consider using a combination of tree structures and hash tables for efficient indexing and searching. **Focus:** Designing and implementing file system structures, using multiple data structures together, optimizing for common file system operations.

23. An online shopping cart can be represented as a tree, where each node represents an item or a category of items. Write an algorithm to calculate the total price of all items in the shopping cart. **Focus:** Tree traversal, calculating sums within a tree structure.

24. Implement a system that allows customers to apply discounts and coupons to their shopping carts. Consider using a combination of trees and other data structures (e.g., hash tables) to efficiently apply discounts and calculate the final price. **Focus:** Applying discounts and promotions to tree-like structures, efficient implementation of discount rules, optimizing for complex pricing scenarios.

25. In a social network, users can form groups. Given a list of friendships, determine if all users in a specific group are connected (directly or indirectly) through friendships. **Focus:** Disjoint set union (DSU) data structure, basic connectivity checks.

26. Design an efficient algorithm to find the minimum number of new friendships needed to connect all users in the social network into a single, connected component. **Focus:** Applying DSU for finding connected components, greedy algorithms, optimization for minimizing connections.



27. A treasure hunt involves a series of clues leading to the final treasure. Given a list of possible paths and their associated costs, find the cheapest path to reach the treasure. **Focus:** Greedy algorithms (e.g., Dijkstra's algorithm for shortest paths), basic graph representation.

28. In a more complex treasure hunt, there are time constraints associated with each path. Design an algorithm to find the fastest path to the treasure while considering both path costs and time constraints.

Focus: Combining greedy approaches with other techniques (e.g., priority queues), handling multiple constraints, optimizing for time-critical scenarios.

29. In a simplified chess game with only rooks, determine the minimum number of moves required for a rook to reach a specific target square on an empty board. **Focus:** Breadth-first search (BFS) on a graph (the chessboard), basic graph traversal.

30. In a more realistic chess game with multiple pieces and obstacles, implement a minimax algorithm with alpha-beta pruning to determine the best move for a player. **Focus:** Game tree search, minimax algorithm, optimization techniques like alpha-beta pruning, handling complex game states.

Targeted Application & Tools that can be used:

1. C or C++ Compiler (g++): The standard compiler for CP. Familiarize students with compilation flags (e.g., -O2 for optimization).

2. IDE (Integrated Development Environment): Code:: Blocks, Visual Studio, CLion, or similar IDEs. These provide debugging capabilities, code completion, and other helpful features.

3. Online Judges (CodeChef, Codeforces, LeetCode, HackerRank): Essential for practicing and submitting solutions.

4. Debugger (gdb): Crucial for understanding code execution and finding bugs. Origin, excel and Mat lab soft wares for programming and data analysis.

5. Number Theory Libraries: Some libraries provide pre-built functions for number theory operations (though often it's better to implement them yourself for learning).

6. Wolfram Alpha: A useful tool for verifying number theory calculations and exploring concepts.

7. **String Libraries:** Familiarize students with the string manipulation functions available in C++.

8. **Graph Visualization Tools:** Tools like Graphviz can be helpful for visualizing graphs and understanding graph algorithms.

9. **DP Debugging Techniques:** Practice debugging DP solutions, as they can be complex. Visualizing the DP table can be helpful.

Text Books:

1 Guide to Competitive Programming: Learning and Improving Algorithms Through Contests" (3rd Edition), *Antti Laaksonen, springer, 2024*

2 "Data Structures and Algorithms in Java: A Project-Based Approach" – Dan S. Myers, Cambridge University Press

Reference Books:

1.Data Structures and Algorithmic Thinking with Python/C++/Java", *Narasimha Karumanchi, 5th Edition, Career Monk, 2017.*

2.Introduction to Algorithms, <u>Thomas H. Cormen</u> (Author), <u>Charles E.</u> <u>Leiserson</u> (Author), <u>Ronald L. Rivest</u>, fourth edition April 2022

Web Resources

1. https://nptel.ac.in/courses/106106231



2.

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Assessment Type

- Midterm exam
- Assignment (review of digital/ e-resource from PU link given in references section mandatory to submit screen shot accessing digital resource.)
- Quiz
- End Term Exam
- Self-Learning

Course Code: PPS4006	Course Title: LOC THINKING Type of Course: H		ITICAL	L- T-P- C	0	0	2	1
Version No.	1.0				1	1 1		1
Course Pre- requisites	Students should ha along with its appl				asoni	ng an	d Critic	al thinking,
Anti-requisites	Nil							
Course Description	This is a skill-base This course is des reasoning and Crit	igned to enab ical thinking.	ole the stu	idents to enh	ance	their	skills ir	n Logical
Course Objective	reasoning and Cri their career develo	The objective of the course is to familiarize the learners with concepts in in Logical easoning and Critical thinking through problem solving techniques suitable for heir career development.						
Course				ne students s	hall b	e abl	e to:	
Outcomes	CO1] Understand all the concepts. CO2] Apply the concepts in problem solving (Bloom's taxonomy Level 3)							
	CO2] Apply the co	ncepts in pro	blem solv	ving (Bloom's	taxo	nomy	/ Level 3	3)
Course Content:	1							
Module 1	Logical Thinking	Assignme nt					1	6 Hours
	and Dices, Mirror ar Ires, Data Interpreta			r cutting and	Fold	ing, E	mbedd	ed figures &
Module 2	Critical Thinking	Assignme nt					1	4 Hours
Topics: Analogy, Symbol conclusion, Puzzle	and Notations, Sta	atement and	assumpt	ion, Cause c	of act	tion,	Stateme	ent and
	ition & Tools that c Placement activities		tive exam	inations.				
	Continuous Evalu							
Evaluation	-	c wise evalua						
		-Term & End	Term					
	Text Book							



1. A new approach to reasoning verbal, non-verbal & analytical by BS Sijwali
2. R S Aggarwal
3. Kiran publications
References
<u>1. www.indiabix.com</u>
2. www.testbook.com
3. www.youtube.com/c/TheAptitudeGuy/videos
Topics relevant to Skill Development Logical reasoning and Critical thinking for
Skill Development through Problem solving Techniques. This is attained through
assessment component mentioned in course handout.

Course Code:	Course Title: O	perating Systems		L-T- P- C	3	0	0	3		
CSE2269				L-I-I-C						
Version No.	1.0									
Course Pre- requisites	Nil									
Anti-requisites	NIL									
Course Description	structure and its d internal algorithm and recovery and	This course introduces the concepts of operating system operations, operating system structure and its design and implementation. It covers the classical operating systems internal algorithms such as process scheduling, synchronization, deadlocks detection and recovery and memory management. The course also enhances the problem solving, systems programming ability and case studies.								
Course Object	The objective of the course is to familiarize the learners with the concepts on Operating Systems and attain Employability through Problem Solving Methodologies.									
Course Out Comes	 Describe the fu [Knowledge] Demonstrate v Apply various Demonstrate d 	mpletion of the course andamental concepts of arious CPU scheduling tools to handle synchr eadlock detection and ous memory manageme	f operatin g algorithm onization recovery :	g Systems ar ms[Applic problems.[<i>A</i> methods [Ap	nd cation Appl Applic	ase on] lica catio	tion] on]			
Course Content:										
Module 1	Introduction to Operating System	Assignment	Programi	ming			9]	Hours		
Topics:		1	1				<u> I </u>			



Introduction to OS, Operating-System Operations, Operating System Services, System Calls and its types, Operating System Structure, System Program and its types, Linkers and Loaders, Overview of OS design and implementation, Open-source operating system

Module 2 Management Study Programming/Simulation 11 Hou	Module 2 Process Management Assignment/Case Study Programming/Simulation
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Topics:

Process Concept, Operations on Processes, Inter Process Communication, Communication in clientserver systems (sockets, RPC, Pipes), Introduction to threads - Multithreading Models, Thread Libraries, Threading Issues, Process Scheduling– Basic concepts, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, SRTF, RR and Priority.

Module 3ProcessSynchronizationAssignmentand DeadlocksProcess	Programming	11 Hours
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Topics:

The Critical-Section Problem- Peterson's Solution, Synchronization hardware, Semaphores, Classic Problems of Synchronization with Semaphore Solution- Producer-Consumer Problem, Reader-Writer problems, Dining Philosopher's Problem, . Introduction to Deadlocks, Necessary conditions for deadlock, Resource allocation Graph, Methods for handling deadlock: Deadlock Prevention and Implementation, Deadlock Avoidance and Implementation, Deadlock detection & Recovery from Deadlock.

Module 4	Memory Management	Assignment	Programming/Simulation	10 Hours
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Topics:

Introduction to Memory Management, Basic hardware-Base and Limit Registers, Memory Management Unit(MMU), Dynamic loading and linking, Swapping, Contiguous and Non-Contiguous Memory Allocation, Segmentation, Paging - Structure of the Page Table – Virtual Memory and Demand Paging – Page Faults and Page Replacement Algorithms, Copy-on-write, Allocation of Frames, Thrashing

Introduction to File system management: File System Interface (access methods, directory structures), File system implementation.

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems where in there are resources and entities that use and manage the resources.

Software Tools:

Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install and work on multiple guest Operating Systems on top of a host OS.

Intel Processor identification utility: This software is used to explain about multi-core processors. It helps to identify the specifications of your Intel processor, like no of cores, Chipset information, technologies supported by the processor etc.



Project work/Assignment

Demonstrate process concepts in LINUX OS.

Simulation of CPU scheduling algorithms.

Develop program to demonstrate use of Semaphores in threads.

Develop program to demonstrate use of deadlock avoidance algorithms.

Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019

References

Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.

William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.

Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020

Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau , "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html

Course Code: CSE2270	Course Title: Operating Systems Lab	L-T- P- C	0	0	2	1
Version No.	1.0					
Course Pre- requisites	Nil					
Anti-requisites	NIL					
Course Description	This laboratory course provides hands-on exp operating systems through practical assignment covers foundational aspects such as system cal inter-process communication, synchronization, and file systems. Students will implement and and scheduling algorithms, fostering deeper und design. The lab also introduces modern OS too basics of open-source OS environments.	ts, simulation ls, process and deadlocks, r simulate real derstanding o	s, an d thr nem -tim f O	nd o read nory ne C S an	case stu 1 manag 7 manag 0S comp rchitectu	dies. It gement, gement, ponents ure and



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Course Object	The objective of the course is to familiarize the learners with the concepts of Operating Systems and attain Employability through Problem Solving Methodologies.
Course Out	On successful completion of the course the students shall be able to:
Comes	1] Demonstrate system-level programming using system calls and OS structures. [Apply]
	2] Simulate process scheduling and multithreading techniques. [Apply]
	3] Apply various tools to handle synchronization problems using semaphores and shared memory. [Apply]
	4] Demonstrate memory management and file system concepts using simulation or scripting. [Apply]
Course Content:	
Targeted Appli	cation:
Software Tools Oracle Virtu and work or	al Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install multiple guest Operating Systems on top of a host OS.
It helps to id	sor identification utility: This software is used to explain about multi-core processors lentify the specifications of your Intel processor, like no of cores, Chipset , technologies supported by the processor etc.
List of Labor	atory Tasks:
Lab sheet -	1
in proc L2: A	
Python L2: Yo Compa	mplement First-Come-First-Serve (FCFS) process scheduling using C or a. bu are designing a server that handles thousands of client connections. are multithreading and multiprocessing for this task and implement a

basic server model.

Lab sheet -3

L1: Implement Round Robin Scheduling with a fixed time quantum.



L2: In a banking system, concurrent access to accounts leads to data corruption. Design a synchronization solution to avoid race conditions. Lab sheet -4

L1: Write a program to create threads using Pthreads or Python's threading module.

L2: You're tasked with building a file access tracker in an OS. Implement a system to log

file access patterns and identify frequent accesses.

Lab sheet -5

L1: Demonstrate inter-process communication (IPC) using pipes.

L2: A simulation tool needs to emulate process suspension and resumption. Design and implement such a mechanism using signals or condition variables. Lab sheet -6

L1: Simulate the Producer-Consumer problem using semaphores. L2: You're developing a system where sensor devices (producers) generate temperature readings, and data processors (consumers) store and process these readings. To prevent race conditions and ensure buffer safety, implement a synchronization mechanism using semaphores.

Lab sheet -7

L1: Implement Dining Philosophers Problem using threads and synchronization.

L2: In a multi-threaded cafeteria simulation, five philosophers sit around a circular table, each alternating between thinking and eating. To eat, a philosopher must hold two forks (represented by shared resources). Your task is to avoid deadlock and ensure no philosopher starves using thread synchronization techniques.

Lab sheet -8

L1: Write a program to simulate First Fit, Best Fit, and Worst Fit memory allocation strategies.

L2: A system with limited memory blocks needs to allocate memory to processes arriving with various size requests. Your task is to implement three classic memory allocation strategies—First Fit, Best Fit, and Worst Fit—to allocate memory to each process efficiently. Simulate and compare how memory gets allocated in each strateg

Lab sheet -9

L1: Demonstrate paging using a simple page table simulation. L2: A program has a logical address space divided into pages. The system's memory is divided into equal-sized frames. When a program executes, its pages are loaded into available frames in main memory. Simulate the address



translation process using a page table and demonstrate how a logical address is converted to a physical address. Lab sheet -10 L1: Write a program to simulate page replacement algorithms like FIFO and LRU. L2: In a virtual memory system, a process accesses pages in a specific order. The memory can only hold a limited number of pages (frames). When a page is needed and the memory is full, a page replacement algorithm is used to decide which page to evict. Simulate and compare FIFO and LRU algorithms for a given page reference string. Lab sheet -11 L1: Simulate file directory structure (single level/two level). L2: A university campus computer lab has limited memory space available for each student login session. When students open files or run programs, memory pages are loaded into available memory frames. Due to the limited number of frames, some pages must be replaced when new ones are needed. The lab system uses page replacement algorithms to decide which pages to evict when memory is full.. Lab sheet -12 L1: Write a shell script to demonstrate file handling commands in Linux. L2: Design a command-line mini shell that can run background and foreground processes and handle basic built-in commands like cd, pwd, exit. Project work/Assignment Demonstrate process concepts in LINUX OS. Simulation of CPU scheduling algorithms. Develop program to demonstrate use of Semaphores in threads. Develop program to demonstrate use of deadlock avoidance algorithms. Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

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Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020



Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau , "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html

Course Code: CSE2266	Course Title: Theory of Compu	itation	L-T-P-C	3	0	0	3	
Version No.	2.0							
Course Pre- requisites	nil							
Anti-requisites	NIL							
Course Description	The course deals with introduction of formal languages and the correspondence between language classes and the automata that recognize them. Topics include: Formal definitions of grammars and acceptors, Deterministic and Nondeterministic systems, Grammar ambiguity, finite state and push-down automata; normal forms; Turing machines and its relations with algorithms.							
Course Objective	The objective of the course is to familiarize the learners with the concepts of Theory of Computation as mentioned above and attain Skill Development through Problem Solving Methodologies.							
Course Outcomes	On successful completion of the course the students shall be able to: 1. Describe various components of Automata. (Knowledge) 2. Illustrate Finite Automata for the given Language. (Application) 3. Distinguish between Regular grammar and Context free grammar. (Comprehension) 4. Construct Push down Automata. (Application) 5. Construct Turing machine for a Language. (Application)							
Course Content:								
Module 1	Introduction to automata theory	Assignment	Problems or Strings and Language operations	1		6 cl	asses	
Topics:			L					

& operations on languages, Representation of automata, Language recognizers, Finite State Machines (FSM): Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs



	GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	NIVE	RSIT	YEARS		
Module 2	Finite Automata		Assignmen	t Assignment Problems on I NFA's	OFA,	13 Sessions
Topics:						
Basic concepts of Graphs and Lang	f Finite automata, DFA guages	- definition	s of DFA, De	eterministic Accep	oters Tr	ansition
NFA's Why Non	lar Languages, NFA- D - determinism? Equiva ction of the Number of	lence of De	terministic a	nd Nondeterminis		
	Regular Expressions	& Context	Assignmen		<i>,</i>	12
Module 3	Free Grammar			CFG, PT, PL a Ambiguity	and	Sessions
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Topics:		·				
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machine, Turing	Machines as Transduce	ers, Halting	Programmin	g Techniques for	Turing	Machines
Targeted Applic	cation & Tools that car	n be used:				

Targeted Application:

1. Text Processing

2. Compilers



- 3. Text Editors
- 4. Robotics Applications
- 5. Artificial Intelligence

Tools:

1. JFLAP (Java Formal Language and Automata Package) Software simulation tool. It's interactive educational

software written in Java to experiment topics in automata theory.

2. Turing machine Online simulators.

Text Book(s):

1. Peter Linz, "An introduction to Formal Languages and Automata", Jones and Bartlett Publications 6th Ed, 2018.

Reference(s):

1. Aho, Ullman and Hopcroft, "Theory of Computation", Pearson India 3rd Edition 2008.

2. Michael Sipser, "Theory of Computation", Cengage India 3rd Ed, 2014.

E-Resources

NPTEL course – https://onlinecourses.nptel.ac.in/noc21_cs83/preview

Course Code: CSE2264	Course Title: Essentials of Al Type of Course: Program Core Course - Theory	L-T-P- C	3	0	0	3
Version No.	1.0					
Course Pre- requisites	NIL					
Anti- requisites	NIL					



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solutions - Forward Probability and Viterbi Algorithm. Applications of Sequence Labeling in
Examination and the second sec
Lextélciallingelenones, tecco afficsiol Fentorio 8 s. dividutila yer Perceptron.
L'Evretjeztelch pleprieratiaco SP Tooblertfoat Acado kue used:
1. Implementation of a shortest-path finder using different search algorithms.
Experiment Nentational a sequence and the sequence of the sequ
Project WorkAssignment a family tree parser
1 Group project on one of the topics mentioned above (Eg. Adversarial search). Experiment No. 12 & 13: Implement a Decision Maker
Level 1: Implement a Minesweeper solver
Level 1: Implement a Minesweeper solver Textbook Splement a Battleship solver Level 2: Implement a Battleship solver 1. Stuart Russel and Peter Norvig. Artificial Intelligence: A Modern Approach. 4 th
Experiment Np. 14 & 35. Hidden Markov Model Level 1: Implement a generic HMM
Level 2: Build a PoS Tagger using a HMM with the Brown Corpus and the Universal Dependencies Tagset 3. Elaine Rich, Kevin Knight and Shivashankar B Nair. Artificial Intelligence. 4 th
Targeted (1001), Med lect Science - 1685, 2024.
3. Google Colab
4. Python IDEs like PyCharm
ProjectDeeplakAKaigmanenA: Missh Doou/shee/in Apreficial nojetholekssaighimEchtionrofib Stephiot, t203 8 ourse
The 20 Wignes ractate that set is a vitable little appression on as the national part of the product of the pro
consistent two sessions. The first session involves exploring a solution to the problem. The second
session Gevelues solution and the second strategies for Complex Problem
Textbsok(n). 6th Edition. Pearson Education. 2021.
Weblinks, Russel and Peter Norvig, Artificial Intelligence: A Modern Approach 1th Edition, Pearson
Weblinks 1. Stuart Russel and Peter Norvig. Artificial Intelligence: A Modern Approach, 4 th Edition. Pearson NPTEL Courses: Mausam (IIT Delhi), "An Introduction to Artificial Intelligence" Education. 2022. Link: https://nptel.ac.in/courses/106102220
Link: https://nptel.ac.in/courses/106102220
 Prateek Joshi and Alberto Artasanchez, Artificial Intelligence with Python, 2nd Edition. Packt. 2020: Shyamanta M. Hazarika (IIT Guwahati), "Fundamentals of Artificial Intelligence".
2020. Link: https://nptel.ac.in/courses/112103280. Useful for the full course
References: 3. Deepak Khemani (IIT Madras), "Artificial Intelligence: Search Methods for Problem-
1. Decepting Khemani. A First Course in Artificial Intelligence. 1 st Edition. 6 th Reprint, 2018.
 2. Munteshti@ha/ndtal.Eriviedio.Ar.Glassical@pp@addsefiolAtorifWiaduheefliged@e. 2nd Edition. Khanna
Publishe Decertation Representation Publishe Decertation
and Reasoning".
Link: https://nptel.ac.in/courses/106106140. Useful for Module 3.
5. Deepak Khemani (IIT Madras), "AI: Constraint Satisfaction". Link:
https://nptel.ac.in/courses/106106158. Useful for Module 2.

Course Code: CSE2262	Course Title: Analysis of Algorithms Type of Course: Theory PCC	L- T-P- C	3	1	0	4
Version No.	1.0					
Course Pre- requisites						



Anti-	Nil								
requisites Course	This course introduces te	chniques for the design	and analysis of efficient al	gorithms and					
Description	methods of applications. This course discusses the classic approaches for algorithm design								
	such as Divide and Conquer, Dynamic Programming, Greedy method. This course also								
	describes other basic stra	es other basic strategies searching solution space. The core concepts of analyzing							
	algorithms and classifyin	ng them into various cor	nplexity classes is covered	in the end.					
Course	The objective of the	course is to familiar	rize the learners with th	ne concepts of					
Objective	Analysis of Algorithms and attain Skill Development through Problem Solving Methodologies.								
Course Out	On successful complet	tion of the course the	students shall be able to	:					
Comes	1. Compute efficiency of	a given algorithm.[App	ply]						
	2. Apply divide and con	quer technique for searc	ching and sorting Problems	[Apply]					
	3. Apply the Dynamic P	rogramming technique	for a given problem. [App]	ly]					
	4. Apply greedy techniq	ue for solving a Probler	n.[Apply]						
	5. Demonstrate Back tra	cking technique and lin	nitations of Algorithms.[Ap	ply]					
Course Content:									
Module 1	Introduction	Assignment	Simulation/Data Analysis	10 Sessions					
	Mathematical analysis for		vorst case and average case ursive algorithms: Substitut	•					
Module 2	Divide-and-conquer	Assignment	Simulation/Data Analysis	08 Sessions					
Introduction. Ins	sertion Sort; Merge sort, Q	uick sort, Binary search							
Module 3	Dynamic programming	Term paper/Assignment	Simulation/Data Analysis	10 Sessions					
	th examples, Principles of s Algorithms. Chain Matri		osack Problem, Bellman-Fo	rd algorithm,					
Module 4	Greedy technique	Term paper/Assignment	Simulation/Data Analysis	09 Sessions					
	actional Knapsack Problem le-source Shortest Path: Di		ee: Prim's Algorithm and F	Kruskal's					
Module 5	Complexity Classes	Term paper/Assignment	Simulation/Data Analysis	08 Sessions					
Complexity C	lasses- P,NP- NP Hard a	and NP Complete - Bo	olean Satisfiability Probl	em (SAT).					
Branch and Bo	ound: Knapsack problem	; Backtracking, - N-Qu	ueens problem.						
Branch and Bo	ound: Knapsack problem	; Backtracking, - N-Qu	ueens problem.						



1. Anany Levitin, *"Introduction to the Design and Analysis of Algorithms"*, 3rd edition, Pearson Education, 2018.

2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, *"Introduction to Algorithms*", 4th edition, MIT Press, 2022.

References

- 1. J. Kleinberg and E. Tardos, "*Algorithm Design*", Addison-Wesley, 2005.
- 2. Tim Roughgarden, "*Algorithms Illuminated*" (books 1 through 3), "Operating Systems Design and Implementation", Soundlikeyourself Publishing, 2017-2019.
- 3. AV Aho, J Hopcroft, JD Ullman, *"The Design and Analysis of Algorithms"*, Addison-Wesley, 1974.
- 4. Donald E. Knuth, "*The Art of Computer Programming*", Volumes 1 and 3 Pearson.

Web-Resources

- 1. <u>NPTEL</u>: <u>https://onlinecourses.nptel.ac.in/noc19_cs47/preview</u>
- 2. Coursera: Analysis of Algorithms by Princeton University
- 3. <u>Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).</u>

4. <u>Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of Aarhus</u> University

Topics relevant to "SKILL DEVELOPMENT": knapsack, prim's, kruskal's algorithm, quick sort, binary search for **Skill Development** through **Problem Solving methodologies**. This is attained through assessment component mentioned in course handout.

Course	Course Title: Analysis of Algorithms Lab
Code:	Type of Course: Lab - PCC
CSE2263	
Version No.	1
Course Pre- requisites	Nil
Anti- requisites	NIL
Course Description	This course introduces techniques for the design and analysis of efficient algorithms and methods of applications. This course discusses the classic approaches for algorithm design such as Divide and Conquer, Dynamic Programming, Greedy method. This course also describes other basic strategies searching solution space. The core concepts of analyzing algorithms and classifying them into various complexity classes is covered in the end.
Course Objective	The objective of the course is to familiarize the learners with the concepts of <mark>Analysis of Algorithms</mark> and attain <mark>Skill Development</mark> through <mark>Experiential Learning</mark> Methodologies.



	On successful completion of the course the students shall be able to:	
	1. Compute efficiency of a given algorithm. [Applying]	
Course Out Comes	2. Apply divide and conquer technique for searching and sorting Problems.[Applyin]	g]
Comes	3. Apply the Dynamic Programming technique for a given problem. [Applying]	
	4. Apply greedy technique for solving a Problem.[Applying]	
	5. Demonstrate Back tracking technique and limitations of Algorithms.[Applying]	
Course Content		
Module 1	Introduction	3 Sessions
-	inning time of an algorithm, Compare running time of algorithms, Implement such as bubble sort, selection sort	orting
Module 2	Divide-and-conquer	3 Sessions
•	arching algorithms: Linear Search, Binary Search; Compare Sorting algorithm Sort, QuickSort.	s: Insertion
Module 3	Dynamic programming	3 Sessions
Introduction	and memorization: Factorial; Coin Change Problem ; Floyd-Warshall's Algorith	im.
Module 4	Greedy technique	3 Sessions
Fractional Kr algorithm	hapsack Problem; Minimal Spanning Tree Algorithms-Prim's Algorithm, Kruska	l's
Module 5	Complexity Classes	3 Sessions
Branch and I	Bound: Knapsack problem; Backtracking, - N-Queens problem.	
	List of Laboratory Tasks:	
	1. Measuring running time of an algorithm	
	Objective: To experimentally determine the running time of basic algorithms for input size n=10, 100, 1000, etc. by taking differenc starting time and ending time.	
	2. Compare running time of algorithms	
	Objective: To execute two algorithms to solve the same problem, comparatively evaluate the better algorithm for large values of N	
	3. Implement sorting algorithms such as bubble sort, selection sort	
	Objective: To implement comparison based sorting strategies.	
	4. Compare searching algorithms	



performance.	
5. Compare Sorting algorithms	
Objective: To implement searching strategies that follow top down design approach(Insertion sort, merge sort).	
6. Quick Sort	
Objective: To demonstrate Quick sort and its variants, and their impact on running time.	
7. Dynamic Programming	
Objective: To demonstrate Dynamic Programming approach with the help of Factorial algorithm.	
8. Coin Change Problem	
Objective: To implement an efficient algorithm for the Coin Change problem.	
9. Floyd-Warshall's Algorithm	
Objective: To demonstrate how dynamic programming is used with the help of Floyd-Warshall's algorithm.	
10. Fractional Knapsack Problem	
Objective: To demonstrate how greedy method can be used to solve the Fractional Knapsack Problem.	
11. Minimal Spanning Tree Algorithm	
Objective: To implement greedy strategy to solve the Minimal Spanning Tree problem using Prim's Algorithm.	
12. Kruskal's Minimal Spanning Tree Algorithm	
Objective: To implement greedy strategies to solve the Minimal Spanning Tree problem using Kruskal's Algorithm.	
13. Knapsack Problem	
Objective: To implement Knapsack problem using branch and bound technique.	
14. N-Queen's Problem	
Objective: To demonstrate backtracking method with the help of N-Queen's problem.	5
15. Case Study	

Objective: To demonstrate how various techniques can be used to solve the same problem with the help of Knapsack problem.

Targeted Application & Tools that can be used

1. PyTorch/Jupyter Notebook – For Python programming



Text Book
T1 Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd edition, Pearson Education, 2018.
T2 Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 4th edition, MIT Press, 2022.
References
R1. J. Kleinberg and E. Tardos, "Algorithm Design", Addison-Wesley, 2005.
R2. Tim Roughgarden, " <i>Algorithms Illuminated</i> " (books 1 through 3), "Operating Systems Design and Implementation", Soundlikeyourself Publishing, 2017-2019.
R3. AV Aho, J Hopcroft, JD Ullman, "The Design and Analysis of Algorithms", Addison-Wesley 1974.
R4. Donald E. Knuth, "The Art of Computer Programming", Volumes 1 and 3 Pearson.
Web Based Resources and E-books:
W1. NPTEL: https://onlinecourses.nptel.ac.in/noc19 cs47/preview
W2. Coursera: Analysis of Algorithms by Princeton University
W3. Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).
W4. Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of
Aarhus University
Topics relevant to "EMPLOYABILITY SKILLS": The lab experiments an assessments enable the student to acquire Skill Development through Experientia Learning techniques

Course Code: CSE2260	Course Title: Database Management Systems Type of Course: Theory only - PCC	L-T-P-C	3	0	0	3
Version No.	1.0					
Course Pre- requisite s	Foundational understanding of data types, data struknowledge, familiarity with operating systems and file may of set theory, logic, and discrete mathematics to under query formulation.	anagement	. Ba	sic	knov	vledge



		IVLILU	Midealet of						
Anti- requisites	NIL								
Course Descripti on	This course introduces the foundational principles of database management systems, including data models, schemas, and architectures. This course provides a solid foundation on the relational model of data and the use of relational algebra. It develops skills in SQL for data definition, manipulation, and control, enabling students to construct and execute complex queries. The course also introduces the concept of object oriented and object relational databases and modern database technologies like NoSQL . The also course allows the students to gain insights into data storage structures and indexing strategies for optimizing query performance.								
Course Objective	The objective of the cours DatabaseManagement Sys Solving Methodologies.								
Course Out Comes Course Conte	 On successful completion of 1. Describe the fundament [Understand] 2. Examine databases usi 3. Design simple databased demonstrate the database [Apply] 4. Interpret the concept of 	 On successful completion of the course the students shall be able to: 1. Describe the fundamental elements of relational database management systems. [Understand] 2. Examine databases using SQL query processing and Optimization. [Apply] 3. Design simple database systems applying the normalization constraints and demonstrate the database transaction processing, recovery, and security. 							
Module 1	Introduction to Database Modelling and Relational Algebra (Understand)	Assignment	Problem Solving	10 Sessions					
independence, traditional file s ER model. Relational Alg	to Database: Schema, Ins Data isolation problem ir systems. Entity Relationship ebra with selection, projection), and division operator. Exa	n traditional file (ER) Model, ER on, rename, set o	system, advantages Model to Relational M perations, Cartesian	of database over Aodel, Examples on product, joins (inner					
Module 2	Fundamentals of SQL andQuery Optimization (Apply)	Assignment	Programming	11 Sessions					
Joins, Views, F Database prog NoSQL. Query Optimiz	Querying, DDL, DML, Cor Procedures, Functions and T gramming issues and tech zation: Purpose, transforma ression, choosing evaluatior	riggers. niques: Embedd tion of relational e	ed SQL, Dynamic SC expressions, estimati	QL; SQL / PSM and ng cost and nic programming					
Module 3Relational Design & Transaction Management(Apply)Database Assignme nt12 SessioModule 3Problem Solving12 Sessio									
based on Prin (Fourth Norma Database De-n Transaction I Execution of T support in SC Management;	abase design: Problems in s nary Keys-(1NF,2NF, 3NF) I Form), Join Dependencies normalization. Management: The ACID ransactions; Lock- Based C QL; Introduction to crash The write-ahead log protocol er approaches and interactio	, Boyce-Codd N (Fifth Normal Fo Properties; Tra concurrency Cont recovery; 2PL, \$; Check pointing;	ormal Form, Multi v orm), lossy and lossle nsactions and Sche rol; Performance of I Serializability and R Recovering from a S	ralued Dependency ess decompositions, edules; Concurrent ocking; Transaction ecoverability; Lock					



	Advanced DBMS Tenies			
Module 4	Advanced DBMS Topics (Apply)	Assignment	Case Study	12 Sessions
management sy systems, Constr New database	cs: Object oriented databas /stems, Spatial database ma aint database management applications and architect (ML databases (NXD), Doc	anagement syster systems. ures such as Data	ns, Temporal databa a warehousing, Multii	se management media, Mobility,
Application Area Tools/Simulator	cation & Tools that can be a: Relational database syste used: MySQL DB for stude tion of ORACLE DB on obje	ms for Business, ant practice.	Ū.	0 11
the databa	olving: Constructing ER-Dia ises, querying the database ing: Implementation of any g	s using relational	algebra.	ts, Normalizing
Text Books: T1. Elmasri R and 2018.	d Navathe S B, "Fundamenta	als of Database Sy	/stem", Pearson Publ	ication, 7th Edition,
T2. RamaKrish Education.	na & Gehrke, "Database I	Management Sys	stems" 3rd Edition, 2	2018, McGraw-Hil
	, S. vanden Broucke and B. oring, Managing and Analy			-
References R1 Avi Silbersch Edition, 201	atz, Henry F. Korth, S. Sud 9.	larshan, "Databas	se System Concepts	", McGraw-Hill ,7th
	n, "Designing Data-Intensiv nable Systems", O'Reilly, 20		ne Big Ideas Behind	Reliable, Scalable,
	t to development of "FOUN nusing ER- Relational map			
	t to development of Em atingsophisticated, interactiv			ement computer

Course Code: CSE2261	Course Title: Database Management Systems Lab Type of Course: 1) Laboratory - PCC	L-T-P-C	0	0	2	1			
Version No.	1.0								
Course Pre- requisite s	Foundational understanding of data types, basic programming knowledge, operating systems and file management.								
Anti- requisites	NIL								
Course Descripti on	The Database Management Systems (DBMS) Laborate students with hands-on experience in database des management using SQL and database management tool complements theoretical concepts learned in database students to practice database creation, querying, and opt DBMS Lab enables students to develop industry-re	ign, imple Is such as I ase course timization t	mei MyS es ech	ntat SQL by niqu	ion, . The allov ues.	and alab wing The			



	management, preparing them for careers in software development, data engineering, and database administration.
Course Objective	The objective of the course is to familiarize the learners with the concepts of DatabaseManagement Systems and attain Employability through Problem Solving Methodologies.
Course Out Comes	 On successful completion of the course the students shall be able to: 5. Demonstrate the database concepts, practice, and SQL queries. [Apply] 6. Design and implement database schemas while applying normalization techniques to optimize structure. [Apply]] 7. Develop and implement stored procedures, triggers, and views for automation and efficiency. [Apply] 8. To Design and build database applications for real world problems. [Apply]
Course Conte	

Course Content:

List of Laboratory Tasks:

Create Employee, Student, Banking and Library databases and populate them with required data. Do the following experiments of different lab sheets on those databases.

Labsheet-1 [3 Practical Sessions] Experiment No 1: [1 Session]

1. To study and implement the different language of Structured Query Language.

Level 1: Perform operations using Data Definition Language and Data Manipulation Language commands including different variants of SELECT on Student DB.

Level 2: Identify the given requirements; valid attributes and data types and Perform DDL and DML operations on a given scenario. [Banking Databases]

Experiment No. 2: [2 Sessions]

2. To study and implement the concept of integrity constraints in SQL.

Level 1: Create tables on Banking database using PRIMARY KEY, NOT NULL, UNIQUE, FOREIGN KEY and demonstrate the working of relational, logical, pattern matching, BETWEEN, IS NULL, IN and NOT IN Special Operators on Student Database.

Level 2: Enforce different types of data and referential integrity constraints. Then try queries with special operators based on the student database. [Banking Database].

Labsheet-2 [3 Practical Sessions]

Experiment No. 3: [1 Session]

3. Implement complex queries in SQL.

Level 1: Implement the conjugate of GROUP BY, ORDER BY and aggregate functions on Banking Database. Level 2: Implement MySQL DB queries on library database using appropriate clauses and aggregate functions. Also order the data either in ascending and descending order using corresponding clause. [Library databases].

Experiment No. 4: [2 Session]

4. To study and implement different types of Set and Join Operations [2 Slots] Level 1: Demonstrate different types of Set Operations (UNION, UNION ALL, INTERSECT, MINUS) and Join Operations (INNER JOINS, OUTER JOINS, CROSS JOIN, NATURAL JOIN) on two or more tables of Airline Database. Level 2: Use Set and Join operations to retrieve the data from two or more relations(tables) as per the given

scenario. [Airline Database]

Labsheet-3 [2 Practical Sessions]

Experiment No. 5: [2 sessions]

5. To study and implement Views, and Procedures in MySQL DB.

Level 1: Implement MySQL Views, and Procedures in ORACLE DB on Employee database. Level 2: Analyze the requirement and construct views, and Procedures on Mini Project Domain. [Banking Database]

Labsheet-4 [2 Practical Sessions] Experiment No. 6: [2 Sessions]

6. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.



Level 2: Analyze the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-5 [2 Practical Sessions] Experiment No. 7: [2 Sessions]

7. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Determine the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-6 [4 Practical Sessions]

Experiment No. 8: [2 Sessions]

8. To implement the concept of forms and reports.

Level 1: Implement the concept of forms and reports.

Level 2: Examine the schema relationship.

Experiment No. 9: [2 Sessions]

9. Create the database using the given schema. (Flight Management)
Level 1: Implement a relational database based on the provided schema for the Flight Management system, including the creation of tables, relationships, and constraints.
Level 2: Demonstrate schema relationships by defining primary and foreign keys to ensure data integrity within the Flight Management database.

Labsheet-7 [4 Practical Sessions]

Experiment No. 10: [2 Sessions]

10. Create the database using the given schema. (Company database) Level 1: Implement the database schema by defining tables, relationships, and constraints according to the given Company Database schema.

Level 2: Demonstrate the schema's relationships and data integrity by creating and linking tables as per the specified requirements.

Experiment No. 11: [2 Sessions]

11. Create the database using the given schema. (Student Library)

Level 1: Implement forms and reports based on the provided Student Library database schema, ensuring effective data entry and reporting mechanisms.

Level 2: Demonstrate the schema relationships within the Student Library database, demonstrating how these relationships influence the creation and functionality of forms and reports.

Labsheet-8 [1 Sessions]

12. Design a mini project based on the databases such as Inventory Management System,

University Management System, Hospital Management System, etc.

Level 1: Implement the real time database.

Level 2: Analyze the working of database in real time.

Course Code: CSE2258	Course Title: Web Technologies	L-T- P- C	2	0	0	2
Version No.	1.0					
Course						
Pre-						
requisites						
Anti-requisites	NIL					



		REACH GREATER HEIGHTS	UNIVEN							
Cours Desci	This course highlights the comprehensive introduction to scripting languages are used for creating web-based applications.									
			The associated laboratory provides an opportunity to implement the concepts and enhance critical thinking and analytical skills.							
Cours Objec										
Cours	se	On successfu	l completion of this	course the students shall be	able to:					
Outco	omes	CO1: Implem (Apply)	ent web-based applica	tion using client-side scripting	g languages.					
		CO2: Apply va	arious constructs to er	hance the appearance of a we	bsite. (Apply)					
CO3: Apply server-side scripting languages to develop a web page linked to database.(Apply)										
Cours Conte										
Module 1		Introduction to XHTML	Quizzes and Assignments	Quizzes on various features of XHTML, simple applications	20 Sessions					
	Basics: V	Veb, WWW, Web b	b, WWW, Web browsers, Web servers, Internet.							
	XHTML:	Origins and Evolu	ition of HTML and XH	TML: Basic Syntax, Standard X	KHTML Document					
	Structure	e, Basic Text Mark	asic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic							
	Differenc	es between HTM	IL and XHTML, Den	nonstration of applications	using XHTML for					
	Responsi	ve web pages.								
Module 2 Advanced C		Advanced CSS	Quizzes and assignments	Comprehension based Quizzes and assignments; Application of CSS in designing webpages	20 Sessions					
	Advanced CSS: Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks									
XML:	Basics, Dei	monstration of ap	plications using XML v	vith XSLT.						
Module 3 PHP – Application Level		Quizzes and assignments	Application of PHP in web designing	20 Sessions						
PHP: \$ POS			e Development with F	HP, Arrays, Superglobal Arra	ys, \$GET and					
	-	-	e. e	PHP Classes and Objects, Obj						
-		g with Databases, Applications.	зуц, Database APIS,	Managing a MySQL Databas	e. Accessing					



Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.

Textbook(s):

1] Robert. W. Sebesta, "*Programming the World Wide Web*", Pearson Education, 9th Edition, 2016. 2]Paul Deitel, Harvey Deitel, Abbey Deital,"Internet & World Wide Web How to Program", Fifth

Edition, Pearson Education, 2021.

3]CSS Notes for Professionals, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

4]Deitel, Deitel, Goldberg,"Internet & World Wide Web How to Program", Fifth Edition, Pearson

Education, 2021.

Reference Book(s):

R1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", Pearson Education India,

1st. Edition.2016.

R2. Jeffrey C. Jackson,"Web Technologies: A Computer Science Perspective", Pearson Education, 1st

Edition,2016.

Additional web-based resources

W1. W3schools.com

W2. Developer.mozilla.org/en-US/docs/Learn

W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

- 1. Web, WWW, Web browsers, Web servers, Internet.
- 2. CSS, PHP.
- 3. Designing the website for healthcare.

The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2259	Course Tit Technolog		L-T-P- C	0	0	2	1	
Version No.		1.0						
Course Pre-								



requisites								
Anti-requisites		NIL						
Course Description		This course highlights the comprehensive introduction to scripting languages that are used for creating web-based applications.						
		The associated laboratory provides an opportunity to implement the concepts and enhance critical thinking and analytical skills.						
Course Objective		The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.						
Course		On success	ful com	pletio	n of this course the st	udents sh	all be able to:	
Outcomes		CO1: Implei languages. (Apply)	ment we	eb-bas	ed application using clie	ent-side so	cripting	
		CO2: Apply (Apply)	various	consti	ructs to enhance the apj	pearance	of a website.	
		CO3: Apply to a databas (Apply)		side sc	ripting languages to de	velop a we	eb page linked	
Course Content:								
Module 1	Introduction to XHTML Features	· ·	zes and nments	of XH	es on various features TML, simple cations		8 Sessions	
Standard		ument Struct	ture, Ba	sic Te	xt Markup such as hea	dings, par	ragraphs, lists,	
tables, for	rms, and sem	antic tags.						
Module 2	•	zes and nments	Quizz Appli	orehension based es and assignments; cation of CSS in ning webpages		10 Sessions		
	53 to style HT ve design prir		s, includ	ing lay	out techniques, color so	chemes, ty	pography, and	
XML: Basics, Der	nonstration o	of application	s using	XML w	ith XSLT.			
Module 3	PHP Appl Leve	ication	•	es and ments		web	12 Sessions	



PHP: Introduction to server-side Development with PHP, Arrays, Superglobal Arrays, \$GET and \$ POST,

\$_SERVER Array, \$_Files Array, Reading/Writing Files, PHP Classes and Objects, Object Oriented Design, Working with Databases, SQL, Database APIs, Managing a MySQL Database. Accessing MySQL in PHP, Applications.

List of Laboratory Tasks:

Experiment No. 1: Demonstration of XHTML features

Level 1: Demonstration of various XHTML Tags (Level 1) Level 2: Design and develop static web pages for an online Book store (Level 2).

Experiment No. 2: Application of CSS in web designing

Level 1: Design a document using XHTML and CSS to create a catalog of items for online electronic shopping.

Level 2: Create and save XML document for students' information and display the same using cascaded style sheet.

Experiment No. 3: Application of PHP in web designing.

Level 1: Write a PHP program to read the personal information of a person such as first name, last name, age, permanent address, and pin code entered by the user into a table created in MySQL. Read the same information from the database and display it on the front end.

Level 2: Using PHP develop a web page that accepts book information such as ISBN number, title, authors, edition, and publisher and store information submitted through the web page in MySQL database.

Experiment No. 4: Building a website.

Build a website for organizing an International Conference. The conference website must be able to collect the author's details and upload a file.

Targeted Application & Tools that can be used: Xampp web server to be used to

demonstrate PHP.

Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.

Textbook(s):

1] Robert. W. Sebesta, "*Programming the World Wide Web*", Pearson Education, 9th Edition, 2016. 2]Paul Deitel, Harvey Deitel, Abbey Deital,"Internet & World Wide Web How to Program", Fifth

Edition, Pearson Education, 2021.

3]CSS Notes for Professionals, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

4]Deitel, Deitel, Goldberg,"Internet & World Wide Web How to Program", Fifth Edition, Pearson

Education, 2021.

Reference Book(s):

R1. Randy Connolly, Ricardo Hoar,"Fundamentals of Web Development", Pearson Education India,



1st. Edition.2016.

R2. Jeffrey C. Jackson,"Web Technologies: A Computer Science Perspective", Pearson Education, 1st

Edition,2016.

Additional web-based resources

W1. W3schools.com

W2. Developer.mozilla.org/en-US/docs/Learn

W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

- 4. Web, WWW, Web browsers, Web servers, Internet.
- 5. CSS, PHP.
- 6. Designing the website for healthcare.

The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: MAT2404	Course Title: Discrete Mathematics Type of Course: Theory - ESC	L-T- P- C	3	1	0	4
Version No.	1.0					
Course Pre- requisites	MAT2302					
Anti-requisites	NIL					
Course Description	The course explores the study of fundamentally discrete (not continuous) logic, graph theory, combinatorics, an primarily in computer science fields like and cryptography; it covers topics techniques, relations, functions, cou- algorithms, providing a foundation for structures within computer science.	, focusing on c nd number the ke algorithms, such as prop inting principle	concept eory, v softwa positior es, ar	ts like vith a re de nal lo nd ba	set tl opplica velop ogic, asic	neory ations ment proof graph
Course Objective	The main objective of the course is that of mathematical facts and how to apply logically and mathematically through	them. It teache	es stud	ents h	low to	think



	GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS UNIVERS	MALERIC OF	
	reasoning, combinatorial analysis and applications and modeling. A should carefully blend and balance	successful discrete	• •
Course Outcomes	On successful completion of the co	ourse the students sha	Il be able to:
	CO1 - Explain logical sentences th connectives.	rough predicates, qua	ntifiers and logical
	CO2 - Deploy the counting techniq	ues to tackle combina	torial problems
	CO3 - Comprehend the basic princ relations.	ciples of set theory and	different types of
	CO4 - Apply different types of struc skills	ctures of trees for deve	eloping programming
Course Content:			
Module 1	Fundamentals of Logic		(10 Classes)
Propositional Equival	and Truth Tables, Propositional Lo lences, Predicates and Quantifiers, , Proof Methods and Strategy.		
Module 2	Principle of Counting	Assignment	(15 Classes)
	Principle of Counting	Assignment	(15 Classes)
The Well Ordering Pri The Basics of Cour		ns, Binomial Coeffici	ents and Identities,
The Basics of Cour Generalized Permuta Advanced Principle Co	nciple – Mathematical Induction nting, Permutations and Combinatio	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza	ents and Identities, binations
The Well Ordering Pri The Basics of Cour Generalized Permuta Advanced Principle Co Derangements – Noth	nciple – Mathematical Induction nting, Permutations and Combinatio tions and Combinations, Generating F ounting: The Principle of Inclusion and	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza	ents and Identities, binations
The Well Ordering Pri The Basics of Cour Generalized Permuta Advanced Principle Co Derangements – Noth Module 3 Cartesian Products ar	nciple – Mathematical Induction nting, Permutations and Combinatio tions and Combinations, Generating F ounting: The Principle of Inclusion and ning is in its Right Place, Rook Polyno	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza mials.	ents and Identities, binations tions of the Principle, (10 Classes)
The Well Ordering Pri The Basics of Cour Generalized Permuta Advanced Principle Co Derangements – Noth Module 3 Cartesian Products ar Function Composition Relations, Properties	Inciple – Mathematical Induction Inting, Permutations and Combinatio tions and Combinations, Generating F ounting: The Principle of Inclusion and hing is in its Right Place, Rook Polyno Relations and Functions Ind Relations, Functions, One-to-One, o	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza mials. Onto Functions. The P	ents and Identities, binations tions of the Principle, (10 Classes) igeon-hole Principle,
The Well Ordering Pri The Basics of Cour Generalized Permuta Advanced Principle Co Derangements – Noth Module 3 Cartesian Products ar Function Composition Relations, Properties Partial Orders, Lattice	Inciple – Mathematical Induction Inciple – Mathematical Induction Itions and Combinations, Generating F Inclusion and Combinations, Generating F Inclusion and Functions and Functions Ind Relations, Functions, One-to-One, on Ind Relations, Functions, One-to-One, on Inclusion and Inverse Functions. Incident of Relations, Computer Recognition -	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza mials. Onto Functions. The P	ents and Identities, binations tions of the Principle, (10 Classes) igeon-hole Principle,
The Well Ordering Pri The Basics of Cour Generalized Permuta Advanced Principle Co Derangements – Noth Module 3 Cartesian Products ar Function Composition Relations, Properties Partial Orders, Lattice Module 4 Homogeneous and i	Inciple – Mathematical Induction Inciple – Mathematical Induction Inting, Permutations and Combination tions and Combinations, Generating F ounting: The Principle of Inclusion and ing is in its Right Place, Rook Polyno Relations and Functions Ind Relations, Functions, One-to-One, F and Inverse Functions. of Relations, Computer Recognition – a, Hasse Diagrams, Equivalence Relations Recurrence Relations and	ns, Binomial Coeffici Permutations and Com Exclusion, Generaliza mials. Onto Functions. The P - Zero-One Matrices a tions and Partitions.	ents and Identities, binations tions of the Principle, (10 Classes) igeon-hole Principle, nd Directed Graphs, (10 Classes) g recurrences using

- Properties - Paths and connectedness - Sub graphs - Graph Isomorphism - Operations on graphs -Vertex and edge cuts - Vertex and edge connectivity, Euler and Hamilton Paths, Shortest-Paths.

Tree - Definitions, Properties, and Examples, Routed Trees, Binary search tree, Decision tree, spanning tree: BFS, DFS.



Algorithms on Networks - Shortest path algorithm- Dijikstra's algorithm, Minimal spanning tree- Kruskal algorithm and Prim's algorithm.

Targeted Application & Tools that can be used:

Discrete mathematics provides the mathematical foundations for many computer science courses including data structures, algorithms, database theory, automata theory, formal languages, compiler theory, computer security, and operating systems.

Assignment:

Assignment 1: Logic Equivalences and Predicate calculus.

Assignment 2: Equivalence Relations and Lattices

Assignment 3: Recurrence Relations

Text Book

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition, 2019.

2. Harary – Graph Theory, Addison-Wesley Publishing Company.

References:

- 1. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall.
- 2. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd.

3. Ralph. P. Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia.

E-resources/ Web links:

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED& aue_id=EBSCO95_30102024_54588

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED& gue_id=EBSCO95_30102024_375

https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html

https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course	Course Title: Software Design and	L-T- P- C	3-0-0-3
Code: CSE2271	Development	L-1- F- C	3-0-0-3



Version No.	1.0
Course Pre-requisites	NIL
Anti-requisites	NIL
Course Description	The objective of this course is to provide the fundamentals concepts of Software Engineering process and principles.
	The course covers software requirement engineering processes, system analysis, design, implementation and testing aspects of software system development.
	The course covers software quality, configuration management and maintenance.
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Software Engineering and attain Skill Development through Participative Learning techniques.
Course Out Comes	On successful completion of this course the students shall be able to:
	1] Describe the Software Engineering principles, ethics and proce models(Knowledge)
	2] Identify the requirements, analysis and appropriate design models for given application(Comprehension)
	3] Understand the Agile Principles(Knowledge)
	 Apply an appropriate planning, scheduling, evaluation and maintenan principles involved in software(Application)
Module 1	Introduction to Software Engineering and Process Models Quiz 10 Hour
	(Knowledge level)
Introduction: Need for	br Software Engineering, Professional Software Development, Softwa

Introduction: Need for Software Engineering, Professional Software Development, Software Engineering Ethics, Software Engineering Practice-Essence of Practice, General Principles Software Development Life Cycle

Models: Waterfall Model – Classical Waterfall Model, Iterative Waterfall Model, Evolutionary model-Spiral, Prototype.

Module 2	Software Requirements, Analysis and Desigr (Comprehension level)	Assignment	Development of SRS documents for a given scenario	12 Hours
Requirements En	gineering: Eliciting require	ments, Functi	onal and non- Functional re	equirements,
Software Requirer	nents Specification (SRS),	Requirement	Analysis and validation. R	equirements



modelling- Introduction to Use Cases, Activity diagram and Swim lane diagram. CASE support in Software Life Cycle, Characteristics of CASE Tools, Architecture of a CASE Environment.

Design: Design concepts, Architectural design, Component based design, User interface design.

Agile Principles & Devops	Quiz	10 Hours
(Knowledge level)		

Agile: Scrum Roles and activities, Sprint Agile software development methods - Scaling, User Stories, Agile estimation techniques, Product backlogs, Stake holder roles, Dynamic System Development Method.

Devops: Introduction, definition, history, tools.

Software Testing and Maintenance		Apply the testing concepts	13 Hours
(Application Level)	/ looigiintonit	using Programing	io nouro

Software Testing-verification and validation, Test Strategies - White Box Testing, Black box Testing. Automation Tools for Testing.

Software Quality Assurance-Elements of software quality assurance, SQA Tasks, Goals and Metrics, Software configuration management- SCM process, SCM Tools (GitHub).

Maintenance- Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models.

Targeted Application & Tools that can be used: Selenium, GitHub, CASE Tools

Text Book

 Roger S. Pressman, "Software Engineering – A Practitioner's Approach", VII Edition, McGraw-Hill,
 B2. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management", VI Edition, McGraw-201

References

- 1. Rajib Mall, "Fundamentals of Software Engineering", VI Edition, PHI learning private limited, 2015.
- 2. Ian Sommerville, "Software Engineering", IX Edition, Pearson Education Asia, 2011.
- 3. Agile Software Development Principles, Patterns and Practices.1st Edition, Wiley, 2002

Topics Relevant to "Skill Development: Balck box Testing, White box Testing, Automated Testing for Skill development through Participative Learning Techniques. This is attained through assessment mentioned in the course handout

Course Code:	Course Title: Object Oriented Programming Using Java	L-T- P- C	3	0	0	3
CSE2255	Type of Course: Theory - PCC					



Version No.	2.0					
Course Pre- requisites	Nil	Nil				
Anti-requisites	Nil	Nil				
Course Description	This course introduces to course has theory and l implementation and appli- the student to build real ti for effective problem sol- object oriented programm	ab component wh ication of object-ori me secure application lving. The students	ich emphasize iented program ons by applyin interpret and	es on understanding the ming paradigm. It helps g these concepts and also		
Course Objective	The objective of the co Problem-Solving using EXPERIENTIAL LEARN	JAVA and attain		-		
	On successful complet	ion of the course	the students	shall be able to:		
	CO1: Describe the basic	programming conce	epts. [Understa	and]		
Course Out	CO2: Apply the concept problems. [Application]	of classes, objects a	and methods to	solve		
Comes	CO3: Apply the concept	of arrays and string	s. [Appy]			
	CO4: Implement inherita [Apply]	nce and polymorph	ism building s	ecure applications.		
	CO5: Apply the concepts	of interface and er	ror handling m	echanism. [Apply]		
Course Content:						
Module 1	Basic Concepts of Programming and Java	Assignment	Problem Solving	9 Sessions		
-	tion to Principles of Pro	0		0 10		
Variables, Consta	oad Eclipse IDE to run Jants in java, Operators, Ass	1 0	I I U '	• • •		

Control Statements: Branching and Looping.

Classes, objects, Module 2 Constructors	Assignment	Problem Solving	10 Sessions
---	------------	--------------------	-------------

Topics: Classes, Objects and Methods: Introduction to object Oriented Principles, defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.

Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.

Module 3 Arrays, String and String buffer	Assignment	Problem Solving	8 Sessions
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Topics: Arrays: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Array of objects. String: Creation & Operation. String builder class, methods in String Buffer.

Module 4	Inheritance and Polymorphism	Assignment	Problem Solving	10 Sessions
Topics: Inherita	nce: Defining a subcl	ass. Types of In	heritance, super	keyword. Dynamic

Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.

Module 5	t & Output ration in Java	Assignment	Problem Solving	8 Sessions
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Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.

Text Book

T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education, 11th Edition, 2019.

References

R1. Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Tenth Edition, Pearson 2015.

R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.4th Edition, 2000.

R3. E. Balagurusamy, "Programming with Java", Tata McGraw Hill Education, 6th Edition, 2019.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: <u>Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenjl97t0] (vdoc.pub)</u>

Web resources

s://youtube.com/playlist?list=PLu0W_9III9agS67Uits0UnJyrYiXhDS6q

ps://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

- 1. Static Polymorphism
- 2. Method overloading, constructors
- 3. constructor overloading



- 4. this keyword
- static keyword and Inner classes
 Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.

Course Code:	Course Title: Data Structures Lab	L -т- Р- С	0	0		1	
CSE2254	Type of Course: Lab	L-1- P- C	0	0	2	-	
Version No.	1.0						
Course Pre-							
requisites							
Anti-requisites	NIL						
Course Description	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.						
Course Objective	The objective of the course is SKILL DEVI EXPERIENTIAL LEARNING techniques	The objective of the course is SKILL DEVELOPMENT of student by using EXPERIENTIAL LEARNING techniques					
Course Out Comes	On successful completion of the course the students shall be able to: CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand] CO2: Utilize linked lists for real-time scenarios. [Apply] CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply] CO4: Demonstrate different searching and sorting techniques. [Apply]						
Course Content:							
Module 1	Introduction to Data Structure and Linear Data Structure - Stacks and Queues	n activity			9 Ho	urs	



Gerrag Gode:-					
CSE2253	Introduction to Data St Type of Course: The	tuctures, Types and c	concept of Arrays .	3 0	0 3
Version No. Stack -Conce	1.0 pts and representation	n. Stack operations.	stack implementat	tion using a	rrav and
Course Pre-		· <u> </u>	<u>ł</u>	6	-
Appnetisites of	Stack.				
Anti-	NIL				
Orequisitesepre	sentation of queue, Qu	ieue Operations, Oue	eue implementation	using array.	Types of
Value Itopi	This course introduce				
Queue and Appl	cheoinsportqueeof cho	osing an appropriate	data structure and to	echnique for	program
Curre martippe	development .This of				
Course	-	•	±	1	
Description Module 2	Indeast Dding the im	1	1		
Module 2	Stouramming languag	ge Avstignarsonad kr	nowledgegiathadiw	damental con	1eepteurs
	data structures and pra	actical experience in :	implementing them,	, the student of	can be an
Topics: Linked	Ifist tiv Sidelightinke	veloper Aperationo fu	vdivepplications s	singly linked	storage
	U .	-	11		
	ar List, Applications of The objective of the		DEVELOPMENT	of student	by using
Reclaisictive Rec	u <mark>EXPERIENTIAL LEA</mark>	RNING eschniques			
	On successful com	nletion of the cours	a tha students sha	all he able to	
	On successful com Non-linear Data				12 Hours
Module 3	Stelctifescribertes c	Assignment concept of basic data	Program activi structure, stacks, qu	ty ueues, and ar	rays and
Topics: Trees - Course Out	Introduction of the second	Bistanydree :Term	inology and Propert	ies, Use of D	oubly
_			0 4		
Linkea List, Bin	a (y02e Waivizes alske Pri	ists for leaverbae, see	handos.transprayi, Pos	t - Order tra	iversal,
.Heaps , Exp	eS€J∂nA Ъpe ea,Ræ¢rd	plack nimet inear Alat	h s Træes e, Binagi v	Serachari Tre	[Apply]
	COA: Demonstrate a		-1	. [A]]	
	CO4: Demonstrate d	interent searching an	a sorting techniques	<u>. [Appiy]</u>	
Course	Non-linear Data				
Course	Structures -	Assignment	Program activity	6 Hours	
Content:		•			
	Graphs and				
	Graphs and Introduction to Data	l l			
Tonics Granks	Introduction to Data		perties Representa	tion of Gran	S -ADT
Topics: Graphs Module 1	Introduction to Data		perties, Representa rogram activity	tion of Graph	15).HOTTS
	Introduction to Data BAUETUCE AUG Data Stous, Minimum	i ¹ 5h Th assiganden s Pro n Cost spanning trees	operties, Representa rogram activity s, Shortest path and	tion of Graph Transitive cl	¹⁵ 9. Hours osure.
	Introduction to Data	i ¹ 5h Th assiganden s Pro n Cost spanning trees	operties, Representa rogram activity s, Shortest path and	tion of Grapl Transitive cl	18). ADTs osure.
Hashing: Introd	Introduction to Data BAUETUCE AUG Data Stous, Minimum	Bh Th assiganden s Pro n Cost spanning trees Dynamic Hashing			asy ADT osure.
Hashing: Introd	Introduction to Data Bauetochaud Linga hData Stous, twinimum Stacks and Queues uction, Static Hashing,	Bh Th assiganden s Pro n Cost spanning trees Dynamic Hashing			18). ADTs osure.
Hashing: Introd Introduction	Introduction to Data Base Constants of the second s	bh Th assigandeit s Pro n Cost spanning trees Dynamic Hashing tructures, Types and	concept of Arrays .		
Hashing: Introd Introduction	Introduction to Data Statetore and Lines hopta atons, twenimum Stacks and Queues uction, Static Hashing, -Introduction to Data S epts Sciar ching sentatio	bh Th assigandeit s Pro n Cost spanning trees Dynamic Hashing tructures, Types and	concept of Arrays .		
Hashing: Introd Introduction	Introduction to Data Staticture and Linea hData Storic Minimum Stacks and Queues uction, Static Hashing, Introduction to Data S epts Sharching sentatio Sorting	bh Th assigandeit s Pro n Cost spanning trees Dynamic Hashing tructures, Types and	concept of Arrays .		
Hashing: Introd Introduction	Introduction to Data Staticture and Linea hData Storic Minimum Stacks and Queues uction, Static Hashing, Introduction to Data S epts Sharching sentatio Sorting	bh Th assigandeit s Pro n Cost spanning trees Dynamic Hashing tructures, Types and	concept of Arrays .		
Hashing: Introd Introduction	Introduction to Data Staticture and Linea hData Storic Minimum Stacks and Queues uction, Static Hashing, Introduction to Data S epts Sharching sentatio Sorting	Figh Th assignmetrits Pro n Cost spanning trees Dynamic Hashing tructures, Types and Stack operations,	concept of Arrays . stack implementat Program activity	tion using a 6 Hours	rray and
Hashing: Introd Introduction	Introduction to Data Stauctore and Linea hData atous, twinimum Stacks and Queues uction, Static Hashing, Introduction to Data S epts Safar ching Sorting Stack.	Figh Th assignmetrits Pro n Cost spanning trees Dynamic Hashing tructures, Types and Stack operations,	concept of Arrays . stack implementat Program activity	tion using a 6 Hours	rray and
Hashing: Introd Introduction	Introduction to Data Data Etailoric action of the first	Figh Th assignmetrits Pro n Cost spanning trees Dynamic Hashing tructures, Types and Stack operations,	concept of Arrays . stack implementat Program activity	tion using a 6 Hours	rray and



Charles et Representation of queue, Queue Operations, Queue implementation using array, Types of Level 1: Prompt the user, read input and print messages. Programs using class, methods and Queues and Applications of Queue. Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario. Lab sheet -2 Level 1: Programming Electrises on Stack and its operations Assignmen 12 Hours Lever 2. Programming Exercises of Stack + and its operations with condition List **Topics: Linked List** - Singly Linked List, Operation on linear list using singly linked storage structules, Pengramming an Stack application infix to postfix Conversion **Recursion** - Recursive Definition and Processes. Lab sheet Level 1: Programming on Stack application As Bigamanon of postfix 12 Hours Lab sheet -5 Structures - Trees **Topics:** Treesgramming Exercise Frees QBingsy and its Terrations with & Andricoties, Use of Doubly Level 2: -Linked List, Binary tree traversals : Pre-Order traversal, In-Order traversal, Post - Order traversal, Lab sheet -6 .Heaps, Expression Tree, Red Black Tree - AVL Trees, Binary Serach Tree Level 1: Programming Exercises on Linked list and its operations. Programming Exercises on Linked list and its operations with various positions Level 2: 6 Hours Lab sheet -7 Structures -Assignment Program activity Program Grap Examples on Circular Linked list and its operations. Level 1: Hashing Topics Graphya Basing Excepts of Oracher Theo Linkedilis Properties of Reprise International Composition of the Composition of Elementary graph operations, Minimum Cost spanning trees, Shortest path and Transitive closure. Hashing: Introduction, Static Hashing, Dynamic Hashing Level 1: Programming Exercises on factorial of a number week of Hanoi using recursion Program activity 6 Hours Sorting Lab sheet -9 **Topic:** Sorting & Searching - Sequential and Binary Search, Sorting – Selection and Insertion sort, **Level 2:** Programming the tower of Hanoi using recursion Quick sort, Merge Sort, Bubble sort. Lab sheet -10 List of Laboratory Tasks: Latesheet Programming Exercise on Doubly linked list and its operations Level 2: Prompt the user, read input and print messages. Programs using class, methods and objects Lab sheet -11 Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario.



Lakesheet -Program to Construct Binary Search Tree and Graph

Level 2: Programming Exercises for Bracky sedrich aperations e ways) in-order, pre-order and post-

brief and Programming FSxare of on Stack and its operations with condition

Lab sheet = 12

Level 1: Programming on Stack application infix to postfix Conversion Program to Implement the Linear Search & Binary Search

Program to Estimate the Time complexity of Linear Search

Lab sheet =43 Level 1: Programming on Stack application – Evaluation of postfix Lavesheet Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Programmind Extensions on DEstimation that Superational exity containentian Sort

Lakespeet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Lab sheet -15 (Beyond syllabus activity). Even 1: Programming Exercises on Linked list and its operations. Level 1: Program to Construct RED BLACK Tree

Fargeted Appreamoning Foursises on Linked list and its operations with various positions Use of Power Point software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Programming Exercises on Circular Linked list and its operations. Level 1:

Project work/Assignment: Programming Exercises on Circular Linked list and its operations with various positions Level 2:

Assignment: Students should complete the lab programs by end of each practical session and

module wise assignments before the deadline.

Text Programming Exercises on factorial of a number

Theory Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press reprint 2018.

Level 1:

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014. Level 2: Programming the tower of Hanoi using recursion

Lab sheet -10

References Programming Exercise on Doubly linked list and its operations

Revel 2 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson

Lab sheet -11 education publishers, 2017.

Level 1: Program to Construct Binary Search Tree and Graph

Revenzeramming and Data Structure Bhyalackulin (Tselini etale Ang bonks nuch lisherside) and post-

order(and implement BFS and DFS **Web resources**:



Labrander 12. https://onlinecourses.nptel.ac.in/noc20_cs85/preview

Level 1: Program to Implement the Linear Search & Binary Search 2. https://puniversity.informaticsglobal.com/login

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Topics relevant to development of "Skill Development":

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort Linked list and stacks

Topted relevange and evelopment of the first ion mehr and sustain ability f Queuies Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and

module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities

Press, reprint 2018.

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.

R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources:

- 3. For theory :<u>https://onlinecourses.nptel.ac.in/noc20_cs85/preview</u>
- 4. https://puniversity.informaticsglobal.com/login



Topics relevant to development of "Skill Development":

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues

Course Code: CSE2252	Course Title: Data Con Computer Networks Lab Type of Course: Lab /)	L- T-P- C	0	0	2	1
Version No.	1.0		•				
Course Pre- requisites							
Anti-requisites	NIL						
Course Description	This lab-based course provides hands-on experience in the principles and practices of data communications and computer networking. It is designed to complement theoretical concepts covered in the associated lecture course. Through a series of structured experiments and practical exercises, students will gain proficiency in configuring, analyzing, and troubleshooting computer networks. Key topics include network topology design, IP addressing and subnetting, Ethernet and LAN technologies, routing and switching, TCP/IP protocol suite, and basic network security measures. Students will work with industry-standard tools and equipment, including routers, switches, protocol analyzers, and network simulation software such as Cisco Packet Tracer or Wireshark. The objective of this lab course is to provide students with practical, hands-on						
Objective	experience in the co communication systems real-world scenarios, s essential technical skills	onfiguration, operation, and computer networks students will reinforce , and gain a deeper under	, and troub . Through gui theoretical l erstanding of r	lesho ded e know	oting expendence vledg	g of riment e, de	data s and velop
Course Outcomes	 protocols, and devices used in modern communication systems. On successful completion of the course, the students shall be able to: Design and configure basic network topologies using routers, switches, and end devices to meet specified requirements. Analyze and troubleshoot network connectivity and performance issues using tools such as Wireshark and network simulators. Demonstrate understanding of key networking protocols (e.g., TCP/IP, ARP, ICMP, DHCP) through practical implementation and observation. Apply IP addressing and subnetting techniques to efficiently allocate and manage network resources in various networking scenarios. 						
Course Content:							
Module 1,2,3,4	Physical Layer, Network Layer, Transport Laye	Lab Assignment	Problem Sol	ving			4 sions



List of Laboratory Tasks: Lab sheet -1, M-1, 3 [2 Hours] Experiment No 1: Level 1: Study of basic network commands and network configuration commands. Lab sheet -2, M-1[2 Hours] Experiment No 1: Level 1: Identify and explore Network devices, models and cables. Introduction to Cisco packet tracer. Experiment No. 2: Level 2 – Create various network topologies using a cisco packet tracer. Lab sheet -3, M-2,3 [2 Hours] Experiment No. 1: Level 2 - Basic Configuration of switch/router using Cisco packet tracer. Experiment No. 2: Level 2 -Configure the privilege level password and user authentication in the switch/router. Lab sheet – 4, M-3 [2 Hours] Experiment No. 1: Level 2 - Configure the DHCP server and wireless router and check the connectivity Lab sheet -5, M-3 [2 Hours] Experiment No. 1: Level 2 - Configure the static routing in the Cisco packet tracer. Experiment No. 2: Level 2 - Configure the dynamic routing protocol in the Cisco packet tracer. Lab sheet -6, M-4 [2 Hours] Experiment No. 1: Configuration of DNS Server with Recursive & amp; Integrative approach in Cisco packet tracer. Lab sheet - 7, M-4 [2 Hours] Experiment No. 1: Configure the telnet protocol in the router using the Cisco packet tracer. Lab sheet -8, M-4[2 Hours] Experiment No. 1: Level1- Introduction to NS2 and basic TCL program. Lab sheet – 9, M-4 [2 Hours] Experiment No. 1: Level 1: Simulate three node Point to point network using UDP in NS2. Experiment No. 2: Simulate transmission of Ping message using NS2. Lab sheet - 10, M-4[2 Hours] Experiment No. 1: Simulate Ethernet LAN using N-node in NS2. Experiment No. 2: Simulate Ethernet LAN using N-node using multiple traffic in NS2 Lab sheet -11, M-3,4 [2 Hours] Experiment No. 1: Level 1- Introduction to Wire Shark. Experiment No. 2: Level 2- Demonstration of packet analysis using wire shark.



Lab sheet -12, M-1,2,3 [2 Hours]

Experiment No. 1:

Level 2- Demonstration of switch and router configuration using real devices

Targeted Application & Tools that can be used: Cisco Packet Tracer, Wireshark, and NS2.

Case Study/Assignment: Choose and analyze a network from any organization/Assignment proposed for this course in CO1-CO4

Problem Solving: Choose and appropriate devices and implement various

network concepts.

Programming: Simulation of any network using NS2.

Text Book(s):

- 1. Behrouz A. Forouzan, "Data Communications and Networking 5E", 5 th Edition, Tata McGraw-Hill, 2017.
- 2. Andrew S Tanenbaum, Nick Feamster & amp; David J Wetherall, "Computer Networks" Sixth Edition, Pearson Publication, 2022

Reference(s):

- 1. "Computer Networking: A Top-Down Approach", Eighth Edition, James F. Kurose, Keith W. Ross, Pearson publication, 2021.
- 2. William Stallings, Data and Computer Communication, 8th Edition, Pearson Education, 2007.
- 3. Larry L. Peterson and Bruce S. Davie: Computer Networks A Systems Approach, 4th Edition, Elsevier, 2007.

E- Resources:

- 1. https://archive.nptel.ac.in/courses/106/105/106105183/
- 2. http://www.nptelvideos.com/course.php?id=393
- 3.https://www.youtube.com/watch?v=3DZLItfbqtQ
- 4.https://www.youtube.com/watch?v=_fIdQ4yfsfM
- 5. https://www.digimat.in/keyword/106.html
- 6. https://puniversity.informaticsglobal.com/login

Course Code: MAT2303	Course Title: Linear Algebra & Vector Calculus Type of Course:BSC	L-T- P- C	3	1	0	4
Version No.	1.0					
Course Pre- requisites	Basic Concepts of Limits, D Level)	Basic Concepts of Limits, Differentiation, Integration, Matrices (PU Level)				
Anti-requisites	NIL					
Course Description	their operations within t differentiation and integra problems related to linea interpretations in higher din physics, engineering, and	This course explores the fundamental concepts of vectors, matrices, and their operations within the context of calculus, including vector differentiation and integration, while applying these tools to solve problems related to linear systems, transformations, and geometric interpretations in higher dimensions, often with applications in fields like physics, engineering, and computer graphics; key topics include vector algebra, matrix operations, determinants, eigenvalues, eigenvectors,				



Module 1	Systems of Linear Equations 6. Classes)
Course Content:	
	CO4 - Learn different notions of vector and scalar fields with their properties. Understanding the major theorems (Green's, Stokes', Gauss') and some applications of these theorems.
	CO2 - Understand the abstract notions of vector space and dimensionality of it. CO3 - find the matrix representation of a linear transformation given bases of the relevant vector spaces.
Course Out Comes	On successful completion of the course the students shall be able to: CO1 - Use matrix methods and certain techniques to solve the system of linear equations and to find eigen values, eigen vectors of a matrix to check whether it is diagonalizable.
Course Objective	Theorem, and the Divergence Theorem. The course is intended to develop computational proficiency involving procedures in Matrices, Linear Algebra and Vector Calculus which are useful to all engineering disciplines. This course is to equip students with the ability to understand and manipulate vectors in multidimensional space, apply matrix operations to solve systems of linear equations, and utilize concepts like gradients, divergence, and curl to analyze physical phenomena, all while developing a strong foundation for applying these tools in various scientific and engineering fields like physics, mechanics, and computer graphics.
	gradients, divergence, curl, line integrals, surface integrals, and the fundamental theorems of vector calculus like Green's Theorem, Stokes' Theorem, and the Divergence Theorem.

Systems of Linear Equations, Matrices and Elementary Row Operations, Echelon forms, Matrix operations, invertible matrices, Determinants and their properties, Cramer's Rule, LU-decomposition, Applications of Systems of Linear Equations.

Module 2	Vector Space	Assignment	(9Classes)
Linear Combination	s and Linear Indepe	ndence, Vectors in n R ⁿ , Linea	ar Combinations, Linear
Independence Vector	or Spaces, Definition	of a Vector Space, Subspaces	, Basis and Dimension,

Independence Vector Spaces, Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis, Orthogonal bases and orthogonal projections.

Module 3	Linear Transformations	(15 lectures)	

Linear Transformations, Algebra of transformations, The Null Space and Range, Isomorphisms, Matrix Representation of Linear Transformations, Similarity Eigenvalues and Eigenvectors, Eigen values and Eigen vectors, Diagonalization.

Inner Product Spaces, The Dot Product on Rⁿ and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Application: Least Squares Approximation, Diagonalization of Symmetric Matrices, Application: Quadratic Forms.

Singular Value Decomposition: Singular values, computing singular value decomposition, and Introduction to principal component analysis.

Module 4	Vector Calculus	Assignment	(15 lectures)



Vector & Scalar Functions and Fields, Derivatives, Curve, Arc length, Curvature & Torsion, Gradient of Scalar Field, Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field, Physical interpretation, solenoidal and irrotational vector fields. Problems.

Line Integrals, Path Independence of Line Integrals, Green`s Theorem in the plane, Surface Integrals, Divergence Theorem of Gauss, Stokes`s Theorem.

Targeted Application & Tools that can be used:

- Solve systems of linear equations using various methods including Gaussian and Gauss Jordan elimination and inverse matrices.
- Perform matrix algebra, invertibility, and the transpose and understand vector algebra in Rⁿ.
- Determine relationship between coefficient matrix invertibility and solutions to a system of linear equations and the inverse matrices.
- Find eigenvalues and eigenvectors and use them in applications.
- Find the dimension of spaces such as those associated with matrices and linear transformations.
- Understand real vector spaces and subspaces and apply their properties.
- Compute inner products in a real vector space and compute angle and orthogonality in inner product spaces.
- Create orthogonal and orthonormal bases: Gram-Schmidt process and use bases and orthonormal bases to solve application problems.
- Prove basic results in linear algebra using appropriate proof-writing techniques such as linear independence of vectors; properties of subspaces; linearity, injectivity and subjectivity of functions; and properties of eigenvectors and eigenvalues.

Assignment:

Preparation of power-point slides, which include videos, animations, pictures, graphics for better erstanding the applications of Linear Algebra and Vector Calculus to engineering applications – The Ity will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Linear ebra and Vector Calculus is covered.

Text Book

1. Gilbert Strang, Linear Algebra and its applications, Wellesley-Cambridge Press,U.S.; 6th edition.

2. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

1. Introduction to Linear Algebra with Application, Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill

2. Elementary Linear Algebra, Applications version, Anton and Rorres, Wiley India Edition.

3. Advanced Engineering Mathematics, Erwin Kreysig, Wiley Publication.



Elementary Linear Algebra, Ron Larson, Cengage Learning. 4. 5. Linear Algebra and its Applications, David C. Lay, Pearson Education. E-resources/ Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& 1. unique id=EBSCO95 30102024 9607 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& 2. unique id=EBSCO95 30102024 143156 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& 3. unique id=CUSTOM PACKAGE EBSCO 29052023 270975 4. https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& unique id=EBSCO95 30102024 94555 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& 5. unique id=EBSCO95 30102024 243864 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE BASED& 6. unique id=EBSCO95 30102024 224531 NPTEL Video Lectures Matrices and Linear Algebra: 7. 8. https://nptel.ac.in/courses/111106051/ 9. NPTEL Video Lectures Differential Equations: 10. https://nptel.ac.in/courses/111106100/ 11. NPTEL Vector Calculus: 12. https://nptel.ac.in/courses/111/105/111105122/ 13. https://www.math.hkust.edu.hk/~magian/ma006_0607F.html 14. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course Code: ECE1511	Course Title: Design Workshop Course Type : ESC	L- T-P- C	1	0	2	2
Version No.	1.0					
Course Pre- requisites	NIL					



Anti-	NIL					
requisites Course Description Course Objective	Raspberry pi and their app Throughout the course, stu programming and gain han explore how to connect and sensor data, and use it to co beginners who are interested applications using Arduino	lication in various real dents will learn the funds-on experience with d interface sensors with ontrol various output of ed in exploring the work of Raspberry Pi and sent course is Employ	vability Skills of stude	sors. Raspberry Pi udents will boards, read le for pping practical		
Course Outcomes Course	 Explain the main feature Demonstrate the hardways system. Understand the types of 	 Demonstrate the hardware interfacing of the peripherals to Arduino and Raspberry Pi system. Understand the types of sensors and its functions Demonstrate the functioning of live projects carried out using Arduino and Raspberry 				
Content: Module 1	Basic concepts of Microcontrollers	Hands-on	Interfacing Task and Analysis	3 Sessions		
features, Conc Introduction to Arduino Comm	to Arduino, ESP and Node R tept of digital and analog p Embedded C and Arduino pl nunications, Arduino IDE, Va	ports, Familiarizing v atform, Arduino Data rious Cloud Platforms	with Arduino Interfacing B types and variables, Arduino	oard, API's , i/o Functions,		
Module 2	Sensory Devices	Hands-on	Analysis	3 Sessions		
Sensor, Connec Introduction to	rs: Humidity Sensor, Tempera cting Switches and actuators, 3D Printer: 3D Printer techno org: Working with AutoCAD	sensor interface with ology and its working	Arduino. Principles, Applications. Int			

online Simulators: Working with AutoCAD/Fusion 360 Simulator.

Module 3	Introduction to Micro python	Hands-on	Interfacing Task and Analysis	4 Sessions			
Topics:							
Introduction to MicroPython, Comparison with other programming languages, Setting up the MicroPython development environment, Basics of MicroPython syntax and structure.							
Module 4	Working with	Hands-on	Interfacing Task	5 Sessions			
Module 4	Raspberry-pi	Hallus-oli	and Analysis				
Introduction to raspberry p	Introduction to raspberry pi boards, pin-diagram, different types of raspberry pi boards and its application,						
LED and switch control. Mastering Modules, Setup Raspberry - PuTTY SSH, VNC Viewer to interface with							
more complicated sensors and actuators. Various Libraries and its functions.							
-							



Lab: Name of the Experiments:

- 1. Introduction Lab 1: Level 1: Overview on Arduino based Micro-controller, and sensors. Level 2: Interfacing of Arduino and ESP boards with sensors and other components. 2. Lab 2: Smart Plant Monitoring Level 1- Push button-controlled LED. Level 2- Automatic Irrigation and monitoring System using Arduino 3. Lab 3: Robotics with Arduino. Level 1- Servo Motor control using Arduino Level 2: DC Motor Control Using Arduino for Robotics. 4. Lab 4: Environmental pollution using ESP. Level 1 - IoT based air Pollution Monitoring System. Level 2- IoT Based water pollution system 5. Introduction Lab for raspberry pi: Level 1: Overview on Different Raspberry Pi Boards, and sensors. Level 2: Configuring the Raspberry Pi and Interfacing with sensors and other components. 6. Lab 7: Raspberry Pi based Object Detection using TensorFlow and OpenCV. 7. Lab 8: Speech Recognition on Raspberry Pi for Voice Controlled Home Automation. 8. Lab 9: Design the website using HTML and CSS, and host the website on Raspberry Pi. 9. Introduction Lab for 3D printing: Overview of 3D printing. Design of 3D structure using the CAD. Understand the steps of fabrication of simple rectangular box using 3D printer. 10. Lab 10: Design and print of Hollow Cylindrical structure using 3D CAD and 3D printer. 11. Lab 11 Demonstration of Jetson nano board and its capability. (OPTIONAL) 12. Lab 12: Revision
 - 12. Lab 12: Revision 13. Lab 13: Revision
 - 14. Lab 14: Mini Project
 - 15. Lab 15: Mini Project Evaluation.

Topics: Types of Arduino boards, Thonny Python, Python IDLE, sensors, 3D Printer

Targeted Application & Tools that can be used:

Application Area:

Home Automation, Environmental Monitoring, Agriculture and Farming, Industrial Automation, Internet of Things (IoT), Robotics, Wearable Devices, Security Systems, Education and Learning. These are just a few examples of the many application areas where Arduino, Raspberry Pi and sensors can be applied. The flexibility and affordability of Arduino, and Raspberry Pi combined with the wide range of sensors available, allow for endless possibilities in creating innovative projects.

Professionally Used Software: Students can use open SOURCE Software's Arduino IDE and Tincker CAD, Thonny Python, Python IDLE etc.

Project work/Assignment:

1. Projects: At the end of the course students will be completing the project work on solving many real time issues.

2. Book/Article review: At the end of each module a book reference or an article topic will be given to an individual or a group of students. They need to refer the library resources and write a report on



their understanding about the assigned article in appropriate format. <u>Presidency University Library</u> <u>Link</u>.

3. Presentation: There will be a presentation from interdisciplinary students group, where the students will be given a project on they have to demonstrate the working and discuss the applications for the same

Textbook(s):

- 1. Monk Simon "Programming Arduino: Getting Started with Sketches", Mc Graw Hill Publications Second Edition
- 2. Monk Simon "Raspberry Pi Cookbook: Software and Hardware Problems and Solutions", Publisher(s): O'Reilly Media, Inc. ISBN: 9781098130923 fourth Edition.

References

Reference Book(s)

1. Neerparaj Rai "Arduino Projects for Engineers" BPB publishers, first edition, 2016.

2. Ryan Turner "Arduino Programming" Nelly B.L. International Consulting Ltd. first edition, 2019.

3. Charles Bell Micro Python for the Internet of Things: A Beginner's Guide to Programming with Python on Microcontrollers" by" Edition 1, 2017, ISBN 978-1-4842-3123-4

4. Stewart Watkiss "Learn Electronics with Raspberry Pi " Apress Berkeley, CA . second edition,2020. ISBN 978-1-4842-6348-8

5. Jo Prusa, "Basic of 3D printing", Prusa Research, 3rd edition.

6. <u>Volker Ziemann</u>, "A Hands-On Course in Sensors Using the Arduino and Raspberry Pi (Series in Sensors)", CRC Press, 1st Edition. 2018.

Online Resources (e-books, notes, ppts, video lectures etc.):

- 1. Arduino trending Projects < <u>https://www. https://projecthub.arduino.cc/</u>>
- 2. Introduction to Arduino < <u>https://onlinecourses.swayam2.ac.in/aic20_sp04/preview></u>
- 3. Case studies on Wearable technology< <u>https://www.hticiitm.org/wearables></u>
- 4. Raspberry-pi Projects < <u>https://magpi.raspberrypi.com/articles/category/tutorials/</u>>
- 5. Introduction to internet of things< <u>https://nptel.ac.in/courses/106105166></u>

E-content:

- 1. Cattle Health Monitoring System Using Arduino and IOT (April 2021| IJIRT | Volume 7 Issue 11 | ISSN: 2349-6002)
- 2. M H Hemanth Kumar, Ravi Pratap Singh, Nishu Sharma, Pragya Singh" IOT BASED SMART SECURITY SYSTEM USING ARDUINO" 2021 JETIR August 2021, Volume 8, Issue 8.
 - 3. R. Maheswar, P. Jayarajan, S. Vimalraj, G. Sivagnanam, V. Sivasankaran and I. S. Amiri, "Energy Efficient Real Time Environmental Monitoring System Using Buffer Management Protocol," 2018, pp. 1-5, doi: 10.1109/ICCCNT.2018.8494144. https://ieeexplore.ieee.org/document/8494144.
 - Yaser S Shaheen, Hussam, "Arduino Mega Based Smart Traffic Control System ," December 2021 Asian Journal of Advanced Research and Reports 15(12): 43-52, 2021(15(12): 43-52, 2021):15(12): 43-52, 2021.
- Basil, Eliza Sawant, S.D. "IoT based traffic light control system using Raspberry Pi " DOI 10.1109/ICECDS.2017.8389604
- 6. Supriya S, 2Dr. Aravinda " Green leaf disease detection and identification using Raspberry Pi https://www.irjet.net/archives/V9/i8/IRJET-V9I847.



7. Dr. E.N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI : http://dx.doi.org/10.13005/ojcst12.01.03

Topics relevant to development of "SKILL": System design for achieving Sustainable Development Goals.

Course Code: PPS1026	Course Title: Industry Readiness Program – II (Audited Course) Type of Course: Practical Only Course	L- T - P- C	0	0	2	0
Version No.	1.0		1			I
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	This course is designed to enable students learn styles and use empathy in leadership. The course will benef effectively through various activities and learning me	it learners in				
Course Objective	The objective of the course is to familiarize the "Industry Readiness for Young Profess DEVELOPMENT through PARTICIPATIVE LEAR	ionals" a	nd	at	coı tain	-
Course Out Comes	On successful completion of this course the stu CO 1 Apply different communication skills for succ CO 2 Practice team building skills for career succ CO3 Demonstrate ethical leadership skills in work	cess in workj cess			e to:	
Course Content						
Course Code: CSE2201	Course Title: Program Solving Using C Lab Type of Course: Lab - PCC	L- T-P-C	0	0	4	2
Version No.	1.0					
Course Pre- requisites	NIL					
Anti-requisites	NIL					
Course Description	The course is designed to provide complete knowled will be able to develop logics which will help the applications in C. ACAlso by learning the basic progr easily switch over to any other language in future.	em to create	pro	ogra	ms	and
Course Object	The objective of the course is to familiarize the learner Problem SolvingUsing C and attain Employability thr Methodologies.					

Course Code EEE1250	Course fitle: Bisics of Electrical and CYL-T-P-C 0 0 2 1
Version No.	CATE OFFICIENTS - ESSITY YEARS
Course Pre- requisites	NIL
Anti-requisites	NIL
Course Description	This fundamental laboratory provides an opportunity to validate the concepts taught in the basics of electrical and electronics engineering and enhances the ability to visualize real system performance, using both hardware and simulation tools.
Course Objective	The objective of the course is to familiarize the learners with the concepts of Basics of Electrical and Electronics Engineering and attain Skill Development through Experiential Learning techniques.
Basic skill sets required for the laboratory:	
	The students shall be able to develop:
	 An attitude of enquiry. Confidence and ability to tackle new problems. Ability to interpret events and results. Ability to work as a leader and as a member of team. Assess errors and eliminate them. Observe and measure physical phenomenon. Write Reports. Select suitable equipment, instrument and materials. Locate faults in systems. Manipulative skills for setting and handling equipment. The ability to follow standard test procedures. An awareness of the need to observe safety precautions. To judge magnitudes without actual measurement.
Course Out Comes	 Apply basic laws of Electrical Engineering to compute voltage, currents, and other parameters in the circuits. Demonstrate the working of electrical machines to observe performance characteristics. Demonstrate the working of electronic circuits to obtain the V-I Characteristics of various semiconductor devices. Sketch the characteristics and waveforms relevant to standard electrical and electronic circuits
course content.	List of Laboratory Tasks:
	 Experiment No 1: Verification of KVL and KCL for a given DC circuit. Level 1: Study and Verify KVL and KCL for the given electrical Circuit. Level 2: For the same circuit considered in level 1, perform the simulation using NI LabVIEW/Multisim/MATLAB. Experiment No 2: Analyse AC series circuits – RL, RC and RLC . Level 1: Conduct an experiment to perform and verify the impedance, current and power of Series RL and RC circuits



Level 2: Conduct an experiment to perform and verify the impedance and current of RLC series circuits.

Experiment No 3: Calculation of power and power factor of the given AC Circuit.

Level 1: Conduct an experiment to measure the power and power factor for given resistive load.

Level 2: Conduct an experiment to measure the power and power factor for given inductive load.

Experiment No 4: Perform the experiments on given Transformer.

Level 1: Verify the EMF equation of a transformer and compute the voltage transformation ratio.

Level 2: Study the effect of load on the secondary side of the transformer and verify the EMF equation under load conditions.

Experiment No 5: Load test on DC shunt motor

Level 1: Conduct load test on DC shunt motor and find its efficiency at different loads

Level 2: Conduct load test on DC shunt motor and plot the performance characteristics.

Experiment 6: Study of PN-Junction Diode Characteristics in Forward and Reverse Bias Conditions.

Level 1: Carry out an experiment to plot VI Characteristics and hence find the cutin voltage on forward characteristics for the Silicon P-N Junction diode.

Level 2: Carry out an experiment to plot VI Characteristics of Zener diode and hence find the zener voltage on reverse characteristics for the Silicon P-N Junction zener diode.

Experiment No. 7: To observe the output waveform of half wave and full wave rectifier circuit and compute ripple factor and efficiency

Level 1: Identify the components required for a rectifier circuit, rig up the circuit, and sketch the output waveforms without filter.

Level 2: Rig up the rectifier circuit with RC filter, observe the output waveforms, determine the efficiency and ripple factor.

Experiment 8: To construct clipping and clamping circuits for different reference voltages and to verify the responses.

Level 1:Identify the components required for building a Clipper / Clamper circuit. Rig up the circuit according to the circuit diagram given and sketch the output waveform.

Level 2: Given a sinusoidal input of 10 V p-p, implement a positive / negative clipper with output clipped at 2 V.

Experiment 9: To calculate various parameters of emitter follower circuit using BJT

Level 1: Identify the components required to implement an emitter follower circuit. Rig up the circuit and observe the variations in output waveform with respect to the variations in input waveform.

Level 2: Determine the values of Z_{in} input impedance and Z_{out} output impedance for Emitter Follower.

Experiment 10: To Implement RC Coupled amplifier using a BJT and sketch the frequency response.



Level 1: Identify the components required to implement an RC coupled amplifier circuit. Rig up the circuit and sketch the frequency response.

Level 2: From the frequency response curve determine the value of the mid band gain and the bandwidth.

Targeted Application & Tools that can be used:

Targeted Applications: Application Area includes all electrical and electronic circuits (power supply unit, regulator unit, embedded devices, hardware electronics etc.). The students will be able to join a profession which involves basics to high level of electronic circuit design.

Professionally Used Software: Multisim/ P Spice

Besides these software tools hardware equipment such as Multimeters, Function Generators, Power Supplies, Oscilloscopes etc., can be used to perform component/circuit testing and analysis.

Course Material

1. Basics of Electrical and Electronics Engineering Laboratory Manual, Presidency University, Bengaluru.

Text Book:

2. Kothari D. P. & Nagrath I. J., "Basic Electrical and Electronics Engineering", Tata McGraw-Hill

Reference Books:

3. John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and Electronic Technology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson,2011

4. Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007.

5. K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd

6. R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition.

7. A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition

8. A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition **Online Learning Resources:**

9. <u>https://presidencyuniversity.linways.com</u>

10. https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples"

11. Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati, <u>https://nptel.ac.in/courses/117/103/117103063/</u>

Topics relevant to "SKILL DEVELOPMENT": All the experiments which are listed are for **Skill Development** through **Experiential Learning Techniques**. This is attained through the assessment component mentioned in course handout.



Course Outcomes	On successful completion of this course the students shall be able to:
	1. Write algorithms and to draw flowcharts for solving problems
	2. Demonstrate knowledge and develop simple applications in C
	programmingconstructs
	3. Develop and implement applications using arrays and strings
	4. Decompose a problem into functions and develop modular reusable code
	5. Solve applications in C using structures and Union
	6. Design applications using Sequential and Random Access File
	Processing.
Course Content:	

List of Practicals:

Lab Sheet 1: 10 Sessions

Program 1: Sum of Two Numbers

Program 2: Find the Greatest of Three Numbers

Program 3: Check Even or Odd using Conditional Operator

Program 4: Print Multiplication Table using Loop

Program 5: Count Digits in a Number using While Loop

Program 6: Demonstration of Preprocessor Directives

Program 7: Simple Calculator using Switch Case

Lab Sheet 2: 10 Sessions

Program 1: Check Whether a Number is Positive, Negative or Zero

Program 2: Find the Sum of First N Natural Numbers

Program 3: Check Whether a Number is Prime or Not

Program 4: Find Factorial of a Number

Program 5: Reverse a Number

Program 6: Simple Number Guessing Game

Lab Sheet 3: 10 Sessions

Program 1: Linear Search in a One-Dimensional Array

Program 2: Bubble Sort on an Integer Array

Program 3: Matrix Addition (2D Arrays)

Program 4: Count Vowels in a String

Program 6: Selection Sort on an Array

Lab Sheet 4: 10 Sessions

Program 1: Sum of Two Numbers Using User-Defined Function
Program 2: Factorial Using Recursion
Program 3: Swap Two Numbers Using Call by Value (No Swap)
Program 4: Swap Two Numbers Using Call by Reference (With Swap)
Program 5: Pointer Basics - Access and Modify Variable via Pointer
Program 6: Accessing Array Elements Using Pointers

Lab Sheet 5: 10 Sessions

Program 1: Basic Structure UsageProgram 2: Input and Display Array of StructuresProgram 3: Array Inside Structure (Student Marks)Program 4: Structure with Nested Structures (Date of Birth)



Program 5: Union Example and Member Access

Lab Sheet 6: 10 Sessions

Program 1: Write to a File (Text Mode)

Program 2: Read from a File (Text Mode)

Program 3: Append Data to a File

Program 4: Count Characters, Words and Lines in a File

Program 5: Write and Read Structure to/from a Binary File

Program 6: Random Access in File (Update a Record)

Text Book(s):

1. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316- 513-0.

Reference Book(s):

- 1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
- 2. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.

3. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015

- 4. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.
- 5. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Web Links and Video Lectures:

- 1. <u>https://nptel.ac.in/courses/106/105/106105171/</u>
- 2. https://archive.nptel.ac.in/courses/106/104/106104128/

Course Code: MAT2301	Course Title: Calculus and Differential Equations Type of Course: BSC	L-T- P- C	3	1	0	4
Version No.	1.0			•		
Course Pre- requisites Anti-requisites	NIL					
Course Description	Calculus and differential equations ar mathematics, statistics and operations resea able to build upon the foundations of calculus repertoire of theory and practice in these are differential equations in the description and will also be considered. This unit will extend knowledge and use of techniques in different focuses on the concepts of Calculus and Diff specific engineering problems. The course is type in nature.	rch. In this cours s established to g eas. The applicat l modelling of r the problem-sol ial and integral of erential Equations s of both conce	rse, st greatly tion o eal-w ving s calcul ns wi ptual	tuden y enha of calo corld skills us. Th th ref and a	ts car ance t culus probl , rang he co erenc analy	n be their and ems ge of urse ce to tical
Course Objective	The goal of the course Calculus and Differ students with a concrete foundation of differ	1				



	nd higher-order ordinary differential equations enabling them to acquire the nowledge of these mathematical tools.					
Course Out Comes	 On successful completion of the course the s 1. Apply the knowledge of calculus curves and its applications in determinin 2. Apply the principles of integral calculation 3. Learn the notion of partial different multivariate functions and solve problem Jacobian. 4. Solve first-order linear/nonlinear analytically using standard methods. 	to solve problems related to polar ag the bentness of a curve. ulus to evaluate integrals. iation to calculate rate of change of as related to composite functions and				
Course Content:						
Module 1	Differential Calculus	(10 Classes)				
Polar Coordinates, polar curves, angle between radius vector and the tangent, angle between two curves, pedal equations, curvature and radius of curvature. Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and						

divergence.

Module 2	Integral Calculus	Assignment	(10 Classes)

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Rolle's theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule; Maxima and minima.

Module 3	Multivariable Calculus		(10 lectures)	
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Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Module 4 Differential Equations	Assignment	(15 lectures)	
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Definition, types of Differential Equations, Applications, Variable Separable, Homogeneous, Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for x and Clairaut's type.

Linear differential equations of second and higher order with constant coefficients - Non-Homogeneous term of the type $Q(x) = e^{ax}$, Sin ax, Cosax, $e^{ax}v(x)$, $x^nv(x)$ - Method of variation of parameters.

Targeted Application & Tools that can be used:

Differential calculus is used extensively in science and engineering. It can solve problems related to motion, velocity, acceleration, angles of incline or curve on a surface, etc.

Differential Equations are used to model the behavior of electromagnetic fields, including in the design of antennas, microwave ovens, and other devices. Biology: PDEs are used to model biological processes, such as the spread of diseases and the development of biological tissues. Tools Used: Python.



Assignment:

1. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book

1. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition

2. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

1. Victor Henner, Tatyana Belozerova, Mickhail Khenner, Ordinary and Partial Differential Equations, CRC Press, Edition, 2013.

2. Walter Ledermann, Multiple integrals, Springer, 1st edition

3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

E-resources/ Web links:

 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU

 E_BASED&unique_id=EBSCO95_30102024_103205

2. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_106839</u>

3. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_61605</u>

4. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u>

<u>E_BASED&unique_id=EBSC095_30102024_134719</u>

5. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html

6. <u>https://www.scu.edu.au/study-at-scu/units/math1005/2022/</u>

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course Code: PHY2501	Course Title: Optoelectronics and Quantum Physics Type of Course: BSC	L-T-P- C	3	0	0	3
Version No.	1.0	•				
Course Pre- requisites	NIL					
Anti- requisites	NIL					



Course	The	REACH GREATER HEIGHTS	a1au1			dents to u	underete	hd the	tundor	ontolo
Course		Course Title: C	alculus a	and Linear						
Course Code:	r	ⁱ Algebra			v	ices and L-T- P-				
MAT1001	r r	sType of Course:	Basic S	Sciences		(C	13	n o	φ ¹ 2	^{r:} 4
Course Out	On s	Theory			L	dents sha	all be ab	e to:		
Comes		-								
Version No.	•	: 3.0								
Course Pre-	sem	conductor and su Basic Concepts	of Limi	ductivity ts. Differenti	iation	Integrat	ion			
requisites	2	: To understand th		-			IOII			
requisites	<u>د</u>	. To understand th	e princip	les of qualitur	mmed	Lindinics.				
Anti-requisites	3	NIL .								
Course	1	. The course focu	ses on tl	ne concepts c	of cale	culus and	linear a	algebra	with	
Description	ls	reference to spe	cific eng	ineering pro	blems	s. The cou	urse is o	of both	concept	tual
Course	The	cand analytical ty	pe in na	ture. The lab	sess:	ions asso	ciated w	vith the	course	are
Objective Physiconcerned with acquiring an ability to use the MATLAB software.										
		tum mechanics a					0 1			
Course Object	ive _	The objective of		rse 1s Skill L	Develo	opment of	fstuden	t by us	ing Pro	blem
Content:		Solving Technic	lues.							
Course Out Co	omes	t On successful c	ompletic	on of the cou	rse th	e student	s shall b	e able	to:	
Module 1	Soli Sem		the know	wledge of ap	plicat	ions of m	natrix pr	rinciple	s.	
Topics: Clas	ssifica	(12) Understand t	he conce	pt of partial	deriv	atives and	d their a	pplicat	ions.	
semiconductor	s, La	v								
Superconduct	tivity, į	o3) Apply the pri	nciples o	of integral ca	lculu	s to evalu	ate inte	grals.		
Module 2	Quan	t 4) Adopt the	various	analytical m	ethod	s to solve	e differe	ntial ec	luations	5.
Topics: Introduc		(5) Demonstrate	the use (of MATLAR	softv	vare to de	al with	a varie	ty of	
significance. N	Wave				50110			a varie	ty 01	
equation, Prob	ability	mathematical pr	oblems.							-
Course Conten	it:	n titi onorotor Dot	orminatio	n at UAL and	1115				rotione	0 0 0 0 0
,	lnner	Product) Probabili	ity Ortho	gonality						
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Module 1)	t Algebra g				omputers		1	110 Se	ssions
		-		1		mpuleis	•		1	

Review: Types of matrices, elementary transformations, rank of a matrix, normal form, Solution of systems of linear equations: (Homogenous and non-homogenous system) AX = O and AX = B using rank method.

Linear Algebra:

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

Engineering Applications of Linear Algebra.



1 Areas of appPartial toelectronics industry Solar papel technologies quantum
University of the second secon
endoscopy, SQ אראוע אוו פישוע, הdvanced material characterizations using SEM and STM.
Review: Differential calculus with single variable.
Partial Derivatives:
Homogeneous functions and Euler's theorem, Total derivative, Change of variables, Jacobians,
Partial differentiation of implicit functions, Taylor's series for functions of two variables, Maxima
and minima of functions of two variables, Lagrange's method of undetermined multipliers.
and minima of functions of two variables, Eagrange's method of undetermined multipliers.
Engineering Applications of partial derivatives.
2. while a report on importance of quantum entanglement in supercomputers.
Text Book
Module 3 g Integral ac p12 Sessions
2. Quantum Ccalculus J Quantum Information Michael A. Nielsen & Isaac L. Chuang,
Cambridge Universities Press 2010 Edition
Review: Integral calculus for single integrals.
Advanced Integral calculus:
Beta and Gamma functions-interrelation-evaluation of integrals using gamma and beta functions;
error function-properties. Multiple Integrals- Double integrals – Change of order of integration –
Double integrals in polar coordinates – Area enclosed by plane curves, evaluation of triple integrals-
change of variables between Cartesian and cylindrical and spherical polar co-ordinates.
Engineering applications of partial derivatives.
5. <u>Intps://search.ebsconost.com/login.aspx?unect=trueaub=mebkaAnte=525900asite=enost-</u> liVe Ordinary
A https://acord
5. <u>https://searc</u> Equationsm/login.aspx?direct=true&db=nlebk&AN=486032&site=ehost-
Review: First order and first-degree Ordinary Differential Equations, Method of separation of
variables, Homogeneous and Non- Homogeneous Equations reducible to Homogeneous form.
variables, fiomogeneous and from fiomogeneous Equations reducible to fiomogeneous form.
Linear Differential Equations, Bernoulli's Differential Equation, Exact and Non- Exact Differential
Equations, Higher order Differential Equation with constant coefficients and with right hand side of
the form eax, sinax, $cosax$, $eaxf(x)$, $xnf(x)$ etc., Linear equations with variable coefficients such as

Equations, Higher order Differential Equation with constant coefficients and with right hand side of the form eax, sinax, cosax, eaxf(x), xnf(x) etc., Linear equations with variable coefficients such as Cauchy Equation and Lagrange's Equation, D-operators and Inverse D- operators, Method of Variation of Parameters.

Engineering applications of differential equations.



List of Laboratory Tasks:

Introductory Task: Introduction to usage of the software and simple programming tasks. [3 Sessions]

Experiment N0 1: Solution of Simple differentiation with single variable and use of chain Rule.

Experiment No. 2: Solution based on application of Tailors' Series using software

Experiment No. 3: Application of Maxima and Minima condition using software.

Experiment No. 4 Computation of different functions for a specific problem

Experiment No. 5 Computation of Area under a curve.

Experiment No. 6 Solution of a set of simultaneous equations in matrix method

Experiment No. 7 Computation of Eigen Values and Eigen Vectors.

Experiment No. 8 Solution of Partial Differential equation

Experiment No. 9 solution using Cauchy Equation and Lagrange's Equation

Targeted Application & Tools that can be used:

The contents of this course has direct applications in most of the core engineering courses for problem formulations, Problem Solution and system Design.

Tools Used: MatLab, Zylink.

Assignment:

List at least 3 sets of Matrix Applications concerning the respective branch of Engineering and obtain the solution using MATLAB.

Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.



Text Book

Sankara Rao, Introduction to Partial differential equations, Prentice Hall of India, edition, 2011

B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

Victor Henner, Tatyana Belozerova, Mickhail Khenner, Ordinary and Partial Differential Equations, CRC Press, Edition, 2013.

Walter Ledermann, Multiple integrals, Springer, 1st edition

Lay, Linear Algebra ansd its applications, 3rd Ed., 2002, Pearson Education India.

Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition

MatLab usage manual

E-resources/ Web links:

- 1. https://nptel.ac.in/courses/109104124
- 2. https://nptel.ac.in/courses/111106051
- 3. https://nptel.ac.in/courses/111102137
- 4. https://www.cuemath.com/learn/mathematics/algebra-vs-calculus/
- 5. https://stanford.edu/~shervine/teaching/cs-229/refresher-algebra-calculus
- 6. https://math.hmc.edu/calculus/hmc-mathematics-calculus-online-tutorials/linear-algebra/
- 7. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html
- 8. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to the development of Foundation Skills: All solution methods

Topics relevant to development of Employability skills: Use of Matlab software.

Course Code: PHY1002	Course Title: Optoelectronics and Device Physics Type of Course: Engineering Sciences Theory	L-T-P- C	2-0-2-3
Version No.	1.0		



Course Pre- requisites	NIL					
Anti- requisites	NIL					
Course Description	The purpose of this course is to enable the students to understand the fundamentals, working and applications of optoelectronic devices and to develop the basic abilities to appreciate the applications of advanced microscopy and quantum computers. The course develops the critical thinking, experimental and analytical skills. The associated laboratory provides an opportunity to validate the concepts taught and enhances the ability to use the concepts for technological applications. The laboratory tasks aim to develop following skills: An attitude of enquiry, confidence and ability to tackle new problems, ability to interpret events and results, observe and measure physical phenomena, select suitable equipment, instrument and materials, locate faults in systems.					
Course Out Comes	On successful completion of the course the students shall be able to:					
	CO1: Describe the concepts of semiconductors, magnetic materials and superconductors.					
	CO2: Apply the concept of materials in the working of optoelectronic and magnetic devices.					
	CO3: Discuss the quantum concepts used in advanced microscopy and quantum computers.					
	CO4: Explain the applications of lasers and optical fibers in various technological fields.					
	CO5: Interpret the results of various experiments to verify the concepts used in optoelectronics and advanced devices. [Lab oriented].					
Course Objective	The objective of the course is to familiarize the learners with the concepts of "Optoelectronics and device physics "and attain Skill Development through Experiential Learning techniques					
Course Content:						
Module 1	Fundamentals of Materials.	Assignment	Plotting of magnetization (M) v/s Magnetic field (H) for diamagnetic, paramagnetic and ferromagnetic materials using excel/ origin software.	7 Sessions		
	Leept of energy bands, c legnetic materials, Sup		, carrier concentration, concept of Ferr	ni level,		



Module 2	Advanced Devi and application	0	nent Data collection on efficiency of solar cells.	8 Sessions
	junctions, Zener d stics, and LEDs	iode, transistor	characteristics, Optoelectronic devices	, Solar cells, I-
Module 3	Quantum conce and Application	- Lerm na	per Seminar on quantum computers.	8 Sessions
waves, prop	erties. de-Broglie	wavelength ass	ns of Quantum theory: de-Broglie hypo ociated with an electron. Heisenberg's u e equation. Particle in a box	
Module 4	Lasers and Optical fibers	Term paper	Case study on medical application of Lasers.	ns 7 Sessions
laser, Moder	n day applications	of laser: LIDA	, Characteristics of laser, conditions and AR, LASIK, Cutting, Welding and Drilli	ng.
-	-	-	e and acceptance angle (Qualitative), At with block diagram, application of optic	
Applications endoscopy.	-	-	/	
Applications endoscopy. List of Labo	s: Point to point co ratory Tasks:	mmunication v	/	
Applications endoscopy. List of Labo Experiment	s: Point to point co ratory Tasks:	mmunication v	with block diagram, application of optic	
Applications endoscopy. List of Labo Experiment Level 1: Cal	ratory Tasks: No. 1: Experiment	mmunication w cal errors and u cy and precisio	with block diagram, application of optic	
Applications endoscopy. List of Labo Experiment Level 1: Cal Level 2: pro	ratory Tasks: No. 1: Experiment culation of accuratopagation of errors	mmunication w cal errors and u cy and precisio in addition, su ne the wavelen	with block diagram, application of optic ncertainty using excel n of a given data btraction, multiplication and division.	al fibers in
Applications endoscopy. List of Labo Experiment Level 1: Cal Level 2: pro Experiment particle size	s: Point to point co ratory Tasks: No. 1: Experiment culation of accura- opagation of errors N0 2: To determi	mmunication w cal errors and u cy and precisio in addition, su ne the wavelen wder using diff	with block diagram, application of optic ncertainty using excel n of a given data btraction, multiplication and division.	al fibers in
Applications endoscopy. List of Labo Experiment Level 1: Cal Level 2: pro Experiment particle size Level 1: De	s: Point to point co ratory Tasks: No. 1: Experiment culation of accuratopagation of errors N0 2: To determi of lycopodium po	mmunication w cal errors and u cy and precisio in addition, su ne the wavelen wder using diff velength of Las	with block diagram, application of optic ncertainty using excel n of a given data btraction, multiplication and division. agth of semiconductor diode Laser and t fraction.	al fibers in
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Applications endoscopy. List of Labo Experiment Level 1: Cal Level 2: pro Experiment particle size Level 1: De Level 2: Fi Experiment polarity of C	ratory Tasks: No. 1: Experiment culation of accurato pagation of errors NO 2: To determin of lycopodium po termination of Wa nding the particle No. 3: To determination	mmunication w cal errors and u cy and precisio in addition, su ne the wavelen wder using diff velength of Las size of lycopod ine the proport	with block diagram, application of optic ncertainty using excel n of a given data btraction, multiplication and division. agth of semiconductor diode Laser and t fraction. ser lium powder.	al fibers in



Experiment No. 4: To study the I-V characteristics of a given zener diode in forward and reverse bias conditions.

Level 1: To study I –V characteristics of the given Zener diode in reverse bias and to determine break down voltage.

Level 2: To study I –V characteristics of the given Zener diode in forward bias and to determine knee voltage and forward resistance.

Experiment No. 5: To study input and output characteristics of a given Transistor.

Level 1: To determine the input resistance of a given transistor.

Level 2: To determine current transfer characteristics and transistor parameters of a given transistor.

Experiment No. 6: Determination of Fermi energy and Fermi temperature of a given metal and bimetallic wire.

Level 1: Determination of Fermi energy and Fermi temperature of given metal wire.

Level 2: Determination of Fermi energy and Fermi temperature of given bimetallic wire.

Experiment No. 7: To study the current vs voltage characteristics of CdS photo-resistor at constant irradiance and To measure the photo-current as a function of the irradiance at constant voltage.

Level 1 To study the current vs voltage characteristics of CdS photo-resistor at constant irradiance.

Level 2: To measure the photo-current as a function of the irradiance at constant voltage.

Experiment No. 8: To study the I-V characteristics and I-R characteristics of a solar cell as a function of the irradiance.

Level 1: To study the I-V characteristics

Level 2: I-R characteristics of a solar cell as a function of the irradiance.

Experiment No. 9: Calculate the numerical aperture and study the losses that occur in optical fiber cable. .

Level 1: Calculate the numerical aperture.



Level 2: study the losses that occur in optical fiber cable.

Experiment No. 10: To determine the magnetic susceptibility of a given diamagnetic and paramagnetic substances using Quincke's method.

Level 1: To determine the magnetic susceptibility of a given diamagnetic substance.

Level 2: To determine the magnetic susceptibility of a given paramagnetic substance.

Experiment No. 11: Plotting I-V characteristics in forward and reverse bias for LEDs

and Determination of knee voltage.

Level 1: Plotting I-V characteristics in forward and reverse bias for LEDs

Level 2: Determination of knee voltage.

Experiment No. 12: Determination of Stefan's constant and verification of Stefan-Boltzmann Law.

Level 1: Determination of Stefan's constant

Level 2: Verification of Stefan-Boltzmann Law.

Targeted Application & Tools that can be used:

Areas of application are optoelectronics industry, Solar panel technologies, quantum computing software, electronic devices using transistors and diodes, memory devices, endoscopy, SQUIDS in MRI, Advanced material characterizations using SEM and STM.

Origin, excel and Mat lab soft wares for programming and data analysis.

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Assessment Type

Midterm exam

Assignment (review of digital/ e-resource from PU link given in references section - mandatory to submit screen shot accessing digital resource.)

Quiz

End Term Exam

Self-Learning

1. Prepare a comprehensive report on non-conventional energy resources in Karnataka and their pros and cons.



2. Write a report on importance of quantum entanglement in supercomputers.

Text Book

Engineering Physics by Avadhanalu, Revised edition, S. Chand Publications, 2018.

References: 1. Elementary Solid state Physics: Principles and Applications by M.A. Omar, 1st Edition, Pearson Publications, 2002.

2. Principles of Quantum Mechanics by R Shankar, 2nd edition, springer Publications, 2011.

3. Optoelectronics: An Introduction by John Wilson and John Hawkes, 3rd edition, Pearson Publications, 2017.

4. Engineering Physics by Gaur and Gupta, Dhanpat Rai Publications, 2012.

5. Introduction to Quantum Mechanics, David J Griffiths, Cambridge University Press, 2019

E-Resourses:

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=553045&site=ehost-live

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=833068&site=ehost-live

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=323988&site=ehost-live

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1530910&site=ehost-live

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=486032&site=ehost-live

Topics relevant to "SKILL DEVELOPMENT": Fundamentals of materials, Lasers and optical fibers.

for Skill Development through Participative Learning Techniques. This is attained through the Assignment/ Presentation as mentioned in the assessment component in course handout.

Course Code: MEC1006	Course Title: Engineering Graphics Type of Course: Engineering Science & Theory Only	L- T-P- C	2	0	0	2
Version No.	1.2	1	1			
Course Pre-	NIL					
requisites						
Anti-requisites	NIL					



	The course is designed with the objective of giving an overview of engineering						
Course	graphics. It is introductory in nature and acquaints the students with the techniques						
Description	used to create eng	ineering drawings. Th	e course emphasizes on proje	ction of			
Description	points, lines, plan	es and solids and isom	etric projections.				
	The objective of t	he course is to familia	rize the learners with the conc	epts			
Course Objective	of "Engineering C	Graphics" and attain SI	KILL DEVELOPMENT throu	gh Problem			
Course Objective	solving methodologies.						
	On successful completion of this course the students shall be able to:						
	Demonstrate com	petency of Engineerin	g Graphics as per BIS conven	tions and			
	standards.						
	Comprehend the t	theory of projection fo	r drawing projections of Point	s, Lines and			
	Planes under diffe	erent conditions.					
	Prepare multiview	v orthographic projecti	ons of Solids by visualizing the	nem in			
	different positions	5.					
Course Outcomes	Prepare pictorial of	drawings using the prin	nciples of isometric projectior	s to visualize			
	objects in three dimensions.						
Course Content:	1						
Module 1	Introduction	Assignment	Standard technical drawing	02 Sessions			

Module 1	Introduction	Assignment	Standard technical drawing	02 Sessions
	to Drawing			
Topics		1	1	

Topics:

Introduction, drawing instruments and their uses, relevant BIS conventions and standards, Lettering, Line conventions, dimensioning, Selection of drawing sheet size and scale. [02 Hours: Comprehension Level]

	Orthographic	
	projections of	
Module 2	Points, Straight Assignment Lines and Plane	Projection methods Analysis 10 Sessions
	Surfaces	

Topics:

Introduction, Definitions – Elements of projection and methods of projection, Planes of projection, reference line and conventions adopted. First angle and third angle projections. Projection of Points in all 4 quadrants. Projections of Straight Lines (located in first quadrant/first angle projection only): True and apparent lengths, true and apparent Inclinations to reference planes. (No application problems). Projection of Plane surfaces (First angle projection): Regular plane surfaces – triangle, square, rectangle, pentagon, hexagon and circle – in different positions inclined to both the planes using change of position method only. [10 Hours: Application Level]



Module 3 Projec				
Module 3	thographic	Assignment		
Solida	ojections of lids		Multi-view drawing Analysis	10 Sessions

Topics:

Introduction, Projection of right regular prisms, pyramids, cone, hexahedron and tetrahedron in different positions (Problems resting on HP only and First angle projection). [10 Hours: Application Level]

	Isometric			
	Projections of			
	Solids (Using			
Module 4	isometric scale	Assignment	Spatial Visualization	8 Sessions
	only)			

Topics:

Introduction, Isometric scale, Isometric projections of right regular prisms, cylinders, pyramids, cones and their frustums, spheres and hemispheres, hexahedron (cube), and combination of 2 solids, conversion of orthographic view to isometric projection of simple objects.

[8 Hours: Application Level]

Text Book:

1.N. D. Bhatt, "Engineering Drawing: Plane and Solid Geometry," Charotar Publishing House Pvt. Ltd.

References:

K.R. Gopalakrishna, "Engineering Graphics", Subhash Publishers, Bangalore.

D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, "Engineering Graphics with AutoCAD," Prentice Hall.

D. A. Jolhe, "Engineering Drawing with Introduction to AutoCAD," Tata McGraw Hill.

Web resources:

https://nptel.ac.in/courses/112103019

Topics relevant to "SKILL DEVELOPMENT": Projection in first and third angle for SKILL DEVELOPMENT through Problem Solving methodologies. This is attained through the assessment component mentioned in the course handout.



Course Code:	Course Title: Techni	cal English				
ENG1002	Type of Course: Humanit	ties Science / The		L-T-P-C		1-0-2-2
Version No.	V. 3					
Course Pre-requisites	Intermediate Level Englis	sh				
Course	NIL					
Anti-requisites						
Course Description	Technical English course is designed to equip students with the language skills necessary for effective communication in technical and scientific contexts. The course focuses on the specialized vocabulary, writing styles, and communication techniques used in various technical fields, including engineering and information technology.					
Course Objectives	The objective of this course is to develop the learners' EMPLOYABILITY SKILLS by using EXPERIENTIAL LEARNING and PARTICIPATIVE LEARNING TECHNIQUES.					
Course	On successful completion	n of the course, th	ne stude	nts shall b	be abl	e to:
Outcomes	Develop proficiency in us	sing technical vo	cabular	y and tern	ninolo	ogy.
	Apply language skills for	better speaking s	skills in	technical	field	s.
	Write technical description	ons				
	Demonstrate writing skill manuals, and articles.	ls in writing tech	nical do	cuments s	such a	as reports,
Course Content:						
Module 1	Fundamentals of Technical Communication	Worksheets& Quiz		abulary ding	9 C1	asses
Introduction to Technica	l English					
Differences between Tec	chnical English and Genera	l English				
Technical Writing Basics	5					
Technical Vocabulary						
Module 2	Technical Presentation	Presentations	Speak	ing Skills		12 Classes
Introduction	<u> </u>	1	I			
Planning the Presentation	n					
Creating the Presentation	1					



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Giving the Presentation				
Module 3	Technical Description	Assignment	Group Presentation	12 Classes
Product Description	L		1	1
Process Description				
User Manuals				
Transcoding: Diagrams,	charts and images			
Module 4	Technical Writing	Assignment	Writing Skills	12 Classe s
Email Writing	I		1	
Persuasive and Description	ve Language			
Professional Email Etiqu	iette			
Writing clear and concis	e technical emails			
Communicating technica	al information effectively			
Technical Report Writing	g			
Types of technical repor	ts (Lab reports, research re	ports, etc.)		
Components of technica	l reports			
Writing an abstract and e	executive summary			
Structure and content or	ganization			
Transcoding: diagrams,	charts and images			
List of Laboratory Tasks	:			
Module-1				
Level 1: Worksheets				
Level 2: Worksheets				
Module 2				
Level 1: Preparing Pres	entation			
Level 2: Giving Present	ation (Individual)			
Module-3				



Level 1: Product Description & User Manual

Level 2: Process Description & Transcoding

Module 4

Level 1: Email Writing

Level 2: Report Writing

Targeted Applications & Tools that can be used:

Flipgrid

Quizzes

Youtube Videos

Podcast

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Bring out the essence of technical communication with reference to the conventions of technical communication, with examples

Prepare a technical presentation on the importance of Technical Communication and its relevance in a technical field, with real-life examples.

The following individual, as well as group Assignments, will be given to the students.

Presentation

Describing a product/process

Individual Reports

Text Books

Kumar, Sanjay; Pushpalatha. English Language and Communication Skills for Engineers. Oxford University Press. 2018.

Brieger, Nick and Alison Paul. Technical English Vocabulary and Grammar.

 $https://nmetau.edu.ua/file/technical_english_vocabulary_and_grammar.pdf$

Reference Book:

Chauhan, Gajendra Singh, and Kashmiramka, Smita, Technical Communication. Cengage Publication. 2018.

Sunder Jain. Technical Report Writing. Centrum Press, 2013.

John Bowden. "Writing a Report: How to Prepare, Write & Present Really Effective Reports?". 9th Edition 2011



Comfort, Jeremy et. al. 1984. Business Reports in English. Cambridge University Press.

Sharma, R.C. and K. Mohan. 2011. Business Correspondence and Report Writing, Fourth Edition. Tata McGraw Hill.

Web Resources:

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=JSTOR1_3307.

https://puniversity.informaticsglobal.com:2282/ehost/detail/detail?vid=5&sid=3a77d69b-abe5-4681-b39d-

32dfdcb8f4a5%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=154223466&db=iih

Last, Suzan, et. al. Technical Writing Essentials. University of Victoria, British Columbia, 2019 (E-Book)

Wambui, Tabita Wangare, et al. Communication Skills- Volume 1, LAP LAMBRET, USA, 2012 (E Book)

Topics Relevant to the Development of Employability Skills:

Speaking Skills, Writing Skills, Critical Thinking and Critical Analysis, and Group Communication.

Course Code: PPS 1001	Course Title: Introduction to Soft Skills Type of Course: Practical Only Course	L- T-P- C	0	2	1	
Version No.	1.0					
Course Pre- requisites	Students are expected to understand Basic English.Students should have desire and enthusiasm to involve, participate and learn.					
Anti-requisites	NIL					
Course Description	This course is designed to enable students understand soft skills concepts and improve confidence, communication and professional skills to give the students a competitive advantage and increase chances of success in the professional world. The course will benefit learners in presenting themselves effectively through various activities and learning methodologies.					
Course Objective	The objective of the course is to familiarize the learners with the concepts of "Soft Skills" and attain SKILL DEVELOPMENT through PARTICIPATIVE LEARNING techniques.					



Course Out Comes On successful completion of this course the students shall be able to:					
	CO1: Recognize significance				
			10 1		
	cO2: Illustrate effective con others	nmunication while introducing	oneself and		
	CO3: List techniques of forr	ning healthy habits			
	CO4: Apply SMART technic	ue to achieve goals and increas	se productivity		
Course Content:					
Module 1	INTRODUCTION TO SOFT SKILLS	Classroom activity	04 Hours		
Topics: Setting Expec	tations, Ice Breaker, Significar	nce of soft skills, Formal groom	ning, punctuality		
Module 2	EFFECTIVE COMMUNICATION	Individual Assessment	10 Hours		
Module 3	HABIT FORMATION	Worksheets & Assignment	4 Hours		
communication for su		the between hearing and listening production framework, Video in	0		
		s, Identity based habits, Domin			
-	nding up for what is right	s, racially bused habits, Domini	o eneer, nuon		
Module 4	Goal setting & Time Management	Goal sheet	8 Hours		
Introduction to OKR	Techniques, Time Managemen ty, making a schedule, Daily P	management, setting SMART t Matrix, steps to managing tim lan and calendars (To Do List)	e through		
Targeted Application	& Tools that can be used: LMS	3			
Project work/Assignm	nent: Mention the Type of Proj	ect /Assignment proposed for th	his course		
Individual Assessmen	t				
LMS MCQ					
and presentation for sl	-	cation and professional groomin cipative learning techniques. The handout.			



ENG2501	Advanced Englis	h	L-T-P- C 2	0 0 2		
Version No.	2.0					
Course Pre- requisites	ENG1900 - Englis	h for Technical Commun	ication			
Anti-requisites	NIL					
Course Description	abilities in Listen covers interperson delivery (includin reading, the iden Furthermore, the c and the technique skills in the digita prepared to comm	This course is designed to equip students to enhance their communication abilities in Listening, Speaking, Reading, and Writing. The curriculum covers interpersonal communication principles, the art of speech writing and delivery (including impromptu speaking), strategic approaches to critical reading, the identification of logical fallacies, and persuasive writing. Furthermore, the course will introduce students to the potential of AI tools and the techniques of prompt engineering to elevate their communication skills in the digital age. Upon course completion, students will be well- prepared to communicate effectively and critically in both academic and professional environments.				
Course Out Come	 Recognize communication Demonstra speeches using Interpret te strategies to ev Produce pe 	 On successful completion of the course the students shall be able to: 1. Recognize the elements of interpersonal and cross-cultural communication to address communication challenges effectively. 2. Demonstrate the ability to deliver structured and impromptu speeches using effective speaking techniques. 3. Interpret textual and visual materials using critical reading strategies to evaluate arguments, logic, and persuasion. 4. Produce persuasive and analytical essays using effective argumentation techniques and structured writing strategies. 				
Course Content: Module 1	Foundations of Effective	Case Studies/ Role play	Cross-Cultural Competency	12 Classes		
 Ven Cui Activities: Ins Chi 	bal, Non-verbal, and ltural dimensions the tive Listening Techn mmon Errors in Con tagram/YouTube Vo arades with a Twist/	nmunication	Dimensions). iment/Mixed Message	s		
Module 2	Mastering Speech Delivery	JAM	Public Speaking Confidence	12 Classes		
Topics: • Intr	roduction to Prompt	Engineering				



	GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS		P Malegar W	
-	eech Preparation and	U		
	-	e Impromptu Speaking		
	actice Speech Delive	ery		
Activities:				
• Spe	eech Writing			
• Im	promptu Speech			
	Critical			10
Module 3	Reading and	Worksheet	Critical Thinking	12
iviouule 5	Logical	worksheet	and Analysis	Classes
	Analysis			
Topics:				
	ē	egies: Contextualizing, F	0 0 0	•
-		izing Emotional Manipul		
	0 0 0	allacies: Slippery Slope, I Straw Man, Bandwagon, I		
		t, Appeal to ignorance	i tu sousiiaii, Ke	a menning,
Activities:	ruthority, Suine Coe	i, rippear to ignorance		
~ .		1 121 121 51 13	~ . • 4	
• Cri	tical Reading Works	sheet/Identifying Bias in N	News Articles	
	Writing			9
Module 4	Effective	Assignment	Clear and	Classes
	Arguments	8	Coherent Writing	Classes
Topics:			L	
	derstanding Critical	Writing		
• Bu	ilding Arguments (P	athos, Ethos, Logos)		
	chniques for Persuas	_ ,		
Activities:				
C				
		eal Mash-Up/Debates on (Controversial Topics	
• Op	inion Writing			
Targeted Applica	tion & Tools that c	an be used: Quizziz, Cha	tgpt, Gemini, Youtube	2,
Instagram, Quillbo	ot, Grammarly, Padle	et		
References				
	P P Podman	G., & DuPré, A. (2010) Understandin	a human
		Oxford University Press.	2017). Ondersidnain	g numun
	(R. (2020). <i>Critical thin</i>	nking (13th ed.) Mc	Graw-Hill
Educat		10. (2020). <i>Critical init</i>		
		nunicating for success (2)	nd ed.). Routledge.	
		jee, T. (2018). Intercult	·	model for
		ross-cultural communica		
		3-229. https://doi.org/10.1		
	www.ted.com/			
*				
	"employability": Te	eamwork and Collaboration	on, Critical Thinking a	ind
Problem-Solving				



_	g.	L-T-P-C	3 0	0 3
2.0	·			
NIL				
NIL				
of electrical and ele of Engineering. applications of e emphasizes on the both active & pas foundation for the system, power	ectronics engineering pri The course emphasise electrical and electronic working, analysis and de ssive components. Addi e future courses such a electronics Linear I	nciples occurs s on the cha c devices. T esign of electric tionally, this o s Electrical n ntegrated Ci	in vari tracteri he cou cal circ course nachine	ous field stics an urse als uits usin creates es, powe
The objective of the course is to familiarize the learners with the concepts of Basics of Electrical and Electronics Engineering and attain Skill Development through Participative Learning techniques.				
Apply basic laws of and other parameter Discuss various fut of semiconductor of Summarize the oper amplifiers. Discuss the perfor	of Electrical Engineering ers in the circuits. Indamental parameters a devices and their applica erations of different biast	g to compute v ppearing in th tions. ing configurati	voltage e chara ions of	, curren acteristio BJTs ar
Introduction to Electrical Circuits	Assignment/ Quiz	Numerica solving Task	al	10 Session
	Type of Course: Theor 2.0 NIL NIL This is a fundament of electrical and electrical mathematical and electrical and electrican and electrical and electrical and electrical and electrical ande	NIL NIL This is a fundamental Course which is desi of electrical and electronics engineering pri of Engineering. The course emphasise applications of electrical and electronic emphasizes on the working, analysis and de both active & passive components. Addit foundation for the future courses such a system, power electronics Linear I Communication and Digital Communication The objective of the course is to familiarize of Basics of Electrical and Electronics Development through Participative Learnin On successful completion of this course the Apply basic laws of Electrical Engineering and other parameters in the circuits. Discuss various fundamental parameters a of semiconductor devices and their applica Summarize the operations of different biasi amplifiers. Discuss the performance characteristics electrical Machines.	Type of Course: Theory - ESC 2.0 NIL NIL This is a fundamental Course which is designed to know of electrical and electronics engineering principles occurs of Engineering. The course emphasises on the cha applications of electrical and electronic devices. The emphasizes on the working, analysis and design of electrice both active & passive components. Additionally, this of foundation for the future courses such as Electrical n system, power electronics Linear Integrated Cir Communication and Digital Communication etc. The objective of the course is to familiarize the learners w of Basics of Electrical and Electronics Engineering a Development through Participative Learning techniques. On successful completion of this course the students shal Apply basic laws of Electrical Engineering to compute v and other parameters in the circuits. Discuss various fundamental parameters appearing in th of semiconductor devices and their applications. Summarize the operations of different biasing configuratia amplifiers. Discuss the performance characteristics and applicatie electrical Machines. Introduction to Electrical Assignment/ Quiz solving	Type of Course: Theory - ESC 2.0 NIL NIL This is a fundamental Course which is designed to know the use of electrical and electronics engineering principles occurs in vari of Engineering. The course emphasises on the characteri applications of electrical and electronic devices. The course mphasizes on the working, analysis and design of electrical circ both active & passive components. Additionally, this course foundation for the future courses such as Electrical machine system, power electronics Linear Integrated Circuits, Communication and Digital Communication etc. The objective of the course is to familiarize the learners with the of Basics of Electrical and Electronics Engineering and att Development through Participative Learning techniques. On successful completion of this course the students shall be ab Apply basic laws of Electrical Engineering to compute voltage and other parameters in the circuits. Discuss various fundamental parameters appearing in the chara of semiconductor devices and their applications. Summarize the operations of different biasing configurations of amplifiers. Discuss the performance characteristics and applications o electrical Machines.

AC Circuits: Fundamentals of single phase circuits - Series RL, RC and R-L-C Circuits, Concept of active power, reactive power and Power factor, Numerical examples.

Introduction to three phase system and relation between line and phase values in Star & Delta connection, Numerical examples.



Module 2	Semiconductor and Diode applications	Assignment/ Quiz	Memory Recall based Quizzes	10 Sessions
practical behaviou	r, Modelling the Diod	semiconductor, Types of S le Forward Characteristic l its applications like volta	, and Diode app	
Module 3	Transistors and its Applications	Assignment/ Quiz	Memory Recall- based Quizzes	10 Sessions
and their current g amplifier. JFET (off voltage, Comp	ains. Operating point, H Construction, principal parison of BJT and FE	nents, BJT Configurations Biasing, Fixed Bias, and lo of Operation and Volt –A T. MOSFET (Constructio ancement and Depletion r	bad line analysis. Empere character on, principal of C	Single Stage istics). Pinch-
Module 4	Fundamentals of Electrical Machines	Assignment/ Quiz	Numerical solving Task	10 Sessions
examples. AC Mot Self-Learning Topics:	tor: Principle operation	le of operation, Back EM of Induction Motors and ization Techniques, Volta	its Applications.	
factor, Multista Special Machine 	age amplifier, Darlingto	on pair. cial electrical machines a	-	-
 supply unit, regable to join a p Professionally Besides thes Generators, 	gulator unit, embedded rofession which involv y Used Software: M e software tools hau Power Supplies, (ircuit testing and ana	dware equipment such Oscilloscopes etc., c	nics etc.). The str electronic circuit n as Multimete	udents will be design. rs, Function
1. Article review: A students. They nee	At the end, of course an	article topic will be giver esources and write a repor		
		sentation, where the stude king and discuss the appli	-	



3. Case Study: - At the end of the course students will be given a 'real-world' application based circuits like Power Amplifier, Signal/Function Generator etc. as a case study. Students will be submitting a report which will include Circuit Diagrams, Design, Working Mechanism and Results etc. in appropriate format

Text Book(s):

- Kothari D. P. & Nagrath I. J., "Basic Electrical and Electronics Engineering", Tata McGraw-Hill
- Education
- Theraja B.L. and Theraja A.K., "A Textbook of Electrical Technology: Basic Electrical Engineering" in S.I. System of Units, 23rd ed., New Delhi: S. Chand, 2002.
- A.P.Malvino, Electronic Principles,7thEdition, Tata McGraw Hill,2007
- J. Millman, C. C. Halkias and C. D. Parikh, "Millman's Integrated Electronics", McGraw Hill Education, 2nd Edition.
- Basics of Electrical & Electronics Laboratory Manual.

Reference Book (s):

- John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and Electronic Technology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson,2011
- Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007.
- K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd
- R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition.
- A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition
- A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition
- Online Resources (e-books, notes, ppts, video lectures etc.):
- https://presidencyuniversity.linways.com
- https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples"
- Seminar Topic: https://nptel.ac.in/courses/108/105/108105153/ "Electrical Measurements"
- Video lectures on "Electronic Devices" by Prof. Dr. A. N. Chandorkar, IIT Bombay http://www.satishkashyap.com/2013/03/video-lectures-on-electron-devices-by.html
- Video lectures on "Analog Electronics" by Prof. S.C. Dutta Roy, IIT Delhi https://nptel.ac.in/courses/108/102/108102095/
- Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati,
- https://nptel.ac.in/courses/117/103/117103063/
- E-content:
- "Introduction to Electrical Machines https://nptel.ac.in/courses/108/102/108102146/"
- M. -Y. Kao, H. Kam and C. Hu, "Deep-Learning-Assisted Physics-Driven MOSFET Current Voltage Modeling," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 974-977, June 2022, doi: 10.1109/LED.2022.3168243
- https://ieeexplore-ieee-org-resiuniv.knimbus.com/document/9758727
- F. Bonet, O. Aviñó-Salvadó, M. Vellvehi, X. Jordà, P. Godignon and X. Perpiñà, "Carrier
- Concentration Analysis in 1.2 kV SiC Schottky Diodes Under Current Crowding," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 938-941, June 2022, doi: 10.1109/LED.2022.3171112. https://ieeexplore-ieeeorgpresiuniv.knimbus.com/document/9764749



- M. Chanda, S. Jain, S. De and C. K. Sarkar, "Implementation of Subthreshold Adiabatic Logic for Ultralow-Power Application," in IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. .23, no. 12, pp. 2782-2790, Dec. 2015.
- https://ieeexplore.ieee.org/document/7018053
- R. Raut and O. Ghasemi, "A power efficient wide band trans-impedance amplifier in submicron
- CMOS integrated circuit technology," 2008 Joint 6th International IEEE Northeast Workshop on Circuits and Systems and TAISA Conference, 2008, pp. 113-116, doi: 0.1109/NEWCAS.2008.4606334. https://ieeexplore.ieee.org/document/4606334

Topics relevant to "SKILL DEVELOPMENT": Performing suitable experiments to compute the electric circuit parameters, performance operation of machines, and operation of semiconductor devices for Skill Development through Participative Learning techniques. This is attained through assessment component mentioned in course plan.



Course Code: CSE2200	Course Title: Problem Solvin	ng Using C			1		
	Type of Course: School Core	Lab Integra	ated.	L- T-P-C	1 0	4	3
Version No.	1.0						
Course Pre-requisites	NIL						
Anti-requisites	NIL						
Course Description	The course is designed to pro Students will be able to deve programs and applications in constructs they can easily sw to any other language in futu	lop logics w C. ACAlso itch over	hich will help	them to o	create		ng
	The objective of the course is Problem Solving Using C and Methodologies.					-	
Course Outcomes	On successful completion of	this course	the students s	hall be ab	le to:		
	Write algorithms and to draw	flowcharts	for solving p	roblems			
	Demonstrate knowledge and constructs	develop sin	nple application	ons in C p	rogra	mmi	ng
	Develop and implement appl	ications usin	ng arrays and	strings			
	Decompose a problem into fu	unctions and	l develop mod	lular reusa	able c	ode	
	Solve applications in C using structures and Union						
	Design applications using Sequential and Random Access File Processing.						
Course Content:							
Module 1	Introduction to C Language	Quiz	Problem Solving	9 Hrs.			
Topics:		1					
Preprocessor Directives	ming – Algorithms – Pseudo (#define, #include, #undef) - xpressions – Managing Input aking and Looping.	Overview o	f C – Constar	nts, Variab	les an	d Da	ata
	Introduction to Arrays and	Quiz	Problem	9 Hrs.			

Arrays: Introduction – One Dimensional Array – Initialization of One Dimensional Arrays – Example Programs – Sorting (Bubble Sort, Selection Sort) – Searching (Linear Search) - Two Dimensional



Arrays – Initialization of			ole Pro	ograms – Matrix o	operations. Strings:
Introduction – Declaring	and Initializing String				
Variables – Reading Stri	ngs from Terminal – W	riting Strin	g to S	Screen – String Ha	andling Functions.
Module 3	Functions and Pointers	Qui	Z	Problem	9 Hrs.
				Solving	
Topics:	I				
Functions: Introduction -	- Need for User-defined	d functions	– Ele	ements of User-De	efined Functions:
declaration, definition ar	nd function call–Catego	ries of Fur	ctions	s – Recursion. Po	inters: Introduction -
Declaring Pointer Variab	les – Initialization of V	ariables – I	Pointe	er Operators – Poi	inter Arithmetic –
Arrays and Pointers – Pa	rameter				
Passing: Pass by Value, I	Pass by Reference.				
Module 4	Structures and Union	Qui	Z	Problem Solving	9 Hrs.
				Solving	
Topics:					
Structures: Introduction	– Defining a Structure -	– Declaring	g Stru	cture Variable – A	Accessing Structure
Members – Array of Stru	actures – Arrays within	Structures	– Uni	ion: Introduction	– Defining and
Declaring Union – Diffe	rence Between				
Union and Structure.					
Module 5	File handling	Case Study	/	Problem Solving	9 Hrs.
Topics:					
Files: Defining and Oper Access Files	ning a File – Closing a	File – Inpu	t / Ou	tput Operations c	on File – Random
List of Practical Tasks L	ab Sheet 1 (Module I)				
Programs using IO State	ments, Conditional Stat	tements an	d Loo	ping Statements	
Lab Sheet 2 (Module II)					
Programs using Arrays a	nd Strings				
Lab Sheet 3 (Module III))				
Programs using Functior	ns and Pointers				
Lab Sheet 4 (Module IV)				
Programs using Structur	es and Unions				
Lab Sheet 5 (Module V)					
Programs using Files					



Text Book(s):

1. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316- 513-0.

Reference Book(s):

Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.

ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.

Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015

Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.

Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Web Links and Video Lectures:

- 1. https://nptel.ac.in/courses/106/105/106105171/
- 2. https://archive.nptel.ac.in/courses/106/104/106104128/

Course Code:	Course Title: Digital Design					
ECE2007	Type of Course: Theory &Integrated	L- T-P- C	2	0	2	3
	Laboratory					
Version No.	2.0	I				
Course Pre-	[1] Elements of Electronics/Electrical Engineerin	ng, 2] Basic	conc	epts	of nui	nber
requisites	representation, Boolean Algebra					
Anti-requisites	NIL					
Course	The purpose of this course is to enable the studen	nts to apprec	iate 1	the f	undan	nentals
Description	The purpose of this course is to enable the students to appreciate the fundamentals of digital logic circuits and Boolean algebra focusing on both combinational and sequential logic circuits. The course emphasizes on minimization techniques for making canonical and low-cost digital circuit implementations. This course deals with analysis and design of digital electronic circuits. The course also creates a foundation for future courses which includes Computer Architecture, Microprocessors, Microcontrollers, and Embedded Systems etc. The course enhances the Design, Implementation and Programming abilities through laboratory tasks. The associated laboratory provides an opportunity to verify the theoretical knowledge.					
Course Objective	The objective of the course is to familiarize the l Digital Design and attain the SKILL DEVELOP LEARNING.				-	



Course	On successful completion of this c	ourse the stude	ents shall be able to:	
Outcomes	1			
	Describe the concepts of number s	-		gates.
	Apply minimization techniques to	simplify Bool	ean expressions.	
	Demonstrate the Combinational ci	rcuits for a giv	en logic	
	Demonstrate the Sequential and pr	ogrammable l	ogic circuits	
	Implement various combinational	and sequential	logic circuits using g	ates.
Course Content:				
Module 1	Fundamentals of Number systems- Boolean algebra and digital logic	Application Assignment	Data Analysis task	06 classes
Topics:	·			
and POS- Univers	plifications, two, three, four variables al Gates (NAND & NOR) Implement	-	oduction to HDL.	[
Module 2	Boolean function simplification	Assignment	Data Analysis task	08 Classes
	ombinational circuits, Analysis, Des	0 1	· ·	· · · · · ·
	arator, Parity generator and checker, ority Encoders, HDL Models of con	-	-	oders,
Module 3	Combinational Logic circuits:	Application Assignment	Programming Task & Data Analysis task	08 Classes
Topics:			<u> </u>	
Introduction to ac		1 4 1 1 01		
equations, excitat	equential circuits, Storage elements: ion table, Analysis of clocked seque Registers & Counters. HDL Models	ential circuits,	Mealy & Moore Mod	
equations, excitat state machines - F	ion table, Analysis of clocked seque Registers & Counters. HDL Models	ential circuits,	Mealy & Moore Mod	
equations, excitat state machines - F List of Laborator	ion table, Analysis of clocked seque Registers & Counters. HDL Models	ential circuits, 2 s of Sequential	Mealy & Moore Mod	
equations, excitat state machines - F List of Laborator Experiment N0 1	ion table, Analysis of clocked seque Registers & Counters. HDL Models	ential circuits, 2 s of Sequential	Mealy & Moore Mod	



Experiment No. 2: Verify the Boolean Function and Rules Level 1: By using Digital Logic Trainer kit Level 2: By using Analog devices like RPS, Volt meter, Resistors and ICs

Experiment No. 3: Design and Implementations of HA/FA

Level 1: By using basic logic gates and Trainer Kit

Level 2: By using Universal logic gates and Trainer Kit

Experiment No. 4: Design and Implementations of HS/FS

Level 1: By using basic logic gates and Trainer Kit

Level 2: By using Universal logic gates and Trainer Kit

Experiment No. 5: Design and Implementations of combinational logic circuit for specifications

Level 1: Specifications given in the form of Truth table

Level 2: Specification should be extracted from the given scenario

Experiment No. 6: Study of Flip flops

Experiment No. 7: Design and Implementations of sequential logic circuit for specifications Level 1: Specifications given in the form of Truth table

Level 2: Specification should be extracted from the given scenario

Experiment No.8: HDL coding for basic combinational logic circuits

Level 1: Gate level Modeling

Level 2: Behavioral Modeling

Experiment No.9: HDL coding for basic sequential logic circuit

Level 1: Gate level Modeling

Level 2: Behavioral Modeling

Targeted Application & Tools that can be used:



Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, Home Automation, Communication in systems in industries

Professionally Used Software: HDL/VHDL/Verilog HDL/ OOPS

Text Book(s):

Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education, 6th edition

Thomas L. Floyd "DIGITAL LOGIC DESIGN", Pearson Education, fourth edition.

Reference(s):

Reference Book(s):

R1. Jain, R. P., "Modern Digital Electronics", McGraw Hill Education (India), 4th Edition

R2. Roth, Charles H., Jr and Kinney Larry L., "Fundamentals of logic Design", Cengage Learning, 7th

Edition

Online Resources (e-books, notes, ppts, video lectures etc.): Book Free Download

(studymaterialz.in)

eBook1: Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education.

{[PDF] Digital Design By M. Morris Mano, Michael D Ciletti Book Free Download
}

eBook2:Floyd "DIGITAL LOGIC DESIGN" fourth edition- ePub, eBook- [PDF] DIGITAL LOGIC DESIGN FOURTH EDITION FLOYD | abri.engenderhealth.org.

NPTEL Course- NPTEL :: Electrical Engineering - NOC:Digital Electronic Circuits

Digital Logic Design PPT Slide 1 (iare.ac.in)

Lab Tutorial: Multisim Tutorial for Digital Circuits - Bing video

CircuitVerse - Digital Circuit Simulator online

Learn Logisim Beginners Tutorial | Easy Explanation! - Bing video



Digital Design 5: LOGISIM Tutorial & Demo

7. https://presiuniv.knimbus.com/user#/home

E-content:

Z. Xin-Li and W. Hong-Ying, "The Application of Digital Electronics in Networking Communication," 2016 Eighth International Conference on Measuring Technology and Mechatronics Automation (ICMTMA), 2016, pp. 684-687, doi: 10.1109/ICMTMA.2016.168.

An encoding technique for design and optimization of combinational logic circuit DipayanBhadra;Tanvir Ahmed Tarique;Sultan Uddin Ahmed;Md. Shahjahan;KazuyukiMurase2010 13th International Conference on Computer and Information Technology (ICCIT)

A. Matrosova and V. Provkin, "Applying Incompletely Specified Boolean Functions for Patch Circuit Generation," 2021 IEEE East-West Design & Test Symposium (EWDTS), 2021, pp. 1-4, doi: 10.1109/EWDTS52692.2021.9581029.

A. Matrosova, V. Provkin and E. Nikolaeva, "Masking Internal Node Faults and Trojan Circuits in Logical Circuits," 2019 IEEE East-West Design & Test Symposium (EWDTS), 2019, pp. 1-4, doi: 10.1109/EWDTS.2019.8884434.

Topics relevant to "SKILL DEVELOPMENT": Adders, Multiplexers, Decoders / Encoders; Flip-Flops, Counters and Registers for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.

Course Code:	Course Title: Probability and Statistics	L-T- P- C	3	1	0	4
MAT2402	Type of Course: BSC	L-1- P- C	3		U	4
Version No.	1.0			1		
Course Pre- requisites						
Anti- requisites	NIL					
Course Description	The course introduces the concepts of pro- covering how to collect, organize, interpret, mathematical models to understand random across various fields like science, engineerin	and draw infe ness and unce	rences rtainty,	from with a	data (pplica	using tions
Course Objective	The objective of the course is to equip stude probability theory and statistical methods, ena data, and make informed decisions based of various situations, often applied across different business.	abling them to c on the likelihood	ollect, a	analyz ents o	e, inte ccurri	erpret ng in
Course Out	On successful completion of the course the s	students shall b	e able t	to:		
Comes	 Be able to compute conditional probabilit and check for independence of events. 	ies directly and	using E	Bayes'	theor	em,



	Course Conte	 Be able to set up and work with discreparticular, to understand the Bernoull distributions, uniform, normal, and ex Identifying different types of data rela logarithmic). Be able to use specific significance to sample), and chi-squared test 	i, binomial, geometric, ponential distributions. tionships (linear, polyn	Poisson omial, exponential,
Module 1 Basic Probability 6 Classes)	Module 1	Basic Probability		(6 Classes)

Probability of an Event, multiplication rule, combinations, permutations, Addition Law, Multiplication Law, Conditional Probability, Bayes's Theorem and Problems.

Module 2Random Variables and Bivariate DistributionsAssignment(15 Classes)	Module 2	2 Random Variables and Bivariate Distributions	Assignment	(15 Classes)
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Random Variables (discrete and continuous), Probability Mass/Density Functions, Mathematical Expectations, discrete probability distributions - Binomial distribution, Poisson distribution, geometric distribution, Continuous uniform distribution - exponential distribution, normal distribution, gamma distribution. Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

Module 3 Curve Fitting & Statistical Methods (13 Classes)	Module 3	Curve Fitting & Statistical Methods		(13 Classes)
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Curve Fitting (Straight Line (y = a + bx), Parabola ($y = a + bx + cx^2$), Exponential Curves ($y = ae^{bx}$, $y = ab^x$ and $y = ax^b$) Measures of Central tendency, Moments, skewness and Kurtosis, Correlation - Karl Pearson's coefficient of correlation and rank correlation (with & Without repetition, Multiple Correlation - Problems. Regression analysis - lines of regression, Multiple regression - Problems.

Module 4Joint Probability Distribution and Sampling Theory	Assignment	(15 Classes)
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Joint Probability distribution for two discrete random variables, expectation and covariance.

Random sampling, sampling distributions, Standard Error, Type I & Type II errors, Testing of Hypothesis, Test of significance - Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations, Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Targeted Application & Tools that can be used:

The contents of this course has direct applications in most of the core engineering courses for problem formulations, Problem Solution and system Design.

Tools Used: R software (Open Source)

Assignment:	Assi	gnr	nent:	
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1. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book



- 1. Ronald .E. Walpole, Raymond. H. Myers, Sharon. L Myers, and Keying E. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Delhi-9th edition, 2012.
- 2. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

- 1. Miller and Freund, Probability and Statistics for Engineers, Pearson Education Ltd.
- 2. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition.
- 3. Douglas C. Montgomery & George Runger, Applied Statistics and Probability for Engineers, , Wiley Publications

E-resources/ Web links:

- 1. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_10427</u>
- 2. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_100198</u>
- 3. https://nptel.ac.in/courses/109104124
- 4. https://nptel.ac.in/courses/111106051
- 5. https://nptel.ac.in/courses/111102137
- 6. https://www.math.hkust.edu.hk/~magian/ma006_0607F.html
- 7. https://www.scu.edu.au/study-at-scu/units/math1005/2022/
- 8. Presidency University's Knimbus library URL is: presiuniv.knimbus.com

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course Code: CIV1200	Course Title: Foundations of Integrated Engineering Type of Course: ESC	L- T-P- C	2	0	0	2
Version No.	1.0					
Course Pre- requisites	NIL					
Anti- requisites	NIL					

Course Code:	Course Title:					
DES1146	Introduction to Design Thinking	L-T-P- C	1	0	0	1



Course	TT CC trac introduces first they ensind the students to foundational						
Course	Type of Course: Irse introduces first-year engineering students to foundational						
Description	Theory s across key engineering domains, emphasizing real-world						
	proplem-solving, sustainability, and ethical innovation. Students explore how civil,						
Version No.	r1.0						
	L and geomatics to address global challenges. Through case studies, learners gain						
Course	NIL						
	systems, and securing IT solutions. Topics include bioinformatics for environmental						
Pre-	onitoring, GIS-enabled urban planning, renewable energy integration, and						
requisites							
1	bersecurity fundamentals. The course cultivates a holistic understanding of						
Anti-	II'NIL						
requisites							
requisites	technology-driven world.						
Course	-The course aims to introduce students to the fundamental principles and processes of						
Course	Design Thinking and will learn to apply Design Thinking methodologies to real-						
-Description	world challenges. The course emphasizes empathy, creativity, and collaboration,						
Outcomes	equipping students with essential skills for successful engineering practice.						
Outcomes	1 Recall key principles of Agile, DevOps, and bioinformatics used in						
G	This course is designed to develop and familiarize the learners with the concepts of						
Course	creating thinking and attain Entrepreneurship by using Participative Learning						
Objective							
	techniques.						
	On successful completion of the course the students shall be able to:						
	On successful completion of the course the students shall be able to.						
~	Understand the concept and importance of Design Thinking.						
Course	onderstand the concept and importance of Design Timiking.						
Outcomes	Differentiate between traditional problem-solving and Design Thinking.						
	Differentiate between traditional problem solving and Design Thinking.						
	Identify the core stages of the Design Thinking process.						
	cybersecurity threats and blockchain applications						
	All assignments and projects must be developed using the reference materials						
Course	available from the PU e-resource database – JSTOR, EBSCO, Library OPAC,						
Content:							
	NPTEL Videos, etc.						
Module 1	Foundations of Sessions Visual Signment Case studies 6 Sessions						
	Engineering visual s						
Real-world pro	blem-solving µ ^{journal} , logic and practical applications, Collaboration and						
Innovation thro	Durate durate m ^{book of} the Engineering Ethics & Environmental Impact						
Emerging Field	ds nessays, duction to biginformatics and its application						
Module 1	n to u context- ny principle: y context- ny principle: 3 hours						
wodule I	Design						
	Thinking specific						
Module 2	Geomatics assignm Assignment Article Review 6 Sessions						
Smart Infrastri	ucture & Geoment/proje mapping, LiDAR, drone surveys for urban planning,						
	ta analysis for cct anagement.						
	onstruction: 3D-printed structures, self-healing concrete, Digital twins for						
Topic							
Topic							
Definition and	1 Introduction to Design 1 hinking						
Definition and	l Introduction to Design Thinking						
-	e Design Thinking Process						



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Energy if finovat	ions [.] EV cha	ent/proje	ructure, v	vireless powe	er transt	fer, Smart	grid i	integ	ratio	n with
renewables.	I ne laborat	provides	an oppo	rtunity to vali	date the	concepts	taug	ht an	d en	hances
			•	idr technolog						-
CORIFSe				An attitude o						
Description Introduction to	tackle new	Cesion Thin	ability	to interpre	t event	s and re	sults	s, ok	ser	ve and
					uitable	equipme	ent, i	nstru	ume	nt and
Understand use	materialse	ocateifault	s in syst	ems.						
Design Thinkir	On success	ful completi	on of the	course the s	#udents	shall be a	able t	ລ:	1 7	
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Application Are	as include In	terdisciplina	rv proble	<u>m-solvina.' Si</u>	hart city	/ planning	. disa	ster		
Targeted Appli	CO2: Interp	bret the res	ults of va	arious experi	iments	to verify t	he c	once	pts ı	used in
Design ideation	RRIRelactro	nics and and	vangeete	evices.						
e	The objectiv	/e of the cou	irse is to t	amiliarize the	e learne	rs with the	cond	epts	of "	Applied
Research Tools	f 8hysica afot	CcontripDteri	ganieinog	f Okusteti n"gat	noblattiaki	a N <mark>Skill D</mark>	<u>evelo</u>	opme	ent t	hrough
	Experience		techniq	Jes						Ĩ
Feedback tools		Forms, etc.								
Expert Lecture	S									
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L										



Experiment Nerstry.Tofetwayricoglobalcoutp2282a1aoseriatics/dea.gnved=Tracsister086b8c2-260e-Lever-1. To determine the input resistance of a given transistor. Lever-2. To determine the infertation of the second states and the second second second second second second second

What Is Design Thinking and Why Is It Important? By Rim Razzouk and Valerie Shute - Review of Experimental NRcSeaRetevolnerion of Ferences 20025, eppi 3900, 2019, page 9, Public tal above a metalling Will cational Research Association

-evel 1; Determination of Fermi energy and Fermi temperature of given metal wire https://puniversity.informaticsglobal.com:2054/stable/23260048?Search=yes&resultItemClick=true

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Experiment Arb. 12: 2495106251734cb5ch13a8a6f6st185%arron=k#eneraleterist185_offa_sonateeten as a function of the irradiance.

of the irradiance. Abductive Thinking and Sensemaking: The Drivers of Design Synthesis by John Kolko, Design Level 1: To study the I-V characteristics Level 2: VPR 26 No. 1 (Winter, 2010), pp. 15-28 (14 pages), Published by: The MIT Press

https://puniversity.informaticsglobal.com:2054/stable/20627839?Search=yes&resultItemClick=true Experiment No. 8: Calculate the numerical aperture and study the losses that occur in optical fiber &searchText=design+thinking&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Ddesign%2 Cable: Btainking%2656%3Drel&abicsegments=0%2FSYC-6168%2Ftest&refreqid=fastly-

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Experiment No. 9. of Knowing, Design Discipline versus Design Science by Nigel Cross, Design and the versus Design Science by for EDs to the second statement of the second statement of the second se

Level 1: Plotting I-V characteristics in forward and reverse bias for LEDs https://punversity.informaticsglobal.com:2054/stable/1511801?Search=yes&resultItemClick=true& Level 2: Determination of knee-voltage. searchText=design+thinking&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Ddesign%2Bt

Experingen 2 Nov. % OD Determination of Stefars Yonstans and Frenkration of Stefar-Boltzmann Law. Level ult % Determination of Stefan and Carologian Dec 22b1c&seq=1#metadata_info_tab_contents Level 2: Verification of Stefan-Boltzmann Law.

Experiment No. 11: Determination of dielectric constant of given materials.

Level 1: Determination of Stefan's constant

_evel 2: compare the obtain results with other materials

Experiment No. 12: determine the wavelength of monochromatic light, such as sodium light, using Newton's rings.

Level 1: Determination of wavelength

Level 2: determine the radius of curvature of the Plano-convex lens.

Targeted Application & Tools that can be used:

3. Areas of application are optoelectronics industry, Solar panel technologies, quantum computing software, electronic devices using transistors and diodes, memory devices, endoscopy, SQUIDS in MRI, Advanced material characterizations using SEM and STM.

4. Origin, excel and Mat lab soft wares for programming and data analysis.

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Assessment Type

- Midterm exam
- Assignment (review of digital/ e-resource from PU link given in references section mandatory to submit screen shot accessing digital resource.)
- Quiz
- End Term Exam
- Self-Learning



1. Prepare a comprehensive report on non-conventional energy resources in Karnataka and their pros and cons.

2. Write a report on importance of quantum entanglement in supercomputers.

Course Code:	Course Title: Applied	1 Statistics	L-T-P-	1	0	2	2			
MAT1003	Type of Course: Scho	ool Core	С	1	0	2	2			
Version No.	3.0		1							
Course Pre- requisites	None									
Anti-requisites	None									
Course Description	The goal of this course is to provide a firm understanding of probability and statistics by means of a thorough treatment of descriptive statistics, probability and probability distributions keeping in mind the future courses having statistical, quantitative and probabilistic components. The course covers topics such as descriptive statistics, probability, rules for probability, random variables and probability distributions, standard discrete and continuous probability distributions.									
Course Objective	=	The objective of the course is to familiarize the learners with the concepts of "Applied Statistics" and attain Skill Development Through Problem Solving techniques.								
Expected Outcome:	At the end of this cou	urse, students will	be in a po	sition	to					
	apply the techniques of descriptive statistics effectively interpret the ideas of probability and conditional probability demonstrate the knowledge of probability distributions Compute statistical parameters, correlation and regression, probability and sampling distributions using R software.									
Module 1	Descriptive Statistics	Assignment	Coding needed		10 class	es				



Introduction to Statistics, Data and statistical thinking, review of basic statistical parameters,
Covariance, Correlation, Types of Measures of Correlation - Karl Pearson's Correlation Coefficient,
Spearman Rank Correlation, linear regression, Multi linear regression .Module 2Probability6 classes

Introduction to Probability, Probability of an event, Addition Principle, Multiplication law, Conditional Probability, Total Probability and Baye's theorem with examples

Module 3	Random Variables and Probability Distributions	Coding needed	14 classes

Introduction to Random variables, Discrete Random Variables and Continuous Random Variables, Probability Distributions, Probability Mass Function and Probability Density Function, Various Probability distributions, Binomial, Negative Binominal (Self Study), Poisson, Normal and Exponential distributions

Module 4	Sampling Theory	Coding	15 classes
		needed	

Introduction to Sampling Theory, Population, Statistic, Parameter, Sampling Distribution, Standard Error. Testing of Hypothesis, Types of Errors, Critical Region, level of Significance. Difference between Parametric and Non-parametric Tests, Large Sample Tests: Z-Test for Single Mean and Difference of Means (Self Study), Small Sample Tests: Student's t-Test for Single Mean and Difference of Means, F-Test, Chi-Square Test.

Targeted Application & Tools that can be used:

The objective of the course is to familiarize students with the theoretical concepts of probability and statistics and to equip them with basic statistical tools to tackle engineering and real-life problems.

Tools used: R Software / MS-Excel

Text Book

Ronald E Walpole, Raymond H Myers, Sharon L Myers, and Keying E Ye, Probability and Statistics for Engineers and Scientists, Pearson Education, 2016.



References

James T. McClave, P. George Benson and Terry Sincich, Statistics for Business and Economics, 2018.

David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Essentials of Modern Business Statistics with Microsoft Excel, 2020.

David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Essentials of Statistics for Business and Economics, 2019.

Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, John Wiley and Sons, 2018.

Richard A. Johnson, Miller and Freund's Probability and Statistics for Engineers, 2018.

Kishor S Trivedi, Probability and Statistics with reliability, Queuing and Computer Science Applications, John Wiley & Sons, 2008.

Topics relevant to SKILL DEVELOPMENT: The goal of this course is to provide a firm understanding of probability and statistics by means of a thorough treatment of descriptive statistics, probability and probability distributions keeping in mind the future courses having statistical, quantitative and probabilistic components. The course covers topics such as descriptive statistics, probability, rules for probability, random variables and probability distributions, standard discrete and continuous probability distributions for Skill Development through Problem Solving methodologies. This is attained through assessment component mentioned in course handout.

Course Code:	Course Title: Environmental Science	L- T- P- C	1	0	2	0
CHE1018		Contact	1	0	2	3
	Type of Course: School Core- Theory and Lab	hours				
Version No.	2.0					
Course Pre- requisites	NIL					
Anti-	NIL					



requisites								
Course Description	This course emphasizes the need to conserve biodiversity and adopt a more sustainablelifestyle by utilizing resources in a responsible way. Topics covered include basicprinciples of ecosystem functions; biodiversity and its conservation; human populationgrowth; water resources, pollution; climate change; energy resources, andsustainability; Sustaining human societies, policies, and education.This course is designed to cater to Environment and Sustainability							
Course Objective	The objective of the course is to familiarize the learners with the concepts of "Environmental Science" and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques.							
Course Outcomes	On successful completion of this course to Appreciate the historical context of human need for eco-balance. Describe basic knowledge about global of Indian context. Understand biodiversity and its conservat Develop an understanding on types of po Learn about various strategies on Global	n inter limate tion llution	change with change with and ways to	n the environme n particular refe	rence to the vironment			
Course Content:								
Module 1	Humans and the Environment		Assignment	Data Collection	01 class			
states; Great a Self-learning	han-environment interaction: Mastery of fir ancient civilizations and the environment. topics: Humans as hunter-gatherers; Indus Environmental Ethics and emergence of en	strial r	evolution an					
Module 2	Natural Resources and Sustainable		Assignment		03 Classes			

Module 2	Natural Resources and Sustainable	Assignment	03 Classes
	Development		



Topics:

Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, renewable and non-renewable. Water resources: Types of water resources- fresh water and marine resources;

Soil and mineral resources: Important minerals; Mineral exploitation Soil as a resource and its degradation.

Energy resources: Sources of energy and their classification, renewable and non-renewable sources of energy; Advantages and disadvantages.

Self- learning topics: Availability and use of water resources; Environmental impact of overexploitation, issues and challenges.; Environmental problems due to extraction of minerals and use; Sustainable Development Goals (SDGs)- targets, indicators, and challenges for SDGs.

Module 3	Environmental Issues: Local, Regional and	Case study	02 Classes
	Global		

Topics:

Environmental Pollution: Types of Pollution- air, noise, water, soil, municipal solid waste, hazardous waste; Trans- boundary air pollution; Acid rain; Smog.

Land use and Land cover change: land degradation, deforestation, desertification, urbanization. Global change: Ozone layer depletion; Climate change

Self -learning topics: Environmental issues and scales

Module 4	Conservation of Biodiversity and	Assignment	02 Classes
	Ecosystems		

Topics:

Biodiversity-Introduction, types, Species interactions, Extinct, endemic, endangered and rare species, Threats to biodiversity: Natural and anthropogenic activities.

Self-learning topics: Mega-biodiversity, Hot-spots, Major conservation policies. Biodiversity loss: past and current trends, impact.

Module 5 Environmental	Pollution and Case study	03 Classes
Health		



Topics:

Pollution, Definition, point and nonpoint sources of pollution, Air pollution- sources, major air pollutants, health impacts of air pollution.

Water pollution– Pollution sources, adverse health impacts on human and aquatic life and mitigation, Water quality parameters and standards.

Soil pollution and solid waste- Soil pollutants and their sources, solid and hazardous waste, Impact on human health.

Self-learning topics: Noise pollution, Thermal and radioactive pollution.

Module 6	Climate Change: Impacts,	Assignment/case	02 Classes
	Adaptation		
	and Mitigation		

Topics:

Understanding climate change: Natural variations in climate; Projections of global climate change with special reference to temperature, rainfall and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming; Impacts



Vulnerability and adaptation to climate change: Observed impacts of climate change on ocean and land systems; Sea level rise, changes in marine and coastal ecosystems; Impacts on forests and natural ecosystems; Indigenous knowledge for adaptation to climate change.

Self-learning topics: Mitigation of climate change: Synergies between adaptation and mitigation measures; National and international policy instruments for mitigation.

Module 7Environmental ManagementCase studyData analysis02 C1	asses
--	-------

Topics:

Environmental management system: ISO 14001; Environmental risk assessment Pollution control and management; Waste Management- Concept of 3R (Reduce, Recycle and Reuse) and sustainability.

Self-learning topics: Environmental audit and impact assessment; Eco labeling /Eco mark scheme

Module 8	Environmental Treaties and	Case study	Data analysis	01 Classes
	Legislation			

Topics:

Major International Environmental Agreements: Convention on Biological Diversity (CBD), Major Indian Environmental Legislations: Environmental Protection Act, Forest Conservation Act, Public awareness.

Self-learning topics: Paris Agreement, Conference of the Parties (COP), India's status as a party to major conventions: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act.

List of laboratory tasks : Any eight experiments will be conducted

Determination of total alkalinity of a water sample (knowledge)

Estimation of water hardness by EDTA method and its removal (by zeolite/ ion exchange method) (Comprehensive)

Estimation of copper from industrial effluents by colorimetric method (Comprehensive)

Estimation of iron from industrial effluents by titrimetric method/potentiometric method (Comprehensive)

Estimation of nickel from industrial effluents by titrimetric method (Comprehensive)

Estimation of chloride in drinking water by titrimetric method (Comprehensive)

Estimation of fluoride in ground water by colorimetric method (Comprehensive)

Determination of calcium in aqueous solution (Comprehensive)



Determination of Chemical oxygen demand in the industrial effluent. (Comprehensive) Biological oxygen demand of waste water sample (Comprehensive)

Determination of dissolved oxygen of an industrial effluent (Comprehensive)

Quality monitoring analysis of a soil sample (knowledge)

Flame photometric estimation of Sodium and potassium (Application)

Gas Chromatographic analysis of volatile organic compounds (Application)

Targeted Application & Tools that can be used:

Application areas are Energy, Environment and sustainability

Tools: Statistical analysis of environmental pollutants using excel, origin etc.

Project work/Assignment:

Assessment Type

Midterm exam

Assignment (review of digital/ e-resource from PU link given in references section - mandatory to submit screenshot accessing the digital resource.)

Lab evaluation/Assignment

End Term Exam

Self-learning

Assignment 1: Write a Statement of Environment report of your town/city/state/country

Assignment 2: Individual students will carry out the analyses of polluted solid, liquid, and gaseous samples and propose suitable mitigation measures. A detailed and in-depth report needs to be submitted for each case. This may include preparation of reagents, sample preparation (extraction), chemical analysis carried out, instruments and tools used, data collected and processed, inferences made and conclusions arrived at. Necessary support is given in the form of

lab manual and reference links to e-books.

Text Book

G. Tyler Miller and Scott Spoolman (2020), Living in the Environment, 20th Edition, Cengage Learning, USA

Krishnamurthy, K.V. (2003) Text book of Biodiversity, Science Publishers, Plymouth, UK.



Jackson, A.R. & Jackson, J.M. (2000), Environmental Science: The natural environment and human impact, Pearson Education.

Reference Books

Fisher, Michael H. (2018) An Environmental History of India- From Earliest Times to the Twenty-First Century, Cambridge University Press.

William P. Cunningham and Mary Ann Cunningham (2017), Principles of Environmental Science: Inquiry & Applications, 8th Edition, McGraw-Hill Education, USA.

Sinha N., (2020) Wild and Wilful. Harper Collins, India.

www.ipcc.org; https://www.ipcc.ch/report/sixth-assessment-report-cycle/

Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press.

Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press.

E-resources:

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_18126

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_8761

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AJ_1_02082022_3333

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_3063

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_20719

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_16824

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_3954

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=DO_AB_1_06082022_491



https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_id=CU_STOM_PACKAGE_16012023_WORLD_BUSINESS_COUNCIL_SUSTAINABLE_488

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique id=CU_STOM_PACKAGE_16012023_WORLD_BUSINESS_COUNCIL_SUSTAINABLE_583

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=SP_RINGER_INDEST_1_171

https://presiuniv.knimbus.com/user#/searchresult?searchId=3R%20principle&_t=1687427221129

https://presiuniv.knimbus.com/user#/searchresult?searchId=eco%20labelling&_t=1687427279979

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique _id=TE_XTBOOK_LIBRARY01_06082022_395&xIndex=4

https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf

Course Code: CIV1008	Course Title: Basic Engineering Sciences Type of Course: Theory Only	L-T-P- C	2	0	0	2
Version No.	1.0		•			
Course	NIL					
Pre-requisites						
Anti-requisites	NIL					
Course	This basic course on engineering science	e is design	ed to in	ntroduce s	tudents	to the
Description	fields of civil, mechanical and petroleum engineering. Student will be exposed to various fields in civil engineering and different manufacturing techniques in addition to machinery for power production and consumption. Additionally, students will be getting an overview of various sectors of oil & gas industries. This course acquaints students to basics of Industry 4.0 and Construction 4.0. The course aims to enable students to appreciate the multidisciplinary nature of engineering design and operations in the current era with mechanization and digitization transforming every aspect of engineering.					
Course Objective	The objective of the course is skill development of student by using Participative Learning techniques.					



 Recognize the significance of various disciplines in Civil Engineering Discuss the recent evolutions in Civil Engineering Explain various energies, energy generating machineries and energy consumption machineries 						
2] Discuss the recent evolutions in Civil Engineering3] Explain various energies, energy generating machineries and energy						
3] Explain various energies, energy generating machineries and energy						
4] Describe the fundamental concept and terminology associated with the Petroleum Industry						
5] Distinguish between conventional and modern manufacturing techniques						
Course Content:						
Module 1Introduction to various fields in Civil EngineeringCase studies on different Civil Engineering Projects6 Sessions						
Topics: Introduction to Civil Engineering: Definition, scope and branches of Civil Engineering, of Civil Engineer, Overview of Infrastructure.	Role					
Module 2Current Trends and Evolution in Civil EngineeringAssignment AssignmentArticle Review6 Sessions						
Topics: Mechanization in Construction, Application of Digital Technologies in Planning, Design execution, monitoring and maintenance of Construction. Overview of Smart Cities.	l,					
Module 3Power Production and Consumption MachineryAssignment & QuizData Collection6 Sessions						
Topics: Energy and its types, Engines and their applications, Pumps-Compressors and their applications.						
Module 4Overview of Petroleum EngineeringAssignment & QuizArticle Review6 Sessions						
Overview of the Petroleum Industry, Importance of Petroleum Engineering, lifecycle of Petroleum products, Classifications of E&P activities: Key difference between Offshore and Onshore, Onshore facilities, offshore platforms, Digitization of petroleum engineering						
Module 5Industry 4.0Assignment & QuizData Collection6 Sessions						
Topics: Conventional manufacturing process: Metal forming, metal removal and metal joining process.						



Targeted Application & Tools that can be used:

Application Areas include design and implementation of Smart City projects, Infrastructure maintenance, Power production, IC engines, Electric vehicles, onshore and offshore exploration and production activities

Project work/Assignment:

Assignment 1: Collect data and prepare report on various Mega Projects in Civil Engineering

Assignment 2: Review Articles on current evolutions in Civil Engineering.

Assignment 3: Collect data related to renewable energy generation (Wind, Solar)

Assignment 4: Prepare an energy consumption chart for a compressor or pumps.

Assignment 5: Prepare a report on role of 3D printing across various industries.

Assignment 6: Prepare an assignment on geopolitical influence on oil and gas industries.

Text Book:

T1. Elements of Civil and Mechanical Engineering, L.S. Jayagopal & R Rudramoorthy, Vikas Publishers

T2. Elements of Mechanical Engineering, by VK Manglik

T3. Fundamentals of Oil & Gas Industry for Beginners by Samir Dalvi, Notion Press; 1st edition

References

K.P. Roy, S.K. Hajra Choudhury, Nirjhar Roy, "Elements of Mechanical Engineering", Media Promoters and Publishers Pvt Ltd, Mumbai.

Nontechnical Guide to Petroleum Geology, Exploration, Drilling & Production by Norman J. Hyne, PennWell Books; 3rd Revised edition

Web-resources:

Basic Civil Engineering

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=2706932&site=ehost-live

Post-parametric Automation in Design and Construction

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1155197&site=ehost-live

Smart Cities : Introducing Digital Innovation to Cities

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1993146&site=ehost-live

Innovation Energy: Trends and Perspectives or Challenges of Energy Innovation



https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=2323766&site=ehost-live

Mechanical Engineering

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO106_REDO_1705

Additive Manufacturing: Opportunities, Challenges, Implications

https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1134464&site=ehost-live

Society of Petroleum Engineers (SPE)

https://www.spe.org/en/

PetroWiki: A comprehensive online resource created by the Society of Petroleum Engineers that provides information on various aspects of petroleum engineering.

https://petrowiki.spe.org/PetroWiki

Rigzone: A resource for news and information about the oil and gas industry, including job postings and industry trends.

https://www.rigzone.com/

Topics relevant to the development of SKILLS:

Engines-Turbines and their applications.

Mechanization in Construction.

Digitization in Petroleum Industries

Course Code:	Course Title: Problem Solving using JAVA L-T-P-					
CSE1006	Type of Course: Lab Integrated C I 0 4 5					
Version No.	2.0					
Course Pre- requisites	CSE1004 – Problem-Solving Using C					
Anti-requisites	Nil					
Course Description	This course introduces the core concepts of object-oriented programming. This course has theory and lab component which emphasizes understanding the implementation and application of object-oriented programming paradigm. It helps the student to build real-time secure applications by applying these concepts and also for effective problem-solving. The students interpret and understand the need for object-oriented programming to build applications.					



a								
Course Objective	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques							
	On successful comple	etion of the cou	rse, the students shall be able	to:				
	C.O. 1: Describe the	basic programn	ning concepts. [Knowledge]					
	C.O. 2: Apply the con problems. [Applicati	-	, objects and methods to solve	2				
Course Out Comes	C.O. 3: Apply the cor	ncept of arrays a	and strings. [Application]					
	C.O. 4: Implement in [Application]	heritance and p	olymorphism in building secu	re applications.				
	C.O. 5: Apply the cor [Application]	C.O. 5: Apply the concepts of interface and error handling mechanism.						
Course Content:								
Module 1	Basic Concepts of Programming and Java	Assignment	Data Collection/Interpretation	n 12 Sessions				
Variables, Consta	=	Assignments a	, Sample program, Data types nd Expression, Basic Input/ C					
Module 2	Classes, objects, methods and Constructors	Case studies / Case let	Case studies / Case let	12 Sessions				
Tanian Classon (tient Oriente 1 Driveig 1 and 1	<u>f</u>				
adding data mem		ne class, access	object Oriented Principles, de specifiers, instantiating object	-				
	ism: Method overload classes, Accessing me	-	rs, constructor overloading, th l classes.	is keyword, static				
Module 3	Arrays, String and String buffer	Quiz	Case studies / Case let	14 Sessions				
			ssing Array, Multi–Dimension lass, methods in String Buffer					
Module 4	Inheritance and Polymorphism	Quiz	Case studies / Case 14	Sessions				
Topics: Inheritand	ce: Defining a subclass	s, Types of Inhe	ritance, super keyword. Dyna	mic				
-	-		ith data members, with memb					



with class. Abstract keyword: with data members, with member functions and with class, Exception handling.

Module 5	Input & Output Operation in Java	Ou1z	Case studies / Case let	14	Sessions

Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Objects, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.

List of Laboratory Tasks:

- P1 Problem Solving using Basic Concepts.
- P2 Problem Solving using Basic Concepts and Command Line Arguments.
- P3 Programming assignment with class, objects, methods and Constructors.
- P4 Programming assignment with method overloading.
- P5 Programming assignment with constructor overloading.
- P6 Programming assignment with Static members and static methods.
- P7 Programming assignment with Nested classes.
- P8 Programming assignment using Arrays.
- P9 Programming assignment using Strings.
- P10 Programming assignment using String Builder.
- P11 Programming assignment using Inheritance and super keyword.
- P12 Programming assignment using Method overriding and Dynamic method invocation.
- P13 Programming assignment using Final keywords.
- P14 Programming assignment using Abstract keywords.
- P15 Programming assignment using Interface.
- P16 Programming assignment using Interface.
- P17 Programming assignment CharacterStream Classes
- P18 Programming assignment Read/Write Operations with File Channel

Targeted Application & Tools that can be used : JDK /eclipse IDE/ net Beans IDE.

Text Book

T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education.

References

R1: Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Pearson



R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenj197t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_91II9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to the development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword

static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through the assessment component mentioned in the course handout.

ENG2001	Advanced English	L- T- P- C	1	0	2	2
Version No.	1.3					
Course Pre- requisites	ENG1002 Technical English					
Anti-requisites	NIL					
Course	The course emphasizes on technical communicat	tion at adva	nced le	evel	by	
Description	exploring critical reading, technical presentation and review writing. The purpose of the course is to enable learners to review literature in any form or any technical article and deliver technical presentations. Extensive activities in practical sessions equip to express themselves in various forms of technical					



	reach GREATER HEIGHTS communications. Technical presentations and the module on career setting focus on learners' area of interests and enhance their English language writing skills to communicate effectively.							
Course Out Come	On successful completion of the course the students shall be able to: Develop a critical and informed response reflectively, analytically, discursively, and creatively to their reading.							
	-	Communicate effectively, creatively, accurately and appropriately in their						
	Deliver technical	presentations						
	Design resume an	nd create professional port	folio to find a suitable ca	areer				
Course Content: Th	leory							
Module 1	Critical Reasoning and Writing	Writing Essays	Critical Reading	4 Classes				
Topics:			1					
A Catalog of Readi	ng Strategies							
The Myth of Multit	tasking							
A Guide to Writing	Essays Speculating	g about Causes or Effects						
Is Google Making	Us Stupid (Self Stu	dy)						
Module 2	Technical Presentation	Presentation	Oral Skills	3 Classes				
Topics:	I							
Planning the preser	ntation							
Creating the presen	tation							
Giving the presenta	tion							
Module 3	Writing Reviews	Prezi	Review Writing	4 Classes				
Topics:	1	1	1					
Review Writing								
Short film reviews								
Advanced English	Grammar (Self Stu	dy)						
Module 4	Starting your Career	Online Writing Lab	Writing Skills	4 Classes				



Topics:							
Preparing a Resume							
Writing Effective Application Letter							
Creating a Profession	Creating a Professional Portfolio						
Course Content: Pra	actical Sessions						
Module 1	Critical Reasoning and Writing	8 Classes					
Reading and Analyz	zing						
Level 1 – Annotatic	on						
Level 2 - Assumption	ons						
Writing Narrative E	Essays						
Level 1 – Draft 1							
Level 2 – Draft 2							
Module 2	Technical Presentation	10 Classes					
Fishbowl							
Students in the inne	tts form concentric circles with a small group inside and a larger circle engage in an in-depth discussion, while students in the t, logic, and group interaction.	• •					
Level 1 – within gro	oup						
Level 2 – Among 2	group						
Technical Group Pr	resentation						
Module 3	Writing Reviews	Classes					
Practice Worksheets	S						
Level 1 – Eliminati	ng the Passive Voice						
Level 2 – Simple, compound and complex sentences							
Writing Short Film Reviews							
Module 4	Starting your Career	Classes					
Collaborative Project							
Job search and writing report							
Writing Resume							



	GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS UNIVERS	P AGAGES ST	
Module 1-4	Academic Journal		2 Classes
Academic Journal	Writing		
Level 1- Mid Term			
Level 2 – End Term	1		
Targeted Application Dyadic interviews,	on & Tools that can be used: Writing re Grammarly.com	ports, Review writing,	Group Discussion,
Project work/Assign	nment:		
Academic Journal -	- Assignment		
	al (CIJ), students compile task and activities the middle and end of the semestic tor at the middle and end of the semestic to	-	h module and
References			
Hering, Heik. How Presentation. Spring	to Write Technical Reports: Understan ger.	ding Structure, Good I	Design, Convincing
Johnson, Richard. (2010) Technical Communication Toda	y. Pearson, 2015	
	harles R. Cooper and Ellen C. Carillo. Beford/St. Martin's Macmillan Learnii	· · ·	lly Writing Well: A
The Princeton Revi	ew. (2010) MCAT Verbal Reasoning &	Writing. The Princeto	n Review, Inc.
https://www.hitbull	seye.com/Strong-and-Weak-Argument	s.php Accessed on 10 I	Dec 2021
https://www.inc.com 2021	m/guides/how-to-improve-your-present	tation-skills.html Acce	ssed on 10 Dec
Topics Relevant to Career	"employability": Critical Reasoning, P	resentation, Review W	riting and Starting
Topics Relevant to	"Human Values and Professional Ethic	s": Critical reasoning	

Course Code:	Course Title: Enhancing Personality					
PPS1012	through Soft Skills	L- T - P- C	0	0	2	1



	Type of Course: Practical Only	Course							
Version No.	1.0								
Course Pre-	Students are expected to unders	Students are expected to understand Basic English.							
requisites	Students should have desire and	l enthusiasm	to involve,	particij	pate ar	nd lear	n.		
Anti-requisites	NIL								
Course	This course is designed to enable					-			
Description	improve confidence, communic								
	competitive advantage and incre			-					
	The course will benefit learners	-	-	es effec	tively	throug	h		
	various activities and learning n	nethodologie	es.						
Course									
Objective	The objective of the course is to	familiarize	the learners	with th	ie con	cents			
	of "Personality Development th					cepts			
	DEVELOPMENT through PAR	-				s.			
					1				
Course Out									
Comes	On successful completion of thi	is course the	students sh	all be a	ble to:				
	CO 1 Identify the stages of team	n iormation ((Remember)					
	CO 2 Demonstrate effective pre	esentation ski	ills (Apply)						
	CO2 Dromono musfassional again	1 madia musfi	ila (Amalur)						
	CO3 Prepare professional socia	i media prom	ne (Appry)						
Course Content:									
	T D 1111	Classroom a	and outbour	nd team	ı .				
Module 1	Team Building	building ac	ctivities.		61	Hours			
Topics: Importan	ce of team, stages of Team Forma	ation. Trust a	and collabor	ation. V	/irtual	Team			
	-	,		,					
Activity: Team E	Building outbound activity								
	1								
Module 2	Art of Ouestioning	Role plays			4 9	Session	ıs		
Module 2	Art of Questioning	Role plays			4 \$	Session	18		



	GAIN	NORE KNOWLEDGE H GREATER HEIGHTS	U) I I	/		
			en-ended and Close-ended	d questi	ons, Funnel	
technique, Probin	ig quest	tions, Leading questions				
			Practice and evaluation	of		
Module 3	Preser	ntation Skills	individual / group		10 Sessions	
			presentation			
Topics: Content of questions and cha			s, Audience Analysis, Tim	ing and	Pacing, handling	
Activity: Individu	ual pres	entations and team presen	tation			
Module 4		Professional Brand	Brand Framework	4 Sess	vions	
Widdule 4		Building	Activity	4 5055	510115	
Topics: Personal	brand d	efinition. Crafting a comr	elling LinkedIn profile, N	letwork	ing strategies.	
1		, 6 1	6 1 ,		6 6	
Activity: Create	e a basi	c online profile				
Module 5		Recap / Revision		1 Sess	sion	
Wiedule 2		/Feedback Session				
Targeted Applicat	tion & '	Tools that can be used:	I			
TED Talks						
You Tube Links						
Activities						
Project work/Ass	ignmen	t: Mention the Type of Pro	oject /Assignment propose	ed for th	nis course	
Presentation Eval	uation					
Targeted Applica	tion & '	Tools that can be used:				
TED Talks						
YouTube Links						
Videos by L&D 7	Feam sh	ared on Edhitch/YouTube	e.com			
LMS						



Assignments proposed for this course

Evaluation on Presentation

Assignment on LinkedIn Post

YouTube Links: https://youtu.be/z_jxoczNWc (Steve Jobs Introducing the iPhone 4 in June 2010)

References

"Talk Like TED - The 9 Public-Speaking Secrets of the World's Top Minds" By Carmine Gallo St. Martin's Press Copyright © 2014 Carmine Gallo All rights reserved. ISBN: 978-1-250-04112-8

"The Presentation Secrets of Steve Jobs: How to Be Insanely Great in Front of Any Audience" MP3 CD – Import, 22 April 2014

"The Definitive Book of Body Language: The Hidden Meaning Behind People's Gestures and Expressions" Hardcover – Illustrated, 25 July 2006

"Crucial Conversations: Tools for Talking When Stakes Are High" Paperback – Import, 1 July 2002

Web links:

https://www.wordstream.com/blog/ws/2014/11/19/how-to-improve-presentation-skills

https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/

https://hbr.org/2022/05/the-art-of-asking-great-questions

Topics relevant to development of "SKILL": Art of Presentation, Team building, Art of questioning and Personal Branding for Skill Development through Participative Learning Techniques. This is attained through assessment component mentioned in course handout.

Course Code: EEE1007	Course Title: Basics of Electrical and Electronics Engineering. Type of Course: Engineering Science - Theory & Integrated Laboratory	L-T-P-C	3	0	2	4
Version No.	1.0					
Course Pre- requisites	NIL					
Anti- requisites	NIL					



Course Description	machines and basics of transistors and its application. The associated laboratory provides an opportunity to validate the concepts taught and enhances the ability to visualize the real system performance, using both hardware and simulation tools.						
Course Objective		he objective of the course is to familiarize the learners with the concepts of Basics f Electrical and Electronics Engineering and attain Skill Development through xperiential Learning techniques.					
Course Outcomes	 On successful completion of this Explain basic laws of Electrical E parameters in the circuits. Discuss various fundamental para semiconductor devices and their a Summarize the operations of different amplifiers. Summarize the performance charae Machines. Demonstrate the working of elect characteristics Demonstrate the working of elect various semiconductor devices. 	ngineering to comp meters appearing in upplications. erent biasing config cteristics and applic rical machines to ob	ute voltage, curren a the characteristic urations of BJTs an cations of various of pserve performan	s of nd electrical ce			
Course Content:							
Module 1	Introduction to Electrical Circuits	Assignment/ Quiz	Numerical solving Task	10 Sessions			

DC Circuits: Concept of Circuit and Network, Types of elements, Network Reduction Techniques-Series and parallel connections of resistive networks, Star–to-Delta Transformations, Mesh Analysis, Numerical examples.

AC Circuits: Fundamentals of single phase circuits - Series RL, RC and R-L-C Circuits, Concept of active power, reactive power and Power factor, Numerical examples.

Introduction to three phase system and relation between line and phase values in Star & Delta connection, Numerical examples.



					Mean of		
Module 2	Semiconductor and Diode applications		Assignme Quiz	ent/	Memory Recall bas Quizzes	sed	11 Sessions
Mass Action L	Law, Charge densities in a ser	nicondu	ctor, Types	of SC, J	unction dio	des -Ia	leal and
practical behav	viour, Modelling the Diode C	Character	ristic, and I	Diode ap	plications li	ike rec	tifiers,
11 0	clamping circuits. Zener diod	e, charac	cteristics ar	nd its app	plications li	ke vol	tage
regulator.							
	Fundamentals of		Assignme	nt/	Memory		12
Module 3			Assignme Quiz		Recall-bas	sed	Sessions
	Electrical Machines		Quiz		Quizzes		503510115
Numerical exa examples. AC	chines: Single phase transforr amples. DC Motor: principle Motor: Principle operation o ines: Introduction to special e	of operator	tion, Back ion Motors	EMF, to and its A	rque equati Application	on, Nu s.	
	Transistors and its	Assign	ment/	Numer	ical		_
Module 4	Applications	Quiz		solving		12 S	essions
and their curre	racteristics, Current compone ent gains. Operating point, Bi	asing &	stabilizatio	on techni	ques: Fixed	l Bias,	Voltage
divider bias an pair.	nd its stability factor and load	l line ana	alysis. Sing	le and m	ultistage ar	nplifie	r, Darlington
JFET (Constru	action, principal of Operation	and Vol	t – Ampere	characte	eristics). Pir	nch- of	f voltage,
Comparison of	f BJT and FET. MOSFET (C racteristics in Enhancement a	onstructi	ion, princip	oal of Op			-
List of Labora	tory Tasks:						
Experiment No	o 1: Verification of KVL and	KCL for	r a given D	C circui	t.		
Level 1: Study	and Verify KVL and KCL for	or the given the givent the givent the givent the givent the given the given the givent the give	ven electric	al Circu	it.		
	ne same circuit considered in Iltisim/MATLAB.	level 1,	perform th	e simula	tion using l	NI	
Experiment N	o 2: Analyse AC series circui	its – RL,	RC and R	LC .			
Level 1: Cond RL and RC cir	luct an experiment to perform reuits	1 and ver	rify the imp	oedance,	current and	l powe	r of Series
Level 2:							
Experiment N	o 3: Calculation of power and	d power	factor of th	e given	AC Circuit.		
Level 1: Cond	uct an experiment to measure	e the pov	wer and pov	wer facto	or for given	resisti	ve load.



Level 2: Conduct an experiment to measure the power and power factor for given inductive load.

Experiment No 4: Perform the experiments on given Transformer.

Level 1: Verify the EMF equation of a transformer and compute the voltage transformation ratio.

Level 2: Study the effect of load on the secondary side of the transformer and verify the EMF equation under load conditions.

Experiment 5: Load test on DC shunt motor

Level 1: Conduct load test on DC shunt motor and find its efficiency at different loads

Level 2:Conduct load test on DC shunt motor and plot the performance characteristics.

Experiment 6: Study of PN-Junction Diode Characteristics in Forward and Reverse Bias Conditions.

Level 1:Carry out an experiment to plot VI Characteristics and hence find the cut-in voltage on forward characteristics for the Silicon P-N Junction diode.

Level 2: Carry out an experiment to plot VI Characteristics of Zener diode and hence find the zener voltage on reverse characteristics for the Silicon P-N Junction zener diode.

Experiment 7: To observe the output waveform of half wave and full wave rectifier circuit and compute ripple factor and efficiency

Level 1:Identify the components required for a rectifier circuit, rig up the circuit, and sketch the output waveforms without filter.

Level 2: Rig up the rectifier circuit with RC filter, observe the output waveforms, determine the efficiency and ripple factor.

Experiment 8: To construct clipping and clamping circuits for different reference voltages and to verify the responses.

Level 1:Identify the components required for building a Clipper / Clamper circuit. Rig up the circuit according to the circuit diagram given and sketch the output waveform.

Level 2: Given a sinusoidal input of 10 V p-p, implement a positive / negative clipper with output clipped at 2 V.

Experiment 9: To calculate various parameters of emitter follower circuit using BJT



Level 1: Identify the components required to implement an emitter follower circuit. Rig up the circuit and observe the variations in output waveform with respect to the variations in input waveform.

Level 2: Determine the values of Zin input impedance and Zout output impedance for Emitter Follower.

Experiment 10: To Implement RC Coupled amplifier using a BJT and sketch the frequency response.

Level 1: Identify the components required to implement an RC coupled amplifier circuit. Rig up the circuit and sketch the frequency response.

Level 2: From the frequency response curve determine the value of the mid band gain and the bandwidth.

Targeted Application & Tools that can be used:

Targeted Applications: Application Area includes all electrical and electronic circuits (power supply unit, regulator unit, embedded devices, hardware electronics etc.). The students will be able to join a profession which involves basics to high level of electronic circuit design.

Professionally Used Software: Matlab/Multisim/ PSpice

Besides these software tools hardware equipment such as Multimeters, Function Generators, Power Supplies, Oscilloscopes etc., can be used to perform component/circuit testing and analysis..

Text Book(s):

Kothari D. P. & Nagrath I. J., "Basic Electrical and Electronics Engineering", Tata McGraw-HillEducation.

Theraja B.L. and Theraja A.K., "A Textbook of Electrical Technology: Basic Electrical Engineering" in S.I. System of Units, 23rd ed., New Delhi: S. Chand, 2002.

A.P.Malvino, Electronic Principles,7thEdition, Tata McGraw Hill,2007

J. Millman, C. C. Halkias and C. D. Parikh, "Millman's Integrated Electronics", McGraw Hill Education, 2nd Edition.

Basics of Electrical & Electronics Laboratory Manual.

Reference Book (s):

John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and Electronic Technology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson,2011

Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007.

K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd



R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition.

A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition

A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition

Online Resources (e-books, notes, ppts, video lectures etc.):

https://presiuniv.knimbus.com/user#home

https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples"

Seminar Topic: https://nptel.ac.in/courses/108/105/108105153/ "Electrical Measurements"

Video lectures on "Electronic Devices" by Prof.Dr. A. N. Chandorkar, IIT Bombay http://www.satishkashyap.com/2013/03/video-lectures-on-electron-devices-by.html

Video lectures on "Analog Electronics" by Prof. S.C. Dutta Roy, IIT Delhi https://nptel.ac.in/courses/108/102/108102095/

Video lectures on "Diodes", by Prof.ChitralekhaMahanta, IIT Guwahati,

https://nptel.ac.in/courses/117/103/117103063/

"Introduction to Electrical Machines https://nptel.ac.in/courses/108/102/108102146/"

M. -Y. Kao, H. Kam and C. Hu, "Deep-Learning-Assisted Physics-Driven MOSFET CurrentVoltageModeling," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 974-977, June 2022, doi: 10.1109/LED.2022.3168243

https://ieeexplore-ieee-org-resiuniv.knimbus.com/document/9758727

F. Bonet, O. Aviñó-Salvadó, M. Vellvehi, X. Jordà, P. Godignon and X. Perpiñà, "Carrier

Concentration Analysis in 1.2 kV SiCSchottky Diodes Under Current Crowding," in IEEE Electron DeviceLetters, vol. 43, no. 6, pp. 938-941, June 2022, doi: 10.1109/LED.2022.3171112. https://ieeexplore-ieeeorg- presiuniv.knimbus.com/document/9764749

M. Chanda, S. Jain, S. De and C. K. Sarkar, "Implementation of Subthreshold Adiabatic Logic for Ultralow-Power Application," in IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. .23, no. 12, pp. 2782-2790, Dec. 2015.

https://ieeexplore.ieee.org/document/7018053

R. Raut and O. Ghasemi, "A power efficient wide band trans-impedance amplifier in submicron

CMOS integrated circuit technology," 2008 Joint 6th International IEEE Northeast Workshop on Circuits and Systems and TAISA Conference, 2008, pp. 113-116, doi: 0.1109/NEWCAS.2008.4606334. https://ieeexplore.ieee.org/document/4606334

Topics relevant to "SKILL DEVELOPMENT": Performing suitable experiments to compute the Electrical and electronics circuit parameters, performance operation of Machines, and



semiconductor devices for Skill Developmentthrough Experiential Learning techniques. This is attained through assessment component mentioned in course plan.

	1			1				1		
Course Code:	Course Title: Prob JAVA	olem Solving	-	L- T-P- C	1	0	4	3		
CSE1006	Type of Course: In	tegrated				Ĩ				
Version No.	2.0			1	1			1		
Course Pre- requisites	CSE2200 – Proble	m Solving Us	ing C							
Anti-requisites	Nil									
Course Description	This course has the understanding the programming para applications by app solving. The studen	This course introduces the core concepts of object-oriented programming. This course has theory and lab component which emphasizes on understanding the implementation and application of object-oriented programming paradigm. It helps the student to build real time secure applications by applying these concepts and also for effective problem solving. The students interpret and understand the need for object oriented programming to build applications.								
Course Objective	of Problem-Solvin	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques								
	On successful completion of the course the students shall be able to:									
	C.O. 1: Describe the basic programming concepts. [Knowledge]									
Course Out	C.O. 2: Apply the concept of classes, objects and methods to solve problems. [Application]									
Comes	C.O. 3: Apply the concept of arrays and strings. [Application]									
	C.O. 4: Implement inheritance and polymorphism building secure applications. [Application]									
	C.O. 5: Apply the concepts of interface and error handling mechanism. [Application]									
Course Content:										
Module 1	Basic Concepts of Programming and Java		Data Collectio	n/Interpreta	ation	1	2 Se	essions		



Topics: Introduction to Principles of Programming: Process of Problem Solving, Java program structure, Download Eclipse IDE to run Java programs, Sample program, Data types, Identifiers, Variables, Constants in java, Operators, Assignments and Expression, Basic Input/ Output functions, Control Statements: Branching and Looping.

Module 2	Classes, objects, methods and Constructors	Case studies / Case let	Case studies / Case let	12 Sessions
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Topics: Classes, Objects and Methods: Introduction to object Oriented Principles, defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.

Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.

Module 3	Arrays, String and String buffer	Quiz	Case studies / Case let	14 Sessions

Topics: Arrays: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Array of objects. String: Creation & Operation. String builder class, methods in String Buffer.

Module 4Inheritance and PolymorphismQuizCase studies / Case let14Session	ns

Topics: Inheritance: Defining a subclass, Types of Inheritance, super keyword. Dynamic Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.

Module 5	Input & Output Operation in Java	Ouiz	Case studies / Case let	14 Sessions

Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.

List of Laboratory Tasks:

P1 - Problem Solving using Basic Concepts.

P2 - Problem Solving using Basic Concepts and Command Line Arguments.

P3 - Programming assignment with class, objects, methods and Constructors.

P4 - Programming assignment with method overloading.

P5 - Programming assignment with constructor overloading.



- P6 Programming assignment with Static members and static methods.
- P7 Programming assignment with Nested classes.
- P8 Programming assignment using Arrays.
- P9 Programming assignment using Strings.
- P10 Programming assignment using String Builder.
- P11 Programming assignment using Inheritance and super keyword.
- P12 Programming assignment using Method overriding and Dynamic method invocation.
- P13 Programming assignment using Final keywords.
- P14 Programming assignment using Abstract keywords.
- P15 Programming assignment using Interface.
- P16 Programming assignment using Interface.
- P17 Programming assignment CharacterStream Classes
- P18 Programming assignment Read/Write Operations with File Channel

Targeted Application & Tools that can be used : JDK /eclipse IDE/ net Beans IDE.

Text Book

T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education.

References

R1: Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Pearson

R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenj197t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_91II9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword



static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.

Course Code:	Course Title: Basic French		L- T-P- C	2-0-0-2				
FRL1002	Type of Course: Open Elective			2-0-0-2				
Version No.	4.0							
Course Pre-requisites	Not Applicable							
Anti-requisites	Not Applicable							
Course Description	This Course is for beginners and gives an introduction of the French Language (basic grammar, conjugation, daily used vocabulary words, and basic conversations) and French culture. This Course is designed to build up all of the basic skills of French listening, reading, speaking, and writing introduced in the lessons. Besides, this Course offers an access to the French world, helping students to break cultural boundaries and raise cultural literacy.							
Course Objective	This course is designed to improve the learners Employability skills by using participative learning techniques to develop students' language proficiency and cross-cultural competence by active and participatory teaching methods.							
Course Outcomes	On successful completion of the course the students shall be able to:Identify the basics of French Grammar, vocabulary and ConjugationApply the basics strategies of listening, reading, speaking and writing skillsUse of French on everyday topics such as greetings, personal information, time and schedulePractice conversations in French language with peer speakers in different situations							
Course Content:	Learning of Basic French skills							
Module 1	Greetings and Introducing yourself	[Re	emember]	6 Periods				



Chapter 1. Greetings

Objectives: Greetings, introducing yourself, how to welcome someone,

Grammar: Construction of a sentence, the days of the weeks and the months

Chapter 2. Introducing yourself

Objectives: Introduce oneself / ask for someone's personal information.

Grammar: Mas or Fem noun, adjectives, present tense of the 1st group

Usage of audio visual files

Module 2	Expressing likes/dislikes and introducing someone		[Apply]	6 Periods					
Chapter 3. Expressing	g likes and dislikes		I	l					
Objectives: How to e	xpressing what you like and dislik	e.							
Grammar: Negative form, singular and plural.									
Culture: The polite way to address people in French									
Assignment									
Chapter 4. Introducin	g someone								
Objectives: How to d	escribe someone,								
Grammar: Vocabular	y of the family, Demonstrative adj	ectives,							
Present tense of verbs	s of the 2nd and 3rd group								
Module 3	Inviting someone and asking questions		[Apply]	9 Periods					
Chapter 5. Inviting sc	omeone			I					
Objectives: How to in	nvite someone, accept or refuse the	e invitatio	n, Read the time	,					
Grammar: Future ten	se, Interrogation.								
Culture: The art of ac	cepting and declining an invitation	n politely	in French						
Internal									
Chapter 6. Asking for	information,								
Objectives: How to a	sk for information, giving informa	tion							



		vative Projects usin	ply] 9] L- T-P- C -	'ic
a			L-T-P-C -	- -
			 	+ + +
	a Reservation			
Version No.	nake a reconvotion 1.0	future tonce		
Course Pre-	NIL			
requisites	ask for directions, I	mperative tense		
Anti-requisites	NIL			
Course _{Dr}	This course is desig	gned to provide an i	n-depth understanding of Are	duino
Description	-		in various real time projects	-
roject work /Assign			ts will learn the fundamenta	
Assignment (Essay	\ ·		ience with a wide range of sound interface sensors with Ar	
nternal	-		various output devices This c	
Group work / Group			ed in exploring the world of using Arduino and sensors.	electronics
Cever Rook	- T1f.	· · · · · · · · · · · · · · · · · · ·	1.11.4. C1.11 f 1 1.	•
Course Objective	•	LEARNING technic	ability Skills of student by us jues.	ing
Course d	On successful com	pletion of the cours	e the students shall be able to)
Outcomes	Explain the main	features of the Ardu	ino prototype board	
earning materials	Demonstrate the h	nardware interfacing	g of the peripherals to Arduin	o system.
opics relevant to de	Understand the ty	pes of sensors and i	ts functions	
oreign language pr	• Demonstrate the f	functioning of live p	rojects carried out using Ard	uino system.
Course Content:				
	-			
Module 1	Basic concepts of	Hands-on	Interfacing Task and	4
Module I	Arduino	Hallds-oli	Analysis	Sessions
Topics:				
Introduction to Are	duino. Pin configur:	ation and architectu	e, Device and platform featu	res. Concept
			erfacing Board, API's, Intro	· .
-	• •	•	d variables, Arduino i/o Funo	
	cations, Arduino ID	• •		,
	Sensory		Interfacing Task and	
Module 2	Devices	Hands-on	Analysis	4 Sessions



Arduino Sensors: Humidity Sensor, Temperature Sensor, Water Detector / Sensor, PIR Sensor, Ultrasonic Sensor, Connecting Switches and actuators, sensor interface with Arduino.

Introduction to 3D Printer: 3D Printer technology and its working Principles, Applications. Introduction to online Simulators: Working with Tinkercad Simulator.

Topics: Types of Arduino boards, sensors, 3D Printer

Targeted Application & Tools that can be used:

Application Area:

Home Automation, Environmental Monitoring, Agriculture and Farming, Industrial Automation, Internet of Things (IoT), Robotics, Wearable Devices, Security Systems, Education and Learning. These are just a few examples of the many application areas where Arduino and sensors can be applied. The flexibility and affordability of Arduino, combined with the wide range of sensors available, allow for endless possibilities in creating innovative projects.

Professionally Used Software: students can use open SOURCE Softwares Arduino IDE and Tincker CAD

Project work/Assignment:

1. Projects: At the end of the course students will be completing the project work on solving many real time issues.

2. Book/Article review: At the end of each module a book reference or an article topic will be given to an individual or a group of students. They need to refer the library resources and write a report on their understanding about the assigned article in appropriate format. Presidency University Library Link .

3. Presentation: There will be a presentation from interdisciplinary students group, where the students will be given a project on they have to demonstrate the working and discuss the applications for the same

Textbook(s):

Monk Simon "Programming Arduino: Getting Started with Sketches", Mc Graw Hill Publications Second Edition



References

Reference Book(s)

1. Neerparaj Rai "Arduino Projects for Engineers" BPB publishers, first edition, 2016.

2. Ryan Turner "Arduino Programming " Nelly B.L. International Consulting Ltd. first edition, 2019.

Online Resources (e-books, notes, ppts, video lectures etc.):

Arduino trending Projects < https://www. https://projecthub.arduino.cc/>

Introduction to Arduino < https://onlinecourses.swayam2.ac.in/aic20_sp04/preview>

Case studies on Wearable technology< https://www.hticiitm.org/wearables>

E-content:

Cattle Health Monitoring System Using Arduino and IOT (April 2021| IJIRT | Volume 7 Issue 11 | ISSN: 2349-6002)

M H Hemanth Kumar, Ravi Pratap Singh, Nishu Sharma, Pragya Singh" IOT BASED SMART SECURITY SYSTEM USING ARDUINO" 2021 JETIR August 2021, Volume 8, Issue 8.

R. Maheswar, P. Jayarajan, S. Vimalraj, G. Sivagnanam, V. Sivasankaran and I. S. Amiri, "Energy Efficient Real Time Environmental Monitoring System Using Buffer Management Protocol," 2018, pp. 1-5, doi: 10.1109/ICCCNT.2018.8494144. https://ieeexplore.ieee.org/document/8494144.

Yaser S Shaheen, Hussam., "Arduino Mega Based Smart Traffic Control System," December 2021 Asian Journal of Advanced Research and Reports 15(12): 43-52, 2021(15(12): 43-52, 2021):15(12): 43-52, 2021.

Topics relevant to development of "SKILL": System design for achieving Sustainable Development Goals.



Course	C								
Course Code:		urse Title: Integral Transforms tial Differential Equations		P-C	3	0	0	3	
MAT2010	Тур	pe of Course:1] School Core							
Version No.		1.0							
Course Pre- requisites		Calculus and Differential Equations							
Anti- requisites		NIL							
Course Descriptio n		This course aims to introduce various transform techniques such as Laplace transform, Fourier transform and Z-transform in addition to expressing functions in terms of Fourier series. The course covers applications of Laplace transform to LCR circuits and solutions of different equations using Z-transform. The course also deals with the analytical methods for solving partial differential equations and the classical applications of partial differential equations.							
Course Objective		The objective of the course is to familiarize the learners with the concepts of "Transform Techniques, Partial Differential Equations" and attain Skill Development through Problem Solving Techniques.							
Course Out Comes		On successful completion of t CO1 - Express functions in te CO2 - Apply Laplace transfor CO3 - Employ Z-transform te CO4 - Solve a variety of parti	rms of unifor m technique chniques to s	rmly co to solv solve di	nvergent F e differenti fference eq	ourier al equa juation	series. ations.		
Course Content:									
Module 1	Lap	place Transforms			(12 Classe	es)			
Laplace tran Inverse Lapl	sforr ace t	aplace transform of elementar n of periodic function, unit-sto ransform of standard function orem, solution of linear and sir	ep function ans. s - problems.	nd Imp , initial	ulse functio and final v	on – re alue th	lated pro leorem.	blems.	
Module 2	Foi	arier Series	Assignment		(8 Classes)			
		eriodic functions, Dirichlet's c period. Half range Fourier seri			-		unctions	period	
Module 3		urier Transforms and Z - Insforms			(13 Classe	es)			



Fourier Transforms: Definitions, infinite Fourier transforms, Fourier sine and cosine transforms, inverse Fourier transforms, Problems.

Difference equations and Z-transforms: Z-transforms – Basic definitions, Standard Z-transforms, Linearity property, Damping rule, Shifting rule, Initial value theorem, Final value theorem, Inverse Z-transforms. Difference equations – Basic definitions, Application of Z-transforms to solve difference equations.

		I	
Module 4	Partial Differential Equations	Assignment	(12 Classes)

Formation of PDE, Solution of non-homogeneous PDE by direct integration, Solution of homogeneous PDE involving derivative with respect to one independent variable only (Both types with given set of conditions) Method of separation of variables. (First and second order equations) Solution of Lagrange's linear PDE. of the type P p + Q q = R.

Applications of PDE: Derivation of one-dimensional wave and heat equations. Various possible solutions of these by the method of separation of variables. D'Alembert's solution of wave equation. Two-dimensional Laplace's equation – various possible solutions. Solution of all these equations with specified boundary conditions (Boundary value problems).

Targeted Application & Tools that can be used:

The objective of the course is to familiarize students with a variety of numerical techniques and the theoretical concepts of probability and statistics to equip them with the necessary numerical approaches and basic statistical tools to tackle engineering and real-life problems.

Assignment:

Newton-Raphson Methods, Gauss-Seidel Method, LU Decomposition, Trapezoidal Rule, Simpson's rule, Runge-Kutta 4th Order.

Text Book

Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition

B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

Victor Henner, Tatyana Belozerova, Mickhail Khenner, Ordinary and Partial Differential Equations, CRC Press, Edition, 2013.

Walter Ledermann, Multiple integrals, Springer, 1st edition

E-resources/ Web links:

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue id=EBSCO95 30102024 140238

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_233298



https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_204892

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_246791

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_223548

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_134719

https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniq ue_id=EBSCO95_30102024_32614

https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html

https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course Code: CBC2000 Course Title: Foundations of Blockchain Technology L:T:P:C – 3:0:0:3

Course Description

This course introduces the foundational principles of blockchain technology, its architecture, components, and applications. It explores the working of distributed ledgers, cryptographic fundamentals, consensus algorithms, and the structure of cryptocurrencies and smart contracts.

Course Objectives

- Understand the fundamentals of distributed ledger technology
- Explore cryptographic primitives used in blockchain systems
- Explain consensus algorithms and their roles in decentralized networks
- Analyze the architecture and components of blockchain platforms
- Examine blockchain applications across industries

Course Outcomes

CO1 (Understand): Describe the architecture and components of blockchain technology **CO2 (Understand):** Explain cryptographic techniques and consensus mechanisms in blockchain



CO3 (Apply): Demonstrate the creation and validation of transactions and blocks **CO4 (Analyze):** Compare various blockchain platforms and their real-world applications

Course Content (45 Hours Total)

Module 1: Introduction to Blockchain Technology – 10 Sessions

History of blockchain, Evolution from Bitcoin to Web3, Distributed ledger technology, Key characteristics: immutability, transparency, trust, Use cases and applications

Module 2: Cryptography and Blockchain – 12 Sessions

Hash functions (SHA-256), Digital signatures, Merkle trees, Public and private key cryptography, Wallets and addresses, Transaction lifecycle

Module 3: Consensus Mechanisms – 11 Sessions

Consensus overview, Proof-of-Work (PoW), Proof-of-Stake (PoS), Practical Byzantine Fault Tolerance (PBFT), Delegated Proof of Stake (DPoS), Comparison of consensus algorithms

Module 4: Blockchain Platforms and Applications – 12 Sessions

Bitcoin overview, Ethereum overview, Permissioned vs permissionless blockchains, Hyperledger Fabric basics, Smart contracts, Blockchain in finance, healthcare, and supply chain

Textbooks

T1: Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press

T2: Imran Bashir, Mastering Blockchain, Packt Publishing, 3rd Edition, 2020

Reference Books

R1: Antonopoulos, Mastering Bitcoin, O'Reilly Media

R2: Arvind Narayanan et al., *Introduction to Cryptography and Blockchain*, Princeton Press

R3: Don Tapscott & Alex Tapscott, *Blockchain Revolution*, Portfolio

R4: Josh Thompson, Blockchain Basics, CreateSpace

Web Resources

W1: <u>https://blockgeeks.com</u>

W2: <u>https://ethereum.org</u>

W3: <u>https://bitcoin.org</u>

W4: https://hyperledger.org

W5: <u>https://web3.foundation</u>



Course Code:	Course Title: Op	erating Systems						
CSE2502				L-T- P- C	3	0	0	3
	Type of Course: Only	Program Core and	Theory		5	U	U	5
Version No.	1.0			<u> </u>				<u> </u>
Course	CSE2200- Computer Organization, Problem solving using C							
Pre- requisites	Students should have basic knowledge on computers, computer software & hardware, and Computer Organization. Prior programming experience in C is recommended.							
Anti-requisites	NIL							
Course	This course introd	uces the concepts of	f operating sy	stem operation	ons,	ope	rating	systen
Description	structure and its design and implementation. It covers the classical operating systems internal algorithms such as process scheduling, synchronization, deadlocks detection and							
	recovery and memory management. The course also enhances the problem systems programming ability and case studies.					olem s	olving	
Course Object	The objective of the course is to familiarize the learners with the concepts of OperatingSystems and attain Employability through Problem Solving Methodologies.							
Course Out	On successful completion of the course the students shall be able to:							
Comes	Describe the fundamental concepts of operating Systems and case studies.[Knowledge] 2] Demonstrate various CPU scheduling algorithms[Application] Apply various tools to handle synchronization problems.[Application]4] Demonstrate deadlock detection and recovery methods [Application] 5] Illustrate various memory management techniques.[Application]							
Course Content:								
Module 1	Introduction to Operating System	Assignment	Program	nming			9 1) Hours
Topics:	<u> </u>							
Introduction to O	S Operating-Syst	em Operations, Op	erating Syste	m Services	Sv	ster	n Call	s and

Introduction to OS, Operating-System Operations, Operating System Services, , System Calls and its types,

Operating System Structure, System Program and its types, Linkers and Loaders, Overview of OS design and implementation, Open-source operating system



Module 2ProcessAssignment/CaseManagementStudy	Programming/Simulation	11 Hours
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Topics:

Process Concept, Operations on Processes, Inter Process Communication, Communication in clientserver systems (sockets, RPC, Pipes), Introduction to threads - Multithreading Models, Thread Libraries, Threading Issues, Process Scheduling– Basic concepts, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, SRTF, RR and Priority.

Module 3	Process Synchronization and Deadlocks	Assignment	Programming	11 Hours
WIOUUIC J	and Deadlocks	Assignment	riogramming	11 110015

Topics:

The Critical-Section Problem- Peterson's Solution, Synchronization hardware, Semaphores, Classic Problems of Synchronization with Semaphore Solution- Producer-Consumer Problem, Reader-Writer problems, Dining Philosopher's Problem, . Introduction to Deadlocks, Necessary conditions for deadlock, Resource allocation Graph, Methods for handling deadlock: Deadlock Prevention and Implementation, Deadlock Avoidance and

Implementation, Deadlock detection & Recovery from Deadlock.

Module 4	Memory Management	Assignment	Programming/Simulation	10 Hours
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Topics:

Introduction to Memory Management, Basic hardware-Base and Limit Registers, Memory Management Unit(MMU), Dynamic loading and linking, Swapping, Contiguous and Non-Contiguous Memory Allocation, Segmentation, Paging - Structure of the Page Table – Virtual Memory and Demand Paging – Page Faults and Page Replacement Algorithms, Copy-on-write, Allocation of Frames, Thrashing

Introduction to File system management: File System Interface (access methods, directory structures), File system implementation.

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems wherein there are resources and entities that use and manage the resources.

Software Tools:

1. Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install andwork on multiple guest Operating Systems on top of a host OS.

2. Intel Processor identification utility: This software is used to explain about multi-core processors. Ithelps to identify the specifications of your Intel processor, like no of cores, Chipset information,

technologies supported by the processor etc.



Project work/Assignment

- 1. Demonstrate process concepts in LINUX OS.
- 2. Simulation of CPU scheduling algorithms.
- 3. Develop program to demonstrate use of Semaphores in threads.
- 4. Develop program to demonstrate use of deadlock avoidance algorithms.
- 5. Develop program to demonstrate use of page replacement algorithms.
- 6. Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

1. Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019

2.

References

- 1. Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.
- 2. William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.
- 3. Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020
- 4. Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau , "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

- 5. <u>https://www.os-book.com/OS9/</u>
- 6. <u>https://pages.cs.wisc.edu/~remzi/OSTEP/</u>
- 7. https://codex.cs.yale.edu/avi/os-book/OS10/index.html

Course Code: CSE1508	Course Title: Data Structures Type of Course: Theory	L-T-P- C	3	0	0	3
Version No.	1.0					
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	This course introduces the fundamental emphasize the importance of choosing an ap for program development .This course h emphasizes on understanding the imple structures using Java programming langua fundamental concepts of data structures and them, the student can be an effective d applications.	ppropriate da as theory an mentation a age .With a l practical ex	nta structu nd lab co und appli a good ka aperience	re an ompo catio nowl in in	nd te ment ns edge nplet	chnique t which of data e in the menting
Course Objective	The objective of the course is SKILL D EXPERIENTIAL LEARNING techniques	EVELOPMI	ENT of s	tude	nt b	y using



Course	Course Title: Data Communications and dents shall be able to:				
Code:	Computer Networks $\Gamma_{L-T-\dot{P}-\dot{Q}}$ 3 $\stackrel{1}{\to}$ 0 $\stackrel{1}{\to}$ 3				
CSE1506	Type of Course: Theory & Integrated				
Course Out					
Comos	Laboratory Applyl				
Version	1.0				
No.	CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply]				
Course	CO4: Demonstrate different searching and sorting techniques. [Annly]				
Pre-	ECE2007 - Digital Design				
C requisites					
<u>Content</u> Anti-	NIL				
requisites	Introduction to				
Course					
	The objective of this course is to provide knowledge in data communications and				
Descriptio	computer networks, its organization and its implementation, and gain practical				
n	experience in the installation, monitoring, and troubleshooting of LAN systems.				
	L.•				
Introduction	The associated laboratory is designed to implement and simulate various				
Steel Con	e networks using Cisco packet tracer, NS2. All the lab exercises will focus on the				
Applications	of fundamentals of creating multiple networks, topologies and analyzing the				
Queues -Rep	network traffics.				
Course	The objective of the course is to familiarize the learners with the concepts of Data				
Objective	Communications and Computer Networks and attain Employability through				
Objective	Problem Solving Methodologies.				
	Troblem Solving Methodologies.				
Course	On successful completion of this course, the students shall be able to:				
'Outcomes k	^e CO1: Illustrate The Basic Concepts Of Data Communication And Computer				
structures, Cir	COI: inustrate The Basic Concepts OI Data Communication And Computer				
Recursion - R	INCLIVOINS. (Apply)				
recention i					
Madula 2	_CO2: Analyze the functionalities of the Data Link Layer. (Analyse)				
Module 3					
Module 3 Topics: Trees	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer				
Topics: Trees	_CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply)				
Topics: Tree Linked List, E	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply)				
Topics: Tree Linked List, E	_CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply)				
Topics: Trees Linked List, E .Heaps , Expre	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply)				
Topics: Trees Linked List, E .Heaps , Expre Course	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) Structures -				
Topics: Trees Linked List, E .Heaps , Expre	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply)				
Topics: Trees Linked List, E .Heaps, Expro Course Content:	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Structures - Craphs and Assignment Program activity Assignment				
Topics: Trees Linked List, E .Heaps , Expre Course Content: Module 1	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Si CO4: Demonstrate the working principles of the Transport layer and Application Co3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Si CO4: Demonstrate the working principles of the Transport layer and Application Co3: Apply Coants and Crants and Assignment Program activity OBUE OBUE DBusical layer CO1				
Topics: Trees Linked List, E .Heaps , Expre Course Content: Module 1 Topics: Grap	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Assignment Program activity Assignment Program activity Assignment Program activity Assignment Program activity Assignment Problem Assignment Solving Application of Graphs				
Topics: Trees Linked List, E .Heaps, Expre Course Content: Module 1 Topics: Gran	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Structures - Cranks and Assignment Program activity 6 Hours Cranks and Assignment Problem 17 Sessions (L9 + P8) Solving Sentation of Granks ADT To Computer Networks and Data communications, Network Components – Topologies,				
Topics: Trees Linked List, E .Heaps , Exprese Course Content: Module 1 Topics: Gran Introduction to Transmission	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) ⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ^{est} Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and the the transport layer and the trayer and the transport layer and the transport layer and				
Topics: Trees Linked List, E .Heaps , Exprese Course Content: Module 1 Topics: Gran Introduction to Transmission	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) Structures - Cranks and Assignment Program activity 6 Hours Cranks and Assignment Problem 17 Sessions (L9 + P8) Networks and Data communications, Network Components – Topologies,				
Topics: Trees Linked List, E .Heaps, Exprese Course Content: Module 1 Tonics: Gran Introduction t Transmission Physical Laye	CO2: Analyze the functionalities of the Data Link Layer. (Analyse) CO3: Apply the Knowledge of IP Addressing and Routing Mechanisms in Computer Networks.(Apply) ⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ CO4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ^{es} Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and Application ⁱⁱⁱ Layer. (Apply) ⁱⁱⁱ Co4: Demonstrate the working principles of the Transport layer and the transport layer the tra				



	REACH GREATER HEIGHTS	VLILVI	Milesis			
M 1 1 A		Assignment	Problem	20 Sessions (L12 +		
Module 2	Data Link Layer –CO2	s	Solving	P08)		
Module 5	ayer - Error Detection and Co	gn prostion Parity	0	ing Distance Flow Control		
	ntrol, Stop and Wait, Multiple	-		-		
	ng & Searching - Sequential a		/	-		
-	erra Cart Dubble sort	Assignment	Problem	21 Sessions (L13 +		
– Module 3 🗧	- Network Layer –CO3		Solving	P8)		
	atory lasks:		e	, , , , , , , , , , , , , , , , , , ,		
•	er Services - Network Layer	-	e 1	•		
IPv4 IPV6 – S	Subnetting. Routing, - Distance	e Vector Routing	;, Link State Ro	outing, RIP, OSPF, BGPV4.		
Laval 2. Dra	Turner and an I		a D 1.1	has 17 Sessions (L11 +		
Module 4	т I	m Assignment u		P_{Bas} 17 Sessions (L11 + P6)		
Lab sheet -2	Application Layer - CO4	S	Solving	10)		
-	yers - Connection manageme		•			
Selective Rep	peat ARQ, UDP, TCP, congesti	ion control, Con	gestion avoida	nce The Application Layer:		
Domain Nam	ne System (DNS), Domain Nat	me Space, FTP,	Electronic Ma	il (SMTP), HTTP.		
Tangatad An	nlighting for Tools that say h					
Targeteu Ap	plication & Tools that can be	e useu:				
Cisco Packet	t Tracer, Wireshark, and NS2 S	Simulator.				
Project work	x/Assignment: Choose and a	analyse a netwo	rk from any o	rganization/Assignment		
0	r this course in CO1-CO4	v	v	8 8		
r · r · · · · ·						
	gramming on Stack application	1 – Evaluation of	i postiix			
Topics relate	d to					
1 Problem S	Solving: Choose and appropr	riate devices an	d implement v	various network		
concepts.	orving. Choose and appropr	fute devices un		unous network		
concepts.						
2. Employability: Simulation of any network using Cisco Packet Tracer/NS2.						
Lab sneet -6 Textbook(s):						
Textbook(3).						
T1. Behrouz	A. Forouzan, "Data Commu	inications and l	Networking w	ith TCP/IP Protocol		
Suite", 6 th E	dition, Tata McGraw-Hill, 2	022.				
T? Androw	S Tananhaum Niak Faamst	or & David IV	Nothorall "Co	mnutar Natwarks" Sixth		
T2. Andrew S Tanenbaum, Nick Feamster & David J Wetherall, "Computer Networks" Sixth Edition, Pearson Publication, 2022.						
Eulion, rearson rubication, 2022.						
References						
1. R1. "Computer Networking: A Top-Down Approach", Eighth Edition, James F. Kurose, Keith W. Ross, Pearson publication, 2021.						
2. R2. William Stallings, Data and Computer Communication, 8th Edition, Pearson Education, 2007.						
R3. Behrouz A. Forouzan, "Data Communications and Networking 5E", 5th Edition, Tata						

R3. Behrouz A. Forouzan, "Data Communications and Networking 5E", 5th Edition, Tata McGraw-Hill, 2012

E-Resources:



- 1. https://www.geeksforgeeks.org/what-is-spread-spectrum/
- 2. <u>https://www.geeksforgeeks.org/difference-between-fdma-tdma-and-cdma/</u>
- 3. <u>https://archive.nptel.ac.in/courses/106/105/106105183/</u>
- 4. <u>http://www.nptelvideos.com/course.php?id=393</u>
- 5. <u>https://www.digimat.in/keyword/106.htmlhttps://puniversity.informaticsglobal.com/logi</u>

<u>n</u>

Level 1: Program to Construct Binary Search Tree and Graph

Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and post-order(and implement BFS and DFS

Lab sheet -12

Level 1: Program to Implement the Linear Search & Binary Search

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018.

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.



R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources:

- 5. For theory :<u>https://onlinecourses.nptel.ac.in/noc20_cs85/preview</u>
- 6. <u>https://puniversity.informaticsglobal.com/login</u>

Topics relevant to development of "Skill Development":

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues

Course Code: CSE1500	Course Title: Computation using Python Type of Course: Engineerin Theory Integrated		L-T- P-C	2	0	0	2	
Version No.	1.0							
Course Pre- requisites	•							
Anti-requisites	NIL							
Course Description	conditionals, loops, fund inspiring examples. It the exceptions and file usage Python dictionaries, class	The course efficiently introduces fundamental ideas including conditionals, loops, functions, lists, strings, and tuples through some inspiring examples. It then discusses dynamic programming like handling exceptions and file usage. In terms of data structures, the course covers Python dictionaries, classes, and objects for constructing user-defined datatypes like linear and binary search.						
Course Object	The objective of the course Computational Thinkin through Participative Lea	g using Pytho	n and				-	
Course Out Comes	 On successful completion of the course the students shall be able to: 1) Describe algorithmic solutions for basic computing issues (Understand) 2) Explain data types and operators. (Understand) 3) Demonstrate control structures and Functions. (Apply) 4) Apply the data structures for the given data. (Apply) 5) Demonstrate the file operations. (Apply) 							
Course Content:								
Module 1	Computational Thinking And Problem Solving	Assignment	Р	rogram	ming	Se	6 ssions	



Topics:

Fundamentals of Computing– Identification of Computational Problems Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi

Module 2	Datatypes, Expressions, Statements	Assignment	Pro	gramming	6 Sessions
Topics:		I I			
and list; variab	eter and interactive mode, debu bles, expressions, statements, tu ograms: exchange the values o een two points.	ple assignment, j	preceden	ce of operators	s, comments
Module 3	Control flow, Functions, Strings	Assignment	Pro	gramming	6 Sessions
slices,immutab	ters, local and global scope, pility, string functions and me are root, gcd, exponentiation, so	ethods, string m	odule; L	ists as arrays	. Illustrativ
Module 4	Lists, Tuples, Dictionaries	Assignment	Pro	gramming	6 Sessions
Topics: Lists: list oper parameters; Tu methods; adva	Lists, Tuples, Dictionaries rations, list slices, list methods, uples: tuple assignment, tuple as nced list processing- list compu- dents marks statement, Retail b	list loop, mutabi s return value; Di rehension; Illustra	lity, alias	ing, cloning li	Sessions sts, list and
Lists: list oper parameters; Tu methods; adva	rations, list slices, list methods, ples: tuple assignment, tuple as nced list processing- list comp	list loop, mutabi s return value; Di rehension; Illustra	lity, alias ctionarie ative pro	ing, cloning li	Sessions sts, list and



			White and	-						
Course Code:	Course Title: Digital Design		L- T-P- C	2	0	0	2			
ECE2022	Type of Course: ESC			-	-	-				
VeitsionBroak	1.0									
Course Pre-	[1] Elements of Electronics/Ele	ectrical Engine	ering, 2] Bas	ic co	nce	ots of				
requisites	number representation, Boolea	-	5, 1		•					
<u> </u>	tel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st									
Anti-requisites Edition	NIL 2021									
References	The purpose of this course is to onable the students to appreciate the fundamentals of digital logic circuits and Boolean algebra focusing on both combinational and sequential logic circuits. The course emphasizes on minimization techniques for making canonical and low-cost digital circuit implementations. This course deals with analysis and design of digital electronic circuits. The course also creates a foundation for future courses which includes Computer Architecture, Microprocessors, Microcontrollers, and Embedded Systems etc.									
O'Reilly Publi	to verify the theoretical knowle	associated iai	poratory prov	vides	an	oppor	tunity			
Course Objecerse Objecersemming"	En "Computational Thinking: The objective of the course is t bighteritions ign Shoaming the LEARNING.	A Beginner's o fammarize t Schurmset/Ei	Guide to F he learners o OPMENP ¹ thro	Proble With ough	the EXI	Solvir conce PERIE	ig_and pts of NTIAL			
Course	On successful completion of this	s course the st	udents shall	ho a	hla t	· • ·				
Outeb Besource	s	s course the st	udents shan	De a	DIE	.0.				
	i. Describe the concepts of		tems, Boolea	an al	gebr	a and	l logic			
W1. <u>https://</u>	onlinecou gates nptel.ac.in/noc20_c	-								
	Apply minimization tech	nniques to sim	plify Boolear	n exp	ress	ions.				
	iii. Demonstrate the Comb									
Tonics relevan	iv. Demonstrate the Seque t to development of "Employat	ential and prog	rammable lo	gic c	ircui	ts				
Course Content:		•								
Topics releval	t to "PROFESSIONAL ETHI	CS": Naming	and coding	conv	entic	n for	simple			
programs using	t to "PROFESSIONAL ETHIC Fundamentals of Number systems- Boolean algebra	Application				06 cl	20226			
Module 1		Assignment	Data Analysi	s tas	k	00 0	asses			
	and digital logic									
Topics:										
functions and sir	er systems and logic gates, Nu nplifications, two, three, four va rsal Gates (NAND & NOR) Imple	riable K-Maps- mentations. Ir	Don't care o	condi	tions					
Module 2	Boolean function simplification	Application Assignment	Data Analysi	s tas	k	08 C	lasses			
Topics:										
Introduction to Combinational circuits, Analysis, Design procedure, Binary Adder and Subtractor, Magnitude comparator, Parity generator and checker, Multiplexers-Demultiplexers, Decoders, Encoders and Priority Encoders, HDL Models of combinational circuits.										
Module 3	Combinational Logic circuits:	Application Assignment	Programming & Data Ana task	-		08 C	lasses			
Topics:		·								



Introduction to sequential circuits, Storage elements: latches and flip flops, Characteristic tables and equations, excitation table, Analysis of clocked sequential circuits, Mealy & Moore Models of finite state machines - Registers & Counters. HDL Models of Sequential circuits.

Targeted Application & Tools that can be used:

Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, Home Automation, Communication in systems in industries Professionally Used Software: HDL/VHDL/Verilog HDL/ OOPS

Text Book(s):

- 1. Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education, 6th edition
- 2. Thomas L. Floyd "DIGITAL LOGIC DESIGN", Pearson Education, fourth edition.

Reference(s):

Reference Book(s):

R1. Jain, R. P., "Modern Digital Electronics", McGraw Hill Education (India), 4th Edition

R2. Roth, Charles H., Jr and Kinney Larry L., "*Fundamentals of logic Design"*, Cengage Learning, 7th

Edition

Online Resources (e-books, notes, ppts, video lectures etc.): <u>Book Free Download</u>

<u>(studymaterialz.in)</u>

- 1. eBook1: Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education.
- 2. {[PDF] Digital Design By M. Morris Mano, Michael D Ciletti Book Free Download
- }
- 3. eBook2:Floyd "DIGITAL LOGIC DESIGN" fourth edition- ePub, eBook- [PDF] DIGITAL LOGIC DESIGN FOURTH EDITION FLOYD | abri.engenderhealth.org.
- 4. NPTEL Course- NPTEL :: Electrical Engineering NOC: Digital Electronic Circuits
- 5. Digital Logic Design PPT <u>Slide 1 (iare.ac.in)</u>

6. Lab Tutorial: <u>Multisim Tutorial for Digital Circuits - Bing video</u>

<u>CircuitVerse - Digital Circuit Simulator online</u>

Learn Logisim Beginners Tutorial | Easy Explanation! - Bing video

Digital Design 5: LOGISIM Tutorial & Demo

7. https://presiuniv.knimbus.com/user#/home E-content:

- 1. Z. Xin-Li and W. Hong-Ying, "The Application of Digital Electronics in Networking Communication," 2016 Eighth International Conference on Measuring Technology and Mechatronics Automation (ICMTMA), 2016, pp. 684-687, doi: 10.1109/ICMTMA.2016.168.
- An encoding technique for design and optimization of combinational logic circuit DipayanBhadra;Tanvir Ahmed Tarique;Sultan Uddin Ahmed;Md. Shahjahan;KazuyukiMurase2010 13th International Conference on Computer and Information Technology (ICCIT)
- A. Matrosova and V. Provkin, "Applying Incompletely Specified Boolean Functions for Patch Circuit Generation," 2021 IEEE East-West Design & Test Symposium (EWDTS), 2021, pp. 1-4, doi: 10.1109/EWDTS52692.2021.9581029.



4. A. Matrosova, V. Provkin and E. Nikolaeva, "Masking Internal Node Faults and Trojan Circuits in Logical Circuits," *2019 IEEE East-West Design & Test Symposium (EWDTS)*, 2019, pp. 1-4, doi: 10.1109/EWDTS.2019.8884434.

Topics relevant to "SKILL DEVELOPMENT": Adders, Multiplexers, Decoders / Encoders; Flip-Flops, Counters and Registers for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.

Course Code: CSE1509	Course Title: Data S Type of Course:Lab	Structures Lab		L-T- P- C	0	0	4	2				
Version No.	1.0											
Course Pre- requisites												
Anti- requisites	NIL											
Course Description	the importance of choos development .This cour understanding the imple programming language structures and practical	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.										
Course Objective	The objective of the c EXPERIENTIAL LEAF			ELOPMEN	Γ of st	udent	by u	sing				
Course Out Comes	 On successful completion of the course the students shall be able to: CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand] CO2: Utilize linked lists for real-time scenarios. [Apply] CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply] CO4: Demonstrate different searching and sorting techniques. [Apply] 											
Course Content:												
Module 1	Introduction to Data Structure and Linear Data Structure – Stacks and Queues	Assignment	Progran	n activity			9 Ho	ours				



Introduction –Introduction to Data Structures, Types and concept of Arrays.

Stack -Concepts and representation, Stack operations, stack implementation using array and Applications of Stack.

Queues -Representation of queue, Queue Operations, Queue implementation using array, Types of Queue and Applications of Queue.

Module 2	Linear Data Structure -Linked List	Assignment	Program activity	12 Hours
Topics: Linked	l List - Singly Linke	ed List, Operation	on linear list using s	singly linked storage
	lar List, Applications			
Recursion - Rec	cursive Definition and	Processes.		
Module 3	Non-linear Data Structures - Trees	Assignment	Program activity	12 Hours
-		•	inology and Properties	· •
	ary tree traversals :Prosion Tree ,Red Black 7		n-Order traversal, Post Binary Serach Tree	z - Order traversal ,
Module 4	Non-linear Data Structures - Graphs and	Assignment	Program activity	6 Hours
Elementary grap	-	m Cost spanning tre	ees, Shortest path and	tion of Graphs . ADT, Transitive closure.
Elementary grap	Basic Concept of Gr h operations, Minimu uction, Static Hashing	m Cost spanning tre	ees, Shortest path and	-
Elementary grap Hashing: Introd Module 5 Topic: Sorting	 Basic Concept of Gradient of	m Cost spanning tre g, Dynamic Hashing Assignment	ees, Shortest path and	Transitive closure. 6 Hours
Elementary grap Hashing: Introd Module 5 Topic: Sorting Quick sort, Merg List of Laborat Lab sheet -1	Basic Concept of Gr h operations, Minimu uction, Static Hashing Searching & Sorting & Searching - Seque ge Sort, Bubble sort. ory Tasks:	Assignment	Program activity	6 Hours ion and Insertion sort,
Elementary grap Hashing: Introd Module 5 Topic: Sorting Quick sort, Merg List of Laborat Lab sheet -1 Level 1: Promp	 Basic Concept of Gradient of Gradient operations, Minimulation, Static Hashing Searching & Searching & Sorting & Searching - Sequence of Sort, Bubble sort. ory Tasks: t the user, read input a 	Assignment ential and Binary Sea	Program activity arch, Sorting – Selecti	Transitive closure. 6 Hours ion and Insertion sort, methods and objects
Elementary grap Hashing: Introd Module 5 Topic: Sorting Quick sort, Merg List of Laborat Lab sheet -1 Level 1: Promp Level 2: Progra	 Basic Concept of Gradient of Gradient operations, Minimulation, Static Hashing Searching & Searching & Sorting & Searching - Sequence of Sort, Bubble sort. ory Tasks: t the user, read input a 	Assignment ential and Binary Sea	Program activity arch, Sorting – Selecti	Transitive closure. 6 Hours ion and Insertion sort, methods and objects
Elementary grap Hashing: Introd Module 5 Topic: Sorting Quick sort, Merg List of Laborat Lab sheet -1 Level 1: Promp Level 2: Progra Lab sheet -2	 Basic Concept of Gradient of Gradient operations, Minimulation, Static Hashing Searching & Searching & Sorting & Searching - Sequence of Sort, Bubble sort. ory Tasks: t the user, read input a 	Assignment ential and Binary Sea and print messages.F	Program activity arch, Sorting – Selecti Programs using class, r	Transitive closure. 6 Hours ion and Insertion sort, methods and objects
Elementary grap Hashing: Introd Module 5 Topic: Sorting Quick sort, Merg List of Laborat Lab sheet -1 Level 1: Promp Level 2: Progra Lab sheet -2 Level 1: Progra	 Basic Concept of Gradient of Gradient operations, Minimulation, Static Hashing Searching & Searching & Sorting & Searching - Sequeting Sort, Bubble sort. ory Tasks: t the user, read input a mming Exercises on formation of the series of the serie	Assignment ential and Binary Sea fundamental Data str Stack and its operat	Program activity arch, Sorting – Selecti Programs using class, r ructure - Arrays based	Transitive closure. 6 Hours ion and Insertion sort, methods and objects



Level 1: Programming on Stack application infix to postfix Conversion Level 2: -Lab sheet -4 Level 1: Programming on Stack application – Evaluation of postfix Lab sheet -5 Level 1: Programming Exercises on Queues and its operations with conditions Level 2: -Lab sheet -6 Level 1: Programming Exercises on Linked list and its operations. Level 2: Programming Exercises on Linked list and its operations with various positions Lab sheet -7 Level 1: Programming Exercises on Circular Linked list and its operations. Programming Exercises on Circular Linked list and its operations with various positions Level 2: Lab sheet -8 Level 1: Programming Exercises on factorial of a number Level 2: Programming the tower of Hanoi using recursion Lab sheet -9 Level 1: Level 2: Programming the tower of Hanoi using recursion Lab sheet -10 Programming Exercise on Doubly linked list and its operations Level 1: Level 2: Lab sheet -11 Program to Construct Binary Search Tree and Graph Level 1: Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and postorder(and implement BFS and DFS Lab sheet -12 Level 1: Program to Implement the Linear Search & Binary Search Level 2: Program to Estimate the Time complexity of Linear Search Lab sheet -13



Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018.

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.

R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources:

- 1. For theory :<u>https://onlinecourses.nptel.ac.in/noc20_cs85/preview</u>
 - 2. https://puniversity.informaticsglobal.com/login

Topics relevant to development of "Skill Development":

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues

Course Code:	Course Title: Computational Thinking	L-T-		
CSE1501	using Python Lab	P-C		



	• -	e of Course: Engineering Science oratory Integrated							
Version No.		1.0							
Course Pre- requisites	•	•							
Anti-requisites	NIL								
Course Description	The course efficiently introduces fundamental ideas and practice								
Course Object		The objective of the cou Computational Thinks through Experiential L	ing using Pytho	n Lab ar				-	
Course Out Comes Course		 On successful completi 6) Explain algorithms (Understand) 7) Illustrate the use of (Apply) 8) Demonstrate conditional solving tasks. (Apple) 9) Utilize appropriate of data. (Apply) 10) Perform file har files in Python (Apple) 	to solve fundame different data typ ionals, loops, an ly) data structures to ndling tasks such	ental con pes and c d functio o efficien	nputatic operator ns to ac tly man	onal prob is in Pyth ldress pr age and	olem. non. roblem proces	s	
Content:									
Module 1		putational Thinking Problem Solving	Assignment	F	rogram	ming	Ses	6 sions	
Demonstration Demonstrate Demonstrate	n of Co Input int mo	ethod.	ent.	<u> </u>					
Demonstrate	data t	ypes							



Demonstrate operators.

Demonstrate simple programs for python environment.

Python program that takes an integer input and calculates the sum of its digits.

			 	-
Module 2	Datatypes, Expressions, Statements	Assignment	Programming	14 Sessions
T 1 1 1 1 1				

Topics:

Python program to count the number of times a given character appears in a string.

Python program to identify the data types of given variables.

A grocery store needs a billing system, write a python program that calculates the total bill amount based on the price of individual items and their quantities.

A car rental company wants to calculate the mileage (km per liter) for different vehicles based on distance traveled and fuel consumed. Write a Python program to calculate the mileage.

A company wants to calculate the net salary of an employee after deducting tax (10%) and provident fund (5%) from the gross salary. Write a Python program to calculate net salary.

In a student grading system where the final grade depends on whether the student has passed both the written and practical exams. You need to check if the student has passed based on certain conditions:

- The student must score at least 40 in the written exam.
- The student must score at least 50 in the practical exam.
- The student must have attended at least 75% of the classes

Write a Python program to check if a person is eligible to vote. The criteria are:

- The person must be at least 18 years old.
- The person should be a citizen of the country.

Write a Python program to classify a person into age groups:

- Child: 0 to 12 years
- Teenager: 13 to 19 years
- Adult: 20 years and above



A user authentication system that checks if the user is authorized based on certain conditions, like having a correct password and being over the age of 18. Write a Python program for the above scenario.

In a student registration system, a student must meet certain criteria to be eligible for course registration:

- The student must have a GPA of 3.0 or above.
- The student must have completed the prerequisite course (True/False).

|--|

Lab Sheet:

An e-commerce store that offers discounts based on the following criteria:

- The customer must be a loyal customer (i.e., True).
- The total purchase amount must be greater than \$100.

Python program to print the Fibonacci sequence up to n terms

Python program to print the Fibonacci sequence up to n terms using Recursion.

Apply slicing on the given data or dictionary.

Python Programs to create array and print the array.

Python program to check if a given number is an Armstrong number. An Armstrong number for a 3-digit number is one where the sum of the cubes of its digits is equal to the number itself.

The media platform wants to count the number of words in user-submitted posts to enforce character limits or to analyze the length of posts. .

In a bookstore inventory system, You need to implement a feature that checks if a book title is a palindrome. The bookstore wants to offer special discounts for books with titles that are palindromes. You need to create a Python function that reads the book title and determines if it's a palindrome.

In a library management system. The library has a database of books identified by unique numbers (IDs). The library staff wants to apply a special offer to books whose IDs are prime numbers. You need to create a Python program that finds all prime numbers between a given range of book IDs.

In a school management system that stores the marks of students for each subject. You are asked to compute the average marks of a student to evaluate their overall performance.



Course Code: 0	Course Title: Data Communication and freent subj	oots and							
	a Computer Networks Lab	$\frac{2}{2}$							
CSE2251	L-T-P-C	$\begin{vmatrix} 0 & 0 \end{vmatrix}^2 \begin{vmatrix} 1 \\ 1 \end{vmatrix}$							
	to Turner of Communication of the state of t	ince the list isn't							
Course Pre-1	NIL NIL								
104	a pymon program to perform nnear search.								
Anti-requisites	NIL f product IDs and need to quickly find a specific product. Біп	ary saarch is							
COURCO	This lab course is to get practical knowledge of working pri								
n • •	Description ist incommunication protocols. Analyse structure and formats of TCP/IP layer								
urrung ur il	protocols using network tools such as Wireshark and net								
Module 4	Lis Implementing various network algorithms such as error control								
	routing, and security related algorithms.								
Lab Sheet:									
Course	The objective of the course is to familiarize the learners with	th the concepts of							
Objective	Lis Computer Networks and attain Skill Development thro	ugh Participative							
	Learning techniques								
Course Out	On successful completion of the course the students shall be a	ble to:							
	e 0								
Comes	• To understand the working principle of various	s communication							
A library mai	ntains protocols.								
quantity avail		and visualize a							
1 0	network topology and observe its performance.								
A school store		l frames.							
	• To analyze data flow in wired and wireless environme								
Course									
	Python program to handle orders using list slicing.								
Module 1	Introduction to Computer Networks	7 Sessions							
	commands like tcpdump, netstat, ifconfig, nslookup, ARP,								
	SYSTEMINFO and traceroute – Capture ping and traceroute PDU								
	yzer and examine - Configuration and logging to a CISCO Route								
-	user Interfaces. Introduction to the basic router configuration and								
	iser interfaces. Introduction to the busic router configuration and	busic communus.							
Module 2	Physical And Data Link Layer	8 Sessions							
AConfiguration	n of IP addressing for a given scenario for a given set of topolo	ogie – Connecting							
devise – C	onfiguration of Hub, Router, Switch and Repeaters using cis	sco packet tracer-							
Configure the privilege level password and user authentication in switch.									
• Count									
	ⁿ Network Layer								
Module 3	Transport Layer	7 Sesions							
	aintains a list of employees' names. Write a program to:								
	e DHCP Server and wireless router and check the connectivity - C	-							
routing using	cisco packet tracer- Configure the Dynamic Routing routing (R	IP Routing) using							
cisco packet									
• Sort ar	id display all employees in alphabetical order.								



	A tuple	stores Application Flight Number, Destination, Duration). Write a prog	m to:
	-	Laver and	
	Module	henlov	08 Classes
	Config	ure the Static NAT using cisco packet tracer - Configure the Dynamic NAT u	sing cisco
	protoco NS2 Si	tracer Configure the DNS Server using cisco packet tracer - Configure of using cisco packet tracer - Wireshark Tool - Three Node Point To Point Netwinulator - Transmission of Ping Message Using NS2 Simulator - Ethernet LAN Using NS2 Simulator - Ethernet LAN Using N-Nodes With Multiple Traffic	ork Using
	Target	ed Application & Tools that can be used: Cisco Packet Tracer, Wireshark, NS	52
	Case S	Study/Assignment: Assignment proposed for this course in CO1-CO4	
h		dudy/Assignment. Assignment proposed for this course in COT COT	
	1. • I	Assume that a computer sends a frame at the transport layer to another compute destination port address is not running. According to what you read from chapt will happen to that process?	
1	2. (Determine the possible bit rate and the number of levels over a channel for th a. $B = 2.4K$ Hz, noiseless channel with $L = 16$. b. $B = 2.4K$ Hz, $SNR = 20$ dB. c Hz, $SNR = 40$ db.	
	3.	Using CISCO Packet Tracer Configuring Static and Default Routes Objectives	1: + -
M	dule 5	• Configure static routes on each router to allow communication between all c	-
IVIC	aule 5	• Test connectivity to ensure that each device can fully communicate with devices.	all other
	I 4.	Getting familiar with Wireshark software by installing it I your system, an following task:	d perform
	Write a	1. List out the packets which are having DNS protocols	
	exceptio		
	-	3. Display all the packets which are having the DNS or HTTP protocol	
5.	16.	Problem Solving: Choose and appropriate devices and implement variou	s network
	g Text B	concepts.	
I			
	Wri _{1.}	CCNA Routing and Switching Study Guide – Todd Lammle, 2013, Sybex.	1 . ~ .
	2. Wri	Wireshark Network Analysis: The Official Wireshark Certified Network Ana	lyst Study
		Guide – Laura Chappell, 2012, Wireshark University.	Dolvool-
	3. Wri	Computer Network Simulation Using NS2 – Ajit Kumar Nayak, Rajlaxmi Ra Mall, 2020, Routledge.	ai, Kakesh
	Refere		
	R1: Al	berto Leon-Garcia and IndraWidjaja: Communication Networks - Fundamenta ey architectures, 2nd Edition Tata McGraw-Hill, 2004.	Concepts



R2: William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, V2007.

R3: "Computer Networking: A Top-Down Approach" – James F. Kurose and Keith W. Ross, 7th Edition, 2016, Pearson.

(Web Based Resources and E-books:

W1: <u>https://gaia.cs.umass.edu/kurose_ross/wireshark.php</u>

W2: <u>https://www.youtube.com/watch?v=x7EJSY0bOK4&ab_channel=ChrisGreer</u>

W3: <u>https://tutorials.ptnetacad.net/</u>

Topics relevant to "SKILL DEVELOPMENT":

Application Layer, Transport Layer, Network Laryer for **Skill development** through **Participative Learning** techniques. This is attained through the assessment component mentioned in the course handout.

5. Assignment 2 on (Module 3 and Module 4 & 5)

Text Book

1Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021

2)Eric Matthes, Python Crash Course,: A Hands-On, Project-Based Introduction to Programming, 3rd Edition, 2023

References

1.Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.

2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

Web Resources

- W2. <u>https://onlinecourses.nptel.ac.in/noc20_cs70/preview</u>
- W3. <u>https://onlinecourses.swayam2.ac.in/cec23_cs02/preview</u>
- W4. <u>https://www.coursera.org/learn/ai-python-for-beginners</u>



Topics relevant to development of "Employability": Data structures using python.

Topics relevant to "PROFESSIONAL ETHICS": Naming and coding convention for simple programs using python.

Course Code:	Course Title: Numerical Computing	L-T- P-	3	0	0	3			
MAT2064	Type of Course:1] School Core C S 0								
Version No.	1.0								
Course Pre- requisites	Calculus, Linear Algebra, Differer	tial Equation	ons						
Anti- requisites	NIL	NIL							
Course Description	solutions to complex problems that utilizing computers to perform cat finding, interpolation, numerical systems of linear equations, and equations, with applications acro fields. It focuses on understandi methods, their implementation in their accuracy and stability.	The course explores mathematical techniques used to approximat solutions to complex problems that are difficult to solve analytically, often utilizing computers to perform calculations, including methods for root finding, interpolation, numerical differentiation and integration, solvin systems of linear equations, and approximating solutions to differentia equations, with applications across various scientific and engineerin, fields. It focuses on understanding the theoretical basis behind thes methods, their implementation in programming languages, and analyzin, their accuracy and stability.							
Course Objective	The objective of the course is to ability to apply various numerical complex mathematical problems t analytically, particularly focusin equations, finding roots of differentiation, and integration, o implement these methods.	techniques hat are diff g on areas functions,	to appro icult or i s like so interpo	ximate mposs olving lation,	solutio ible to systen num	ons to solve ns of erical			
Course Out Comes	On successful completion of the completionCO1 - Calculate errors induced in expansion.CO2 - Demonstrate the application roots ofpolynomial equations and eigen va CO3 - Apply the knowledge of num various physical and engineering processing	the values b ns of numer alues of real merical met	by trunca ical meth symmet hods in r	tion of ods to ric mat	a serie find th trices.	S			



Course	Course Title: Discrete Mathematics arical methods for solving linear Ordinary &
Code:	Course True. Discrete Mathematics
MAT2013	Type of Course:1] School Core
Verei en Ne	
Version No.	
Course Pre-	Linear Algebra
requisites	Solution of Linear Systems of (12 Classes)
Anti-	<u>F</u> NIL
_	mputation: Motivation and Objectives, Number Representation, Machine Precision,
	The course explores the study of mathematical structures that are fundamentally
Description	discrete (not continuous), focusing on concepts like set theory, logic, graph theory, gebra
	combinatorics, and number theory, with applications primarily in computer metho science fields like algorithms, software development, and cryptography; it covers
method for so	ving tonics such as propositional logic proof techniques relations, functions, counting
of linear syste	topics such as propositional logic, proof techniques, relations, functions, counting m of principles, and basic graph algorithms, providing a foundation for analyzing
methods of Ga	
decomposition	discrete problems and structures within computer science.
	es The main objective of the course is that students should learn a particular set of
-Objective -	mathematical facts and how to apply them. It teaches students how to think
Module 2	logically and mathematically through five important themes: mathematical
1	with ereasoning, combinatorial analysis, discrete structures, algorithmic thinking, and
1	with applications and modeling. A successful discrete mathematics course should
interpolation,	Cubiccarefully blend and balance all five themes.
Course	On successful completion of the course the students shall be able to:
Outcomes	CO1 - Explain logical sentences through predicates, quantifiers and logical
Numerical dif	ferent connectives.
integration us	Ing II
· · · ·	$3^{\circ} {\rm s} {\rm M}_{0}{\rm CO2}$ - Deploy the counting techniques to tackle combinatorial problems
double integra	als by CO3 - Comprehend the basic principles of set theory and different types of
	relations.
Module 4	
	CO4 - Apply different types of structures of trees for developing programming E_{-1}
Single step me	thods — 1 aylor s series method, Modified Euler s method, Fourth order Kunge-Kutta
Course)	
Content: 3	ector methods for solving first order equations.
Module 1	(Fundamentals of Logic e1 in (10 Classes)
Basic Connec	ctives and Truth Tables, Propositional Logic, Applications of Propositional Logic,
Propositional	Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference,
Introduction to	o Proofs, Proof Methods and Strategy.
	lication & Tools that can be used: Principle of Counting Assignment (15 Classes)
The Well Orde	ering Principle – Mathematical Induction
10015 0 scu. 1	ymon.



The Basics of Counting, Permutations and Combinations, Binomial Coefficients and Identities, Generalized Permutations and Combinations, Generating Permutations and Combinations

Advanced Principle Counting: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials.

Text Book Module 3	Relations and Functions	л.	(10 Classes)
Cartesian Pro	ducts and Relations Functions O	ne-to-	One Onto Functions The Pigeon-hole Principle

Function Composition and Inverse Functions.

Relations, Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders, Lattice, Hasse Diagrams, Equivalence Relations and Partitions.

5. D. S. Stewar (2017), Higher Engineering Mathematics Sy, War Edition, Huanna Fachoneris.							
Module 4	Recurrence Relations and		(10 Classes)				
F_resources/	Generating Functions		(,				
Homogeneou	s and inhomogeneous recurrences	and their solutions ·	- solving recurrences using				
generating fur	nctions - Repertoire method - Perturb	ation method - Convolu	utions - simple manipulations				

and tricks.

6. https://presiuniv.knimbus.com/user#/view	Detail?searchResultTy	pe=ECATALOGUE BASE
Module 5 1= Graph Theory & Algorithms	Assignment	(15 Classes)
7 https://i on Networks	0	e=ECATALOGUE BASE

Definitions and basic results - Representation of a graph by a matrix and adjacency list - Trees - Cycles - Properties - Paths and connectedness - Sub graphs - Graph Isomorphism - Operations on graphs -Vertex and edge cuts - Vertex and edge connectivity, Euler and Hamilton Paths, Shortest-Paths.

Tree - Definitions, Properties, and Examples, Routed Trees, Binary search tree, Decision tree, spanning tree: BFS, DFS.

Algorithms on Networks - Shortest path algorithm- Dijikstra's algorithm, Minimal spanning tree--Kruskal algorithm and Prim's algorithm.

Targeted Application & Tools that can be used:

Discrete mathematics provides the mathematical foundations for many computer science courses including data structures, algorithms, database theory, automata theory, formal languages, compiler-theory, computer security, and operating systems.

Assignment:

- 3. Assignment 1: Logic Equivalences and Predicate calculus.
- 4. Assignment 2: Equivalence Relations and Lattices

5. Assignment 3: Recurrence Relations

Text Book

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition,2019.

2. Harary – Graph Theory, Addison-Wesley Publishing Company.

References:

- 1. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall.
- 2. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd.

3. Ralph. P. Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia.



E-resources/ Web links:

7. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASE</u> D&unique_id=EBSCO95_30102024_54588

8. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASE</u> D&unique_id=EBSCO95_30102024_375

9. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html

10. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

11.

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course Code:	Course Title: Analysis of Algorithms					
CSE1512		L-T-P-	3	0	0	3
	Type of Course: THEORY Only	C				
Version No.	1.0			•		
Course Pre-	CSE2001 - Data Structures and Algorithms.					
requisites						
Anti-requisites	Nil					
Course	This course introduces techniques for the design and					
Description	algorithms and methods of applications. This course					
	approaches for algorithm design such as Divide and					
	Programming, Greedy method. This course also deso				tegie	s
	searching solution space. The core concepts of analy	0 0				
	classifying them into various complexity classes is c	overed in t	he en	d.		
Course	The objective of the course is to familiarize the	learners w	ith th	le con	ncept	s of
Objective	Analysis of Algorithms and attain Skill Developm	ent throug	h Pr o	oblem	ı Sol	ving
	Methodologies.					
Course Out	On successful completion of the course the students	shall be ab	le to:			
Comes	1. Compute efficiency of a given algorithm.[Applyir	ng]				
	2. Apply divide and conquer technique for searching and sorting Problems.[Applying]					
	3. Apply the Dynamic Programming technique for a given problem. [Applying]					
	4. Apply greedy technique for solving a Problem.[A	.pplying]				
	5. Demonstrate Back tracking technique and limitat	ions of Alg	gorith	ms.[A	Apply	'ing]



Course				
Content:				
M. J. J. 1	In the densities	A	Simulation/Data	10
Module 1	Introduction	Assignment	Analysis	Sessions
Introduction, As	ymptotic Notations and i	ts properties, Best cas	se, worst case and average	case-
Sequential search	h, Sorting; Mathematical	analysis for Recursiv	ve and Non-recursive algo	rithms:
Substitution met	hod and Master's Theore	em.		
M 1 1 2	D 1 1	A	Simulation/Data	08
Module 2	Divide-and-conquer	Assignment	Analysis	Sessions
Introduction. Ins	sertion Sort; Merge sort,	Quick sort, Binary sea	arch.	
		T		10
Module 3	Dynamic	Term	Simulation/Data	10
	programming	paper/Assignment	Analysis	Sessions
Introduction with	ith examples, Principles	of Memoization, 0	-1 Knapsack Problem, E	ellman-Ford
algorithm, Floyd	l-Warshall's Algorithms.	Chain Matrix Multip	lication.	
Module 4	Cready technique	Term	Simulation/Data	09
Mouule 4	Greedy technique	paper/Assignment	Analysis	Sessions
Introduction, Fra	actional Knapsack Proble	em, Minimal Spanning	g Tree: Prim's Algorithm	and
Kruskal's Algori	ithm, Single-source Shor	test Path: Dijkstra's A	Algorithm	
M 11 5		Term	Simulation/Data	08
Module 5	Complexity Classes	paper/Assignment	Analysis	Sessions
Complexity Cla	asses- P,NP- NP Hard and	1 NP Complete - Boo	lean Satisfiability Problem	n (SAT).
Branch and Bou	nd: Knapsack problem; I	Backtracking, - N-Que	eens problem.	
Text Book				
3. Anany L	evitin, "Introduction to t	he Design and Analys	sis of Algorithms", 3rd edi	tion,

- Pearson Education, 2018.4. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, *"Introduction*"
 - to Algorithms", 4th edition, MIT Press, 2022.

Course Code: CSE2503	rse Title: Cryptography and twork Security	L- T-P- C	3	0	0	3
Version No.	1					
Course Pre- requisites	"Data Communications and Com	puter Networ	ks".			
Anti- requisites	NIL					
Course Description	e Course covers the principles and p susing in particular on the security a	5	1 0 1		vork se	ecurity,



	REACH GREATER HEIGHTS					
References		• •	such as shared key encryp			
	• • •		tal signature are explored. The			
			ations such as SSL/ TLS, IPSE			
Design a	esign an and S/ MIME, SET are reviewed. System security issues such as viruses, intrusion					
7						
Course The objective of the course is SKILL DEVELOPMENT of student by using						
Objective	PARTICIPATIVE		-			
8. Donald I	On successful compl	letion of this co	ourse the students shall be able	to:		
			of Cryptography (Knowledge)			
Course			of Cryptographic Algorithms. (
		Public key Cr	yptographic Techniques for var	rious applications.		
	(Comprehension)					
8. <u>Algorith</u> Universi	CO4: Apply the network of the security application of th	work security of developments	concepts during their implement	ntation of network		
Course		ae veropinents.	(ippneuron)			
Content:						
-	to "SKILL DEVELOP	MENT". knor	sack, prim's, kruskal's algorit	hm quick sort		
-	Introduction to	-		1. 08 Sessions		
Modulo 1						
Module 1	Cryptography	U	•			
Module 1 <u>through accessm</u> - Topics:	¹ Cryptography	ned in course	•			
<u>through accesses</u> - Topics: Introduction to Attacks: active Confidentiality, Polyalphabetic,	Cryptography Cryptography, Mode e attacks, passive Data Integrity, Nonre	el of Network attacks, servi epudiation, Su	•	s Control, Data Mono alphabetic,		
<u>through access</u> Topics: Introduction to Attacks: active Confidentiality,	Cryptography Cryptography Cryptography, Mode e attacks, passive Data Integrity, Nonro Play-fair and Hill Cip	el of Network attacks, servi epudiation, Su	Security, OSI Security arch ices: Authentication, Access abstitution Ciphers : Caesar,	s Control, Data Mono alphabetic, am Cipher, Festal		
<u>through accesses</u> - Topics: Introduction to Attacks: active Confidentiality, Polyalphabetic,	Cryptography Cryptography, Mode e attacks, passive Data Integrity, Nonre	el of Network attacks, servi epudiation, Su	Security, OSI Security arch ices: Authentication, Access abstitution Ciphers : Caesar,	s Control, Data Mono alphabetic,		
<u>through accesses</u> - Topics: Introduction to Attacks: active Confidentiality, Polyalphabetic, Structure.	Cryptography Mode cryptography, Mode e attacks, passive Data Integrity, Nonro Play-fair and Hill Cip Private Key Cryptography and Number	el of Network attacks, servi epudiation, Su pher, Introduct Assignmen	Analysis of requirement of	s Control, Data Mono alphabetic, am Cipher, Festal		
 through accession Topics: Introduction to Attacks: active Confidentiality, Polyalphabetic, Structure. Module 2 Topics: Symmetric Encond Advanced Encry about primality 	Cryptography Mode e attacks, passive Data Integrity, Nonro Play-fair and Hill Cip Private Key Cryptography and Number Theory eryption Algorithms a syntion Standard, Mode testing and factorizate rithm, Euler Totient Fu	el of Network attacks, servi epudiation, Su pher, Introduct Assignmen t : Data Encry ular Arithmetic	Analysis of requirement of	s Control, Data Mono alphabetic, am Cipher, Festal 13 Sessions to Galois Field, ttle theorem, brief ean and Extended		
 through accession Topics: Introduction to Attacks: active Confidentiality, Polyalphabetic, Structure. Module 2 Topics: Symmetric Encond Advanced Encry about primality 	Cryptography Mode e attacks, passive Data Integrity, Nonro Play-fair and Hill Cip Private Key Cryptography and Number Theory eryption Algorithms a yption Standard, Mode testing and factorizat	el of Network attacks, servi epudiation, Su pher, Introduct Assignmen t : Data Encry ular Arithmetic	Analysis of requirement of complexity in cryptography ption Standard, Introduction c, Prime numbers, Fermat's lit Logarithmic Problem, Euclide	s Control, Data Mono alphabetic, am Cipher, Festal 13 Sessions to Galois Field, ttle theorem, brief		



		1.0	iffie - Helman Key exchange, N	
• •	• •		ash Algorithm, Message Auther	ntication Codes –
HMAC, Dig	gital Signature, Discus	sion on real tir	ne practices of Cryptography.	
		Assignmen	Implement the advanced	07 Sessions
Module 4	Network Security	t	network security algorithms	
			in recent applications.	
Topics:				
			1· ,· , , , , , , ,	
	-	-	y applications: Authentication:	
		-	GP, MIME, Network Security	applications: If
-			ications: Web Security.	
0 11	cation & Tools that c			
-	• •		niques followed, the algorithms	
encryption and d	lecryptions & the tech	niques for auth	nentication and confidentiality of	of messages.
Assignment:				
0				
Assignment 1: S	Solve the problems of	basic encrypti	on techniques.	
Assignment 2: S	Solve and analyze the	problems on s	ymmetric and asymmetric encr	yption.
Textbooks:				
ICALDUOKS.				
1.William Stallin	ngs, "Cryptography an	nd Network Se	curity - Principles and Practice	s", Prentice Hall
8 th Edition, 2019).			
2 Wede Treese	and Lamman C. Was	1	tration to Counts much suith	
	and Lawrence C was	nington, Intro	oduction to Cryptography with	Coding Theory
Pearson, 2020.				
Reference Book	(8:			
1 Dobrouz A For	rouzon Dobdoon Mul	chonadhyay "	Cruntagraphy and Natwork Sa	ourity" McGrou
Hill, third edition	=	mopaunyay,	Cryptography and Network Se	curity, McGraw
niii, tiira eatuo	<i>m</i> , 2010.			
2. R.Rajaram, "	Network Security and	Cryptography	"SciTech Publication.3 rd Edition	on, 2014.
3. AtulKahate, "	Cryptography and Net	twork Security	", Tata McGraw-Hill, 2 nd Editio	on, 2019.
			ley and Sons Inc. Second Edition	
			-	-
Web references	:			
1.https://onlinece	ourses.nptel.ac.in/noc2	22 cs90/previe	ew	
-	UGC lecture series : E			
https://epgp.in	flibnet.ac.in/Home/Vie	ewSubject?cat	id=fBYckQKJvP3a/8Vd3L08t0)==
	188.195/cgi-bin/koha/	-	~	
			Cwrdl%3A%20Cryptography%2	20and%20Netwo
rk%20Security			/ <u>···</u> ·································	
	88.195/cgi-bin/koha/o	opac-		
-	-	-	vrdl%3A%20Cryptography%20)and%20Networ
k%20Security.	<u></u>	<u></u>	,141,0511,02001 yptogruphy/020	<u>,</u>
<u>x /0205000111y</u> .				
Topics relevant ((+". Cymana atmi	· · · · · · · · · · · · · · · · · · ·	1 and the second
Toples relevant of	to "Skill Development	: Symmetric	e and Asymmetric Encryption A	agorithms and



Course	Course Title: Database N	/Ianagement Sys	stems				
Code:							
CSE1510	Type of Course: 1) Program Core & Theory only L-T-P-C 3 0 0						
Version No.	1.0						
Course	Foundational understandi	ng of data type	es data stru	ictures b	asic r	rnora	mmino
Pre-	knowledge, familiarity	0 11			-	U	U
requisites	knowledge of set theory,						
	algebra and query formula						
Anti-requisites	NIL						
Course	This course introduces	the foundational	principles	of datab	ase	nanag	gement
Description	systems, including data m					-	
L.	solid foundation on the rel					-	
	develops skills in SQL f					-	
	students to construct and	execute complex	queries. The	e course a	lso in	troduc	ces the
	concept of object oriente	d and object rela	ational datab	bases and	mode	ern da	itabase
	technologies like NoSQL.	The also course	allows the s	tudents to	gain	insigh	ts into
	data storage structures and						
Course	The objective of the cour					-	s of
Objective	Database Management Sys	stems and attain I	Employabili	ty through	n Pro l	blem	
~	Solving Methodologies.						
Course	On successful completion						
OutComes	9. Describe the fundament	tal elements of re	lational data	ibase man	ageme	ent sys	stems.
	[Understand]		occesing on	d Ontimiz	ation	[A nn	1]
	10. Examine databases usi	• • • • •	-	-			•
	11. Design simple database systems applying the normalization constraints and demonstrate the database transaction processing, recovery, and security						
	demonstrate the database transaction processing, recovery, and security. [Apply]						
	12. Interpret the concept of advanced databases and its applications. [Apply]						
Course Content	1 1			rr the	L.	rr-/1	
	Introduction to						
	Database Modelling					a -	
Module 1	and Relational Algebra	Assignment	Problem	Solving	10	Sessi	ons
	(Understand)						
Topics:	. ,		I				

Topics:

Introduction to Database: Schema, Instance, 3-shema architecture, physical and logical data independence, Data isolation problem in traditional file system, advantages of database over traditional file systems. Entity Relationship (ER) Model, ER Model to Relational Model, Examples on ER model. **Relational Algebra** with selection, projection, rename, set operations, Cartesian product, joins (inner and outer joins), and division operator. Examples on Relational Algebra Operations.



	Module 2	Fundamentals of SQL and Query Optimization (Apply)	Assignment	Programming	11 Sessions
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Topics:

SQL Database Querying, DDL, DML, Constraints, Operators, Set Operators, Aggregate Functions, Joins, Views, Procedures, Functions and Triggers.

Database programming issues and techniques: Embedded SQL, Dynamic SQL; SQL / PSM and NoSQL.

Query Optimization: Purpose, transformation of relational expressions, estimating cost and statistics of expression, choosing evaluation plans, linear and bushy plans, dynamic programming algorithms.

Module 3	Relational Database Design & Transaction Management(Apply)	Assignment	Problem Solving	12 Sessions
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Topics:

Relational database design: Problems in schema design, redundancy and anomalies, Normal Forms based on Primary Keys-(1NF,2NF, 3NF), Boyce-Codd Normal Form, Multi valued Dependency (Fourth Normal Form), JoinDependencies (Fifth Normal Form), lossy and lossless decompositions, Database De-normalization.

Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; 2PL, Serializability and Recoverability; Lock Management; The write-ahead log protocol; Check pointing; Recovering from a System Crash; Media Recovery; Other approaches and interaction with concurrency control.

Module 4	Advanced DBMS Topics (Apply)	Assignment	Case Study	12 Sessions
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Topics:

Advanced topics: Object oriented database management systems, Deductive database management systems, Spatial database management systems, Temporal database management systems, Constraint database management systems.

New database applications and architectures such as Data warehousing, Multimedia, Mobility, NoSQL, NativeXML databases (NXD), Document-oriented databases, Statistical databases.

Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications. Tools/Simulator used: MySQL DB for student practice.

Also demonstration of ORACLE DB on object-relational database creation and JDBC connection.

- 3. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 4. Programming: Implementation of any given scenario using MySQL.

Text Books:

T1. Elmasri R and Navathe S B, "Fundamentals of Database System", Pearson Publication, 7th Edition, 2018.



- T2. RamaKrishna & Gehrke, "Database Management Systems" 3rd Edition, 2018, McGraw-Hill Education.
- T3. W. Lemahieu, S. vanden Broucke and B. Baesens, "Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data", Cambridge University Press, 2018.

References

- R1 Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill ,7th Edition, 2019.
- R2 M. Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems", O'Reilly, 2017.

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database design using ER- Relational mapping, Implementation of given database scenario using MYSQLDB.

Topics relevant to development of Employability: Develop, test and implement computer databases, creating sophisticated, interactive and secure database applications

Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Nil

Course Code:	Course Title: Web Technology		2-0-0-2			
CSE1504	Type of Course: Program core	L- T-P- C				
	Theory Only					
Version No.	2.0	_	<u> </u>			
Course Pre- requisites	NIL					
Anti-requisites	NIL					
Course Description	This course highlights the basic web design using Hypertext Markup Language and Cascading Style Sheets. Students will be trained in planning and designing effective web pages by writing code using current leading trends in the web domain, enhancing web pages with the use of page layout techniques, text formatting, graphics, images, and multimedia. The focus is on popular key technologies that will help students to build Internet- and web-based applications that interact with other applications and with databases.					
Course Objective	The objective of the course is to familiarize the learn Technology and attain Skill Development thro techniques.		-			



Course	On successful completion	on of this course the s	students shall be able to:					
Outcomes	CO1: Implement web-ba (Application level)	CO1: Implement web-based application using client-side scripting languages. (Application level)						
	CO2 : Apply various constructs to enhance the appearance of a website. (Application level)							
	CO3 : Illustrate java-script concepts to demonstration dynamic web site (Applicatio level)							
	CO4: Apply server-side scripting languages to develop a web page linked to a database. (Application level)							
Course Content:								
Module 1	Introduction to XHTM	L Quizzes and Assignments	Quizzes on various features of XHTML, simple applications	8 Sessions				
Topics:		I		I				
Basics: Web,	WWW, Web browsers, Web	servers, Internet.						
Structure, Ba	gins and Evolution of HTM sic Text Markup, Images, etween HTML and XHTML	Hypertext Links, Li	•					
Module 2	Advanced CSS	Quizzes and assignments	Comprehension based Quizzes and assignments; Application of CSS in designing webpages	8 Sessions				

CSS: Introduction to CSS, Defining & Applying a style, Creating style sheets, types of style sheet, selectors, CSS font properties, border properties, Box model, opacity, CSS pseudo class and pseudo-elements.

Advanced CSS: Layout, Normal Flow, Positioning Elements, Floating Elements, Responsive Design, CSS Frameworks XML: Basics, demonstration of applications using XML

Module 3	Fundamentals of JavaScript	Quizzes and assignments	Application of JavaScript for dynamic web page designing	7 Sessions
Topics:				



JavaScript: Introduction to JavaScript, Basic JavaScript Instructions, Functions, Methods & Objects, Decisions and Loops, Document Object Model, Event handling, handling window pop-ups, JavaScript validation.

Module 4 PHP – Application Level	Quizzes and assignments	Application of PHP in web designing	7 Sessions
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Topics:

PHP: Introduction to server-side Development with PHP, Arrays, \$GET and \$POST, \$_Files Array, Reading/Writing Files, PHP Classes and Objects, Working with Databases, SQL, Database APIs, Managing a MySQL Database. Accessing MySQL in PHP.

Targeted Application & Tools that can be used:

Xampp web server to be used to demonstrate PHP.

Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.

Textbook(s):

1] Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, 8th Edition, 2015.

2] *CSS Notes for Professionals*, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

3] Deitel, Deitel, Goldberg,"*Internet & World Wide Web How to Program*", Fifth Edition, Pearson Education, 2021.

References

1] Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", Pearson Education India, 1st. Edition.2016.

2] Jeffrey C. Jackson, "Web Technologies: A Computer Science Perspective", Pearson Education, 1st Edition,2016.

Topics related to development of "FOUNDATION":

- 1. Web, WWW, Web browsers, Web servers, Internet.
- 2. CSS, PHP.
- 3. Designing for healthcare.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.

E-References

pu.informatics.global, https://sm-nitk.vlabs.ac.in/



Course Title: Introduction to Blockchain Platforms

L:T:P:C - 3:0:0:3

Course Description

This course introduces various blockchain platforms with a focus on their architecture, consensus mechanisms, smart contract capabilities, and use cases. Students will gain insights into leading blockchain ecosystems like Bitcoin, Ethereum, Hyperledger, and others to understand their comparative features and applications.

Course Objectives

- Understand the structural design and functionality of popular blockchain platforms
- Analyze consensus mechanisms used across different blockchain networks
- Explore platform-specific capabilities like smart contracts, tokens, and assets
- Evaluate the suitability of blockchain platforms for specific applications

Course Outcomes

CO1 (Understand): Describe the architecture and consensus of various blockchain platforms

CO2 (Analyze): Compare different blockchain ecosystems in terms of performance, security, and flexibility

CO3 (**Apply**): Illustrate smart contract functionalities in Ethereum and Hyperledger **CO4** (**Apply**): Design application scenarios with suitable blockchain platforms

Course Content (45 Hours Total)

Module 1: Overview of Blockchain Platforms – 11 Sessions

Bitcoin: architecture, scripting, transactions, Ethereum: EVM, gas, smart contracts, Overview of permissioned vs permissionless platforms

Module 2: Ethereum and Smart Contracts – 11 Sessions

Ethereum accounts, transactions, Solidity basics, Gas optimization, ERC standards (ERC-20, ERC-721), DApps and use cases

Module 3: Hyperledger Fabric and Enterprise Platforms – 11 Sessions

Fabric architecture: peers, orderers, channels, Chaincode vs smart contract, Membership Service Providers (MSP), Hyperledger use cases

Module 4: Comparative Study and Emerging Platforms – 12 Sessions Quorum, Corda, Polygon, Binance Smart Chain, Flow and Avalanche overview, Interoperability and bridging, Platform selection for applications

Textbooks

T1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 3rd Edition, 2020T2: Andreas Antonopoulos & Gavin Wood, *Mastering Ethereum*, O'Reilly Media



Reference Books

R1: Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press

R2: Arnaud Le Hors et al., *Hyperledger Fabric Documentation*, Linux Foundation

R3: Tanmay Bakshi, Getting Started with Blockchain and Hyperledger, Apress

R4: Roger Wattenhofer, *Distributed Ledger Technology: The Science of the Blockchain*, InTechOpen

Web Resources

- W1: <u>https://ethereum.org</u>
- W2: <u>https://hyperledger.org</u>
- W3: <u>https://soliditylang.org</u>
- W4: <u>https://quorumconsortium.org</u>
- W5: <u>https://corda.net</u>

Course	Course Title: Web					
Code:	Technologies Lab L-T- 0 0 2 1					
CSE1505	Type of Course: ProgramP- C					
	core lab course					
Version No.	1.0					
Course	Database Management Systems-CSE3156					
Pre-						
requisites						
Anti-requisites	NIL					
Course	This course highlights the comprehensive introduction to scripting languages					
Description	that are used for creating web-based applications.					
	The associated laboratory provides an opportunity to implement the concepts and enhance critical thinking and analytical skills.					
Course Objective	The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.					
Course	On successful completion of this course the students shall be able to:					
Outcomes	CO1: Implement web-based application using client-side scripting languages.					
	(Apply)					
	CO2: Apply various constructs to enhance the appearance of a website. (Apply)					



	CO3: Apply server-side scripting languages to develop a web page linked to database.				
	(Apply)				
Course					
Content:					
List of Laboratory	Tasks:				

Experiment No. 1: Demonstration of XHTML features

Level 1: Demonstration of various XHTML Tags (Level 1)

Level 2: Design and develop static web pages for an online Book store (Level 2).

Experiment No. 2: Application of CSS in web designing

Level 1: Design a document using XHTML and CSS to create a catalog of items for online electronic shopping.

Level 2: Create and save XML document for students' information and display the same using cascaded style sheet.

Experiment No. 3: Application of PHP in web designing.

Level 1: Write a PHP program to read the personal information of a person such as first name, last name, age, permanent address, and pin code entered by the user into a table created in MySQL. Read the same information from the database and display it on the front end.

Level 2: Using PHP develop a web page that accepts book information such as ISBN number, title, authors, edition, and publisher and store information submitted through the web page in MySQL database.

Experiment No. 4: Building a website.

Build a website for organizing an International Conference. The conference website must be able to collect the author's details and upload a file.

Targeted Application & Tools that can be used: Xampp web server to be used to demonstrate PHP.

Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.

Textbook(s):



1. Robert. W. Sebesta, "*Programming the World Wide Web*", Pearson Education, 9th Edition, 2016.

2]Paul Deitel, Harvey Deitel, Abbey Deital,"Internet & World Wide Web How to Program", Fifth Edition, Pearson Education, 2021.

3]CSS Notes for Professionals, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

4]Deitel, Deitel, Goldberg,"Internet & World Wide Web How to Program", Fifth Edition, Pearson

Education, 2021.

Reference Book(s):

R1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", Pearson Education India, 1st. Edition.2016.

R2. Jeffrey C. Jackson,"Web Technologies: A Computer Science Perspective", Pearson Education, 1st Edition,2016.

Additional web-based resources

W1. W3schools.com

W2. Developer.mozilla.org/en-US/docs/Learn

W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

- 1. Web, WWW, Web browsers, Web servers, Internet.
- 2. CSS, PHP.
- 3. Designing the website for healthcare.

The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2000	Course Title: Software Design and Development Type of Course: School Core [Theory Only]	L-T- P- C	3-0-0-3
Version No.	1.0		



Course Pre-requisites	NIL					
Anti-requisites	NIL					
Course Description	The objective of this cou Software Engineering pr	-	vide the fundamentals co inciples.	ncepts of		
	The course covers software requirement engineering processes, system analysis, design, implementation and testing aspects of software system development.					
	The course covers softw maintenance.	are quality, c	configuration managemen	nt and		
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Software Engineering and attain Skill Development through Participative Learning techniques.					
Course Out Comes	On successful completion of this course the students shall be able to: 1] Describe the Software Engineering principles, ethics and process models(Knowledge)					
	2] Identify the requiren given application(Comp	•	sis and appropriate desig	gn models for a		
	3] Understand the Agile	Principles(K	Inowledge)			
	4] Apply an appropriate planning, scheduling, evaluation and maintenance principles involved in software(Application)					
	Introduction to					
Module 1	Software Engineering and Process Models	Quiz		10 Hours		
La face das de servicios No. 1. 4	(Knowledge level)	~ Durfer'	and Saferrary Days			

Introduction: Need for Software Engineering, Professional Software Development, Software Engineering Ethics, Software Engineering Practice-Essence of Practice, General Principles Software Development Life Cycle

Models: Waterfall Model – Classical Waterfall Model, Iterative Waterfall Model, Evolutionary model-Spiral, Prototype.

Module 2		Assignment	Development of SRS documents for a given	12 Hours
	(Comprehension level)		scenario	



Requirements Engineering: Eliciting requirements, Functional and non-Functional requirements, Software Requirements Specification (SRS), Requirement Analysis and validation. Requirements modelling- Introduction to Use Cases, Activity diagram and Swim lane diagram. CASE support in Software Life Cycle, Characteristics of CASE Tools, Architecture of a CASE Environment.

Design: Design concepts, Architectural design, Component based design, User interface design.

	Agile Principles & Devops	Quiz	10 Hours	
	(Knowledge level)			

Agile: Scrum Roles and activities, Sprint Agile software development methods - Scaling, User Stories, Agile estimation techniques, Product backlogs, Stake holder roles, Dynamic System Development Method.

Devops: Introduction, definition, history, tools.

Module 4		Assignment	Apply the testing concepts using Programing	13 Hours
	(Application Level)			

Software Testing-verification and validation, Test Strategies - White Box Testing, Black box Testing. Automation Tools for Testing.

Software Quality Assurance-Elements of software quality assurance, SQA Tasks, Goals and Metrics, Software configuration management- SCM process, SCM Tools (GitHub).

Maintenance- Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models.

Targeted Application & Tools that can be used: Selenium, GitHub, CASE Tools

Text Book

Roger S. Pressman, "Software Engineering – A Practitioner's Approach", VII Edition, McGraw-Hill,
 7.

82. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management", VI Edition, McGraw-, 2018.

References

- 4. Rajib Mall, "Fundamentals of Software Engineering", VI Edition, PHI learning private limited, 2015.
- 5. Ian Sommerville, "Software Engineering", IX Edition, Pearson Education Asia, 2011.
- 6. Agile Software Development Principles, Patterns and Practices.1st Edition, Wiley, 2002



Topics Relevant to "Skill Development: Balck box Testing, White box Testing, Automated Testing for Skill development through Participative Learning Techniques. This is attained through assessment mentioned in the course handout

Course	Course Title: Database Management Systems						
Code:	Laboratory L-T-P-C 0 0 2 1						
CSE1511	Type of Course: 1) Laboratory						
Version No.	1.0						
Course Pre- requisites	Foundational understanding of data types, basic programming knowledge, operating systems and file management.						
Anti-requisites	NIL						
Course Description	The Database Management Systems (DBMS) Laboratory is designed to provide students with hands-on experience in database design, implementation, and management using SQL and database management tools such as MySQL. The lab complements theoretical concepts learned in database courses by allowing students to practice database creation, querying, and optimization techniques. The DBMS Lab enables students to develop industry-relevant skills in database management, preparing them for careers in software development , data engineering, and database administration.						
Course Objective	The objective of the course is to familiarize the learners with the concepts of Database Management Systems and attain Employability through Problem Solving Methodologies.						
Course OutComes Course Content	 On successful completion of the course the students shall be able to: 13. Demonstrate the database concepts, practice, and SQL queries. [Apply] 14. Design and implement database schemas while applying normalization techniques to optimize structure. [Apply]] 15. Develop and implement stored procedures, triggers, and views for automation and efficiency. [Apply] 16. To Design and build database applications for real world problems. [Apply] 						

List of Laboratory Tasks:

Create Employee, Student, Banking and Library databases and populate them with required data. Do the following experiments of different lab sheets on those databases.

Labsheet-1 [3 Practical Sessions]

Experiment No 1: [1 Session]

1. To study and implement the different language of Structured Query Language.

Level 1: Perform operations using Data Definition Language and Data Manipulation Language commands including different variants of SELECT on Student DB.

Level 2: Identify the given requirements; valid attributes and data types and Perform DDL and DML



operations on a given scenario. [Banking Databases]

Experiment No. 2: [2 Sessions]

2. To study and implement the concept of integrity constraints in SQL.

Level 1: Create tables on Banking database using PRIMARY KEY, NOT NULL, UNIQUE,

FOREIGN KEY and demonstrate the working of relational, logical, pattern matching, BETWEEN, IS NULL, IN and NOT IN Special Operators on Student Database.

Level 2: Enforce different types of data and referential integrity constraints. Then try queries with special operators based on the student database. [Banking Database].

Labsheet-2 [3 Practical Sessions]

Experiment No. 3: [1 Session]

3. Implement complex queries in SQL.

Level 1: Implement the conjugate of GROUP BY, ORDER BY and aggregate functions on Banking Database. Level 2: Implement MySQL DB queries on library database using appropriate clauses and aggregate functions. Also order the data either in ascending and descending order using corresponding clause. [Library databases].

Experiment No. 4: [2 Session]

4. To study and implement different types of Set and Join Operations [2 Slots] Level 1: Demonstrate different types of Set Operations (UNION, UNION ALL, INTERSECT, MINUS) and Join Operations (INNER JOINS, OUTER JOINS, CROSS JOIN, NATURAL JOIN) on two or more tables of Airline Database. Level 2: Use Set and Join operations to retrieve the data from two or more relations(tables) as per the given scenario. [Airline Database]

Labsheet-3 [2 Practical Sessions]

Experiment No. 5: [2 sessions]

5. To study and implement Views, and Procedures in MySQL DB.

Level 1: Implement MySQL Views, and Procedures in ORACLE DB on Employee database.

Level 2: Analyze the requirement and construct views, and Procedures on Mini Project Domain. [Banking Database]

Labsheet-4 [2 Practical Sessions]

Experiment No. 6: [2 Sessions]

6. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Analyze the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-5 [2 Practical Sessions] Experiment No. 7: [2 Sessions]

7. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Determine the requirement and construct Functions and Triggers. [Supply chain Database]



Labsheet-6 [4 Practical Sessions]

Experiment No. 8: [2 Sessions]

8. To implement the concept of forms and reports.

Level 1: Implement the concept of forms and reports.

Level 2: Examine the schema relationship.

Experiment No. 9: [2 Sessions]

9. Create the database using the given schema. (Flight Management)

Level 1: Implement a relational database based on the provided schema for the Flight Management system, including the creation of tables, relationships, and constraints.

Level 2: Demonstrate schema relationships by defining primary and foreign keys to ensure data integrity within the Flight Management database.

Labsheet-7 [4 Practical Sessions]

Experiment No. 10: [2 Sessions]

10. Create the database using the given schema. (Company database)

Level 1: Implement the database schema by defining tables, relationships, and constraints according to the given Company Database schema.

Level 2: Demonstrate the schema's relationships and data integrity by creating and linking tables as per the specified requirements.

Experiment No. 11: [2 Sessions]

11. Create the database using the given schema. (Student Library)

Level 1: Implement forms and reports based on the provided Student Library database schema, ensuring effective data entry and reporting mechanisms.

Level 2: Demonstrate the schema relationships within the Student Library database, demonstrating how these relationships influence the creation and functionality of forms and reports.

Labsheet-8 [1 Sessions]

12. Design a mini project based on the databases such as Inventory Management System, University Management System, Hospital Management System, etc.

Level 1: Implement the real time database.

Level 2: Analyze the working of database in real time.

Course Code: CSE1513	Course Title: Analysis of Algorithms Laboratory Type of Course: Integrated	L- T-P- C	0	0	2	1
Version No.	1		•			
Course Pre requisites	-CSE2001 - Data Structures and Algorithms.					



Anti- requisites	NIL	
Course Description	This course introduces techniques for the design and analysis of efficient algor methods of applications. This course discusses the classic approaches for algorith such as Divide and Conquer, Dynamic Programming, Greedy method. This co describes other basic strategies searching solution space. The core concepts of algorithms and classifying them into various complexity classes is covered in the	hm design ourse also analyzing
Course Objective	The objective of the course is to familiarize the learners with the concepts of A Algorithms and attain Skill Development through Experiential Methodologies.	-
Course Out Comes	 On successful completion of the course the students shall be able to: 1. Compute efficiency of a given algorithm. [Applying] 2. Apply divide and conquer technique for searching and sorting Problems.[App 3. Apply the Dynamic Programming technique for a given problem. [Applying 4. Apply greedy technique for solving a Problem.[Applying] 5. Demonstrate Back tracking technique and limitations of Algorithms.[Applying]
Course Content		
Module 1	Introduction	3 Sessions
_	unning time of an algorithm, Compare running time of algorithms, Implement source as bubble sort, selection sort	rting
Module 2	Divide-and-conquer	3 Sessions
-	urching algorithms: Linear Search, Binary Search; Compare Sorting algorithms: I Sort, QuickSort.	insertion
Module 3	Dynamic programming	3 Sessions
Introduction	and memorization: Factorial; Coin Change Problem ; Floyd-Warshall's Algorithm	m.
Module 4	Greedy technique	3 Sessions
Fractional Ka	napsack Problem; Minimal Spanning Tree Algorithms-Prim's Algorithm, Kruska	ıl's
Module 5	Complexity Classes	3 Sessions
Branch and I	Bound: Knapsack problem; Backtracking, - N-Queens problem.	1
	List of Laboratory Tasks:	
	1	



1. Measuring running time of an algorithm

Objective: To experimentally determine the running time of basic algorithms for input size n=10, 100, 1000, etc. by taking difference of starting time and ending time.

2. Compare running time of algorithms

Objective: To execute two algorithms to solve the same problem, and to comparatively evaluate the better algorithm for large values of N.

3. Implement sorting algorithms such as bubble sort, selection sort

Objective: To implement comparison based sorting strategies.

4. Compare searching algorithms

Objective: To implement two searching strategies and compare their performance.

5. Compare Sorting algorithms

Objective: To implement searching strategies that follow top down design approach(Insertion sort, merge sort).

6. Quick Sort

Objective: To demonstrate Quick sort and its variants, and their impact on running time.

7. Dynamic Programming

Objective: To demonstrate Dynamic Programming approach with the help of Factorial algorithm.

8. Coin Change Problem

Objective: To implement an efficient algorithm for the Coin Change problem.

9. Floyd-Warshall's Algorithm

Objective: To demonstrate how dynamic programming is used with the help of Floyd-Warshall's algorithm.

10. Fractional Knapsack Problem

Objective: To demonstrate how greedy method can be used to solve the Fractional Knapsack Problem.

11. Minimal Spanning Tree Algorithm

Objective: To implement greedy strategy to solve the Minimal Spanning Tree problem using Prim's Algorithm.



[]	12. Kruskal's Minimal Spanning Tree Algorithm
	Objective: To implement greedy strategies to solve the Minimal Spanning Tree problem using Kruskal's Algorithm.
]	13. Knapsack Problem
	Objective: To implement Knapsack problem using branch and bound technique.
]	14. N-Queen's Problem
	Objective: To demonstrate backtracking method with the help of N-Queen's problem.
1	15. Case Study
	Objective: To demonstrate how various techniques can be used to solve the same problem with the help of Knapsack problem.
	Targeted Application & Tools that can be used
	2. PyTorch/Jupyter Notebook – For Python programming
	Text Book
	 T1 Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd edition, Pearson Education, 2018. T2 Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein,
	<i>"Introduction to Algorithms"</i> , 4th edition, MIT Press, 2022. References
]	R1. J. Kleinberg and E. Tardos, "Algorithm Design", Addison-Wesley, 2005.
	R2. Tim Roughgarden, "Algorithms Illuminated" (books 1 through 3), "Operating Systems Design and Implementation", Soundlikeyourself Publishing, 2017-2019.
	R3. AV Aho, J Hopcroft, JD Ullman, " <i>The Design and Analysis of Algorithms</i> ", Addison-Wesley, 1974.
1	R4. Donald E. Knuth, "The Art of Computer Programming", Volumes 1 and 3 Pearson.
	Web Based Resources and E-books:
	W1. <u>NPTEL</u> : <u>https://onlinecourses.nptel.ac.in/noc19_cs47/preview</u>
	W2. Coursera: Analysis of Algorithms by Princeton University
	W3. <u>Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).</u>



W4. <u>Algo</u> r	rithms Coding Contest Lin	ks maintained by Prof G	erth Stølting Brodal of
Aarhus Ui	<u>niversity</u>		
Topics re	elevant to "EMPLOYA	BILITY SKILLS":	The lab experiments and
-			oment through Experiential
	techniques		
	.comiquos		

Course Code: CBD2518 | Course Title: Data Security and Cryptography | L:T:P:C = 3:0:0:3

| Version No: 1.0 |

Course Pre-requisites:

Anti-requisites: NIL

Course Description:

This course offers a comprehensive introduction to the principles and practices of data security and cryptography. It covers classical and modern cryptographic algorithms, key management, authentication protocols, data integrity, and network security mechanisms. Students gain a practical understanding of how cryptographic techniques ensure confidentiality, integrity, and availability in real-world applications.

Course Objectives:

1. To introduce the fundamentals of cryptographic techniques and their mathematical foundations

2. To understand symmetric and asymmetric encryption algorithms and their applications

3. To explore cryptographic protocols for authentication, digital signatures, and secure communication

4. To analyze and evaluate security threats and countermeasures in digital systems and networks



Course Outcomes:

CO1 (Understand): Explain fundamental concepts of cryptography and data security CO2 (Analyze): Compare and analyze various encryption techniques and cryptographic protocols

CO3 (Apply): Implement encryption/decryption algorithms and simulate secure data communication

CO4 (Apply): Apply security mechanisms to assess and solve real-time data security issues

Course Content:

Module 1: Introduction to Cryptography and Number Theory | No. of Sessions: 12 Cryptography Basics, Security Attacks, Services, Mechanisms, Symmetric vs. Asymmetric Cryptography, Modular Arithmetic, Euler's Theorem, Fermat's Theorem, Euclidean Algorithm

Module 2: Symmetric and Asymmetric Encryption Algorithms | No. of Sessions: 11 DES, Triple DES, AES, Blowfish, RC4, RSA Algorithm, ElGamal, Key Distribution and Management, Diffie-Hellman Key Exchange

Module 3: Authentication, Hashing and Digital Signatures | No. of Sessions: 11 Authentication Protocols, Message Authentication Codes (MAC), Hash Functions (SHA, MD5), Digital Signatures, Public Key Infrastructure (PKI), Certificate Authorities

Module 4: Data Security and Network Protocols | No. of Sessions: 11 IPSec, SSL/TLS, Secure Email (PGP, S/MIME), Secure E-commerce, Firewalls, Intrusion Detection Systems (IDS), Blockchain Basics for Security

Textbooks:

T1: William Stallings, *Cryptography and Network Security: Principles and Practice*, Pearson, 7th Edition, 2017

T2: Behrouz A. Forouzan, *Cryptography and Network Security*, McGraw-Hill Education, 2nd Edition, 2011

Reference Books:

R1: Bruce Schneier, *Applied Cryptography: Protocols, Algorithms, and Source Code in C*, Wiley, 2nd Edition, 1996

R2: Douglas R. Stinson, *Cryptography: Theory and Practice*, CRC Press, 4th Edition, 2018

R3: Charlie Kaufman et al., *Network Security: Private Communication in a Public World*, Prentice Hall, 2nd Edition, 2002

R4: Christof Paar and Jan Pelzl, *Understanding Cryptography*, Springer, 2010

Web Resources: W1: https://cryptography.io W2: https://nvlpubs.nist.gov



W3: https://www.owasp.org

W4: https://www.tutorialspoint.com/cryptography/index.htm

W5: https://www.coursera.org/learn/crypto

Course	Course Title: Smart Contra		L- T-	3-0-0-3
Code:	and Solidity Type of Course	e:	P- C	
CBC250	Integrated		1-0	
<mark>0</mark>				
Version	1			
No.				
Course	Basics of Mathematics and a	ny Programming	Language	
Pre-				
requisite				
S				
	NONE			
requisit				
es				
	Solidity is an object-oriented	• •	• •	•
	Smart contracts are program	-		
Descripti	Ethereum state. Solidity is a	-		-
on	Virtual Machine (EVM). It		•	-
	Ethereum Virtual Machine		-	
	events and logging blockchai			
Cours	The objective of the course i			-
e	Contract and Solidity and a	ttain <u>EMPLOY</u>	ABILITY through I	Experiential
v	Learning Techniques.			
ve		A (1)		
	On successful completion o			
Course	CO 1 :Understand the funda	mentals of comp	utational Element o	f the Blockchain
Out	Technology	ad an anotion a of		x 4h a4 a 4a 4 a 4
Comes	C.O 2: Implementuser-defin	-	• •	y that are not
	possible through plain crypto C.O 3: Exhibitbest practices	• 1		ontro ata viain a
	-	for designing sol	lutions with smart c	ontracts using
	Solidity and Remix IDE			
Modulo 1	Introduction to Smart	TEST-1	Fundaments of Sn	100
Module 1	Contract	1151-1	Contractand Solid	ity
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		IVLIIUI		
/ Node.js, D	ocker, Binary Packages, Buil	ding from Source	e, CMake options.	
Module 2	Solidity in Depth	TEST-1	Case studies / Case let	12
				Sessions
Topics: Lay	yout of a Solidity Source Fi	ile, Structure of	a Contract, Types, Units a	nd Globally
Available V	Variables, Expressions and	Control Struc	tures, Contracts, Solidity	Assembly,
Miscellaneo	us, Solidity v0.5.0 Breaking	Changes		
		1	1	
Module 5	Contract Metadata &	Endterm lab	Implementing	14
	ContractABI	Exam	Applications	Sessions
	Specification			
—	coding of the Metadata Hash	-	-	
	and NatSpec, Usage for Sou		•	
U	Encoding, Types, Design Cri		0 1	
Encoding,	Function Selector and Argun	nent Encoding, E	xamples, Use of Dynamic T	'ypes,
Events, JSC	ON, Strict Encoding Mode, N	Ion- standard Pac	cked Mode	
Textbooks:				
T1: Williar	n Stallings, *Cryptography a	nd Network Secu	urity: Principles and Practice	e*, Pearson,
7th Edition	, 2017			
T2: Behrou	z A. Forouzan, *Cryptograp	hy and Network	Security*, McGraw-Hill Ed	ucation,
2nd Edition	n, 2011			
Reference	Pooles			
	Books. Schneier, *Applied Cryptogr	anhy: Protocola	Algorithms and Source Co.	do in C*
	Edition, 1996	apiry. I fotocors,	Algorithmis, and Source Co	de m C ⁺ ,
•	as R. Stinson, *Cryptography	. Theory and Dro	ation* CPC Drass Ath Edit	ion 2018
-	e Kaufman et al., *Network S	•		
	all, 2nd Edition, 2002	security. I fivate		wona ,
	of Paar and Jan Pelzl, *Under	estanding Crypto	aranhy* Springer 2010	
		standing Cryptog	Shapiny , Springer, 2010	
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W1: https:/	//cryptography.io			
	/nvlpubs.nist.gov			
-	//www.owasp.org			
-	//www.tutorialspoint.com/cry	ptography/index	.htm	
	//www.coursera.org/learn/cry			
I	6 7	•		

Course Code: CBC250 1	Course Title: Smart Contract and Solidity Lab Type of Course: Integrated	L- T- P- C	0-0-2-1
Version No.	1		



	REACH GREATER HEIGHTS					
Course	Basics of Mathematics and a	any Programming	g Language			
Pre-						
requisite						
S						
- Anti-	NONE					
requisit	NONE					
-						
es						
	Solidity is an object-oriented					
Course	Smart contracts are program	-				
Descripti	Ethereum state. Solidity is a	-				
on	Virtual Machine (EVM). It	t is influenced b	by C++, Python and Java	Script. The		
	Ethereum Virtual Machine	(EVM) and asse	mbly (low level language),			
	events and logging blockchat	in emissions, sen	d vs transfer methods, scopin	ng and more		
Cours	The objective of the course i	s to familiarize t	he learners with the concept	s of Smart		
e	Contract and Solidity and a					
Objecti	Learning Techniques.					
ve						
	On successful completion of	of the course the	students shall be able to.			
	-			akahain		
Course	CO1 :Understand the funda	intentais of comp	utational Element of the Bio	OCKCHAIII		
Out	Technology					
Comes	C.O 2: Implementuser-defin	-		e not		
	possible through plain crypto	• 1				
	C.O 3: Exhibitbest practices	for designing so	lutions with smart contracts	using		
	Solidity and Remix IDE					
			Fundaments of Smart			
Module 1	Introduction to Smart	TEST-1	Contractand Solidity	12Sessio		
	Contract		Contractanta Sonarty	ns		
Topics: A	Simple Smart Contract,	Blockchain Bas	ics The Ethereum Virtua	I Machine		
—	, Remix, npm					
0	Oocker, Binary Packages, Buil	ding from Source	a CMaka options			
/ Noue.js, L	ocker, Binary Fackages, Bun	unig nom sourc	e, CMake options.			
Module 2	Solidity in Depth	TEST-1	Case studies / Case let	12		
				Sessions		
Topics: La	yout of a Solidity Source Fi	ile, Structure of	a Contract, Types, Units a	nd Globally		
Available	Variables, Expressions and	Control Struc	tures, Contracts, Solidity	Assembly,		
Miscellaneo	ous, Solidity v0.5.0 Breaking	Changes				
Module 3	Contract Metadata &	Endterm lab	Implementing	14		
iniouule e	ContractABIExamApplicationsSessions					
	Specification	LXam	Applications	565510115		
Topics: Ei	ncoding of the Metadata Hash	in the Bytecode	, Usage for Automatic Inter	face		
-	and NatSpec, Usage for Sou	•	e e			
	Encoding, Types, Design Cri		•			
-	••••••		•			
	Function Selector and Argun			ypes,		
Events, JS	ON, Strict Encoding Mode, N	ion-standard Pac	cked Mode			



Week 15	Mini project: End-to-end secure message exchange with key management	Python + GPG + OpenSSL
Week 14	Network traffic capture and analysis for secure protocols	Wireshark
Week 13	Secure Email communication using GnuPG (PGP Simulation)	GnuPG
Week 12	Password hashing and brute force attack demo	John the Ripper / Hashcat
Week 11	Steganography and cryptanalysis demo	Steghide / CrypTool
Week 10	Setup secure communication using SSL/TLS	OpenSSL / Wireshark
Week 9	Digital signature creation and verification	GnuPG / Python (cryptography)
Week 8	Hashing and message digest using SHA, MD5	Python (hashlib) / OpenSSL
Week 7	Diffie-Hellman key exchange simulation	Python
Week 6	RSA key generation, encryption, and decryption	OpenSSL / Python
Week 5	AES encryption in ECB and CBC modes	OpenSSL / Python (cryptography)
Week 4	DES algorithm implementation and file encryption	OpenSSL / Python (PyCryptodome)
Week 3	Playfair and Hill Cipher encryption and decryption	Python / CrypTool
Week 2	Implementation of Caesar and Monoalphabetic ciphers	Python / CrypTool
1	encryption techniques	(PyCryptodome)
Week	Introduction to cryptographic tools and basic	CrypTool / Python
Week	Lab Experiment Title	Tool/Technology Used

R Open-Source Tools Overview

- CrypTool Educational tool for learning cryptography visually
- Python (PyCryptodome, hashlib, cryptography) For programmatic encryption/decryption
- OpenSSL Command-line utility for SSL, AES, RSA operations
- GnuPG For creating and verifying digital signatures and PGP
- Wireshark Packet sniffer for analyzing network-level security



T1: William Stallings, *Cryptography and Network Security: Principles and Practice*, Pearson,
7th Edition, 2017
T2: Behrouz A. Forouzan, *Cryptography and Network Security*, McGraw-Hill Education,
2nd Edition, 2011

Reference Books:

R1: Bruce Schneier, *Applied Cryptography: Protocols, Algorithms, and Source Code in C*, Wiley, 2nd Edition, 1996

R2: Douglas R. Stinson, *Cryptography: Theory and Practice*, CRC Press, 4th Edition, 2018 R3: Charlie Kaufman et al., *Network Security: Private Communication in a Public World*, Prentice Hall, 2nd Edition, 2002

R4: Christof Paar and Jan Pelzl, *Understanding Cryptography*, Springer, 2010

Web Resources:

W1: https://cryptography.io

W2: https://nvlpubs.nist.gov

W3: https://www.owasp.org

W4: https://www.tutorialspoint.com/cryptography/index.htm

W5: https://www.coursera.org/learn/crypto

| Course Code: CBC2502 | Course Title: Distributed Ledger Technology | L:T:P:C = 3:0:0:3

Version No: 1.0

Course Pre-requisites:

Anti-requisites: NIL

Course Description:

This course introduces the principles, architectures, and applications of Distributed Ledger Technology (DLT), with a special focus on blockchain systems. Students will explore consensus mechanisms, smart contracts, permissioned and permissionless ledgers, and enterprise blockchain frameworks like Hyperledger Fabric and Corda. Real-world use cases in supply chain, finance, and digital identity are emphasized.

Course Objectives:

- 1. Understand the fundamentals and types of distributed ledger technologies.
- 2. Explore blockchain architecture and consensus mechanisms.
- 3. Analyze security, scalability, and privacy in decentralized systems.
- 4. Apply DLT in enterprise and public applications through smart contracts and platforms.

Course Outcomes:



CO1 (Understand): Explain the architecture and working principles of DLT and blockchain.CO2 (Analyze): Compare consensus mechanisms and evaluate DLT use cases and limitations.CO3 (Apply): Implement smart contracts using Ethereum or Hyperledger.CO4 (Apply): Develop secure and scalable DLT applications for real-world problems.

Course Content:

Module 1: Introduction to DLT and Blockchain | No. of Sessions: 11 Distributed Ledger vs Centralized Systems, Blockchain overview, Key features of DLT (immutability, transparency, decentralization), Cryptographic primitives, Merkle trees, Hash functions, Public vs Private blockchains, Peer-to-peer networking

Module 2: Blockchain Architecture and Consensus Mechanisms | No. of Sessions: 12 Blockchain structure, Blocks and transactions, Consensus algorithms: Proof of Work, Proof of Stake, Delegated PoS, Byzantine Fault Tolerance, Forks, Block finality, Challenges in consensus, Network latency, Scalability

Module 3: Smart Contracts and DLT Frameworks | No. of Sessions: 11 Introduction to smart contracts, Ethereum architecture, Solidity basics, Hyperledger Fabric architecture and components, Chaincode in Go/Node.js, Smart contract lifecycle, Oracles and offchain data access

Module 4: Applications, Security, and Industry Use Cases | No. of Sessions: 11 DLT in supply chain, digital identity, healthcare, fintech, Security issues in blockchain: 51% attack, Sybil attacks, Double spending, Data privacy and GDPR, Case studies: IBM Food Trust, TradeLens, Digital Voting

Textbooks:

T1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 3rd Edition, 2020

T2: Melanie Swan, *Blockchain: Blueprint for a New Economy*, O'Reilly Media, 2015

Reference Books:

R1: Arshdeep Bahga and Vijay Madisetti, *Blockchain Applications: A Hands-On Approach*, VPT, 2017

R2: Andreas M. Antonopoulos and Gavin Wood, *Mastering Ethereum*, O'Reilly Media, 2018

R3: Narayan Prusty, *Building Blockchain Projects*, Packt Publishing, 2018

R4: Nitin Gaur et al., *Hands-On Blockchain for Python Developers*, Packt, 2020



Web Resources:

+:

W1: https://ethereum.org/en/developers/

W2: https://hyperledger.org/use/fabric

W3: https://www.ibm.com/blockchain

W4: https://www.blockchain-council.org/

W5: https://developer.algorand.org/

Course	Course Title: Essentials of	AI					
Code:	Type of Course: Theory		т тр				
CSE1700			L-T-P- C	3	0	0	3
			C				
Version No.	2.0						
Course Pre-	Basic knowledge of program	nming, mathem	atics, unde	ersta	ndin	g of o	lata
requisi Data	handling						
tes							
Anti-	NIL						
requisites							
Course	This course is a comprehe		•		-		
Description	learners with the fundamenta						
	with artificial intelligence	· /	0				
	individuals who are new						-
	programming concepts. It of	-			-		
	with hands-on experience in					h as 1	machine
	learning, neural networks, an				-		
Course	The objective of the cou			-		-	-
Objective	Fundamentals, Manipulate			•		-	
	Machine Learning Algorithm	ns and Build ar	nd Train Ne	eural	Ne	twork	ts for AI
	Applications.						
Course	On successful completion of			hall	be a	ble to):
Outcomes	CO 1: Apply Python Progra	-	-				
	CO 2: Build and Train Machine Learning Models						
	CO 3: Develop Deep Learni						
	CO 4: Deploy AI Solutions a	and Understand	l Ethical In	nplic	eatio	ns	
Course							
Content:		1	T				
Module 1	Introduction to Python	Assignment	Impleme	ntati	on	10.9	Sessions
	Programming for AI		mpreme			IVK	
Topics:							



Python Basics: Variables, Data Types, Operators, and Control Flow Functions, Loops, and Conditionals statements, Data Structures: Lists, Tuples, Dictionaries, Sets ,Introduction to Libraries: NumPy and Pandas for data manipulation, Basic Input/Output and File Handling Introduction to Python for AI: Libraries and Frameworks Overview

Module 2	Data Processing, Visualization	Assignment	Implementation	10 Sessions
----------	-----------------------------------	------------	----------------	-------------

Topics:

cleaning and preprocessing with Pandas,Handling missing data, outliers, and duplicates, Data transformation (Normalization, Encoding), Introduction to Matplotlib and Seaborn for Data Visualization, Exploratory Data Analysis (EDA), Visualizing datasets to understand patterns and relationships.

Module 3	Introduction to Machine	Mini -	Implementation	10 Sessions
Module 5	Learning	Project		

Topics:

What is Machine Learning? Types of ML algorithms Supervised Learning: Regression, Classification, Unsupervised Learning: Clustering, Key ML Algorithms: Linear Regression, Decision Trees, K-Means ,Introduction to Scikit-learn library Model evaluation (Accuracy, Precision, Recall, Confusion Matrix)

Module 4	Neural Networks	Quiz	Implementation	10 Sessions
	and Deep			
	Learning			

Topics:

Introduction to Neural Networks and Deep Learning, Perceptron Model and Backpropagation

Deep Neural Networks and Activation Functions, Introduction to TensorFlow and Keras, Building and Training Neural Networks for Image and Text Classification, Overview of Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs)

Targeted Application & Tools that can be used: Applications:

- 1. **Data Preprocessing**: Clean and manipulate data from various sources such as CSV, Excel, SQL databases, and APIs.
- 2. Exploratory Data Analysis (EDA): Gain insights into datasets by identifying trends, patterns, and outliers.
- 3. **Predictive Modeling**: Build models for classification (e.g., spam detection) and regression (e.g., house price prediction).
- 4. **Clustering**: Group data into clusters for unsupervised learning tasks (e.g., customer segmentation).
- 5. **Model Evaluation**: Assess model performance using appropriate metrics such as accuracy, precision, recall, and F1-score.

Tools:

• **Pandas**: For data manipulation and cleaning (e.g., handling missing values, merging datasets).



- **NumPy**: For numerical operations and working with arrays and matrices.
- **Matplotlib**: For creating static, animated, and interactive visualizations.
- Seaborn: For advanced data visualizations (e.g., heatmaps, pair plots).
- **Plotly**: For creating interactive visualizations, especially useful for large datasets.
- Scikit-learn: The go-to library for implementing machine learning algorithms (e.g., linear regression, decision trees, k-means clustering).
- **XGBoost**: For advanced gradient boosting models, particularly for large-scale machine learning tasks.
- **TensorFlow** (for deep learning in Module 4): A powerful open-source library for building machine learning and deep learning models.
- **Keras**: High-level neural network API, built on top of TensorFlow, to easily create deep learning models.

NLTK: The Natural Language Toolkit for various text processing tasks like tokenization, stemming, and part-of-speech tagging.

spaCy: A fast NLP library for advanced NLP tasks such as named entity recognition and dependency parsing.

Transformers (by Hugging Face): A powerful library for using pre-trained Transformer-based models like BERT, GPT, and others for advanced NLP tasks.

Text Book(s):

T1: Essentials of Python for Artificial Intelligence and Machine Learning by Pramod Gupta and Anupam Bagchi

Reference(s):

- "Artificial Intelligence with Python" Prateek Joshi
- "Python Machine Learning" Sebastian Raschka & Vahid Mirjalili
- "Hands-On Artificial Intelligence with Python" Teet Straus
- "Deep Learning for Coders with Fastai and PyTorch" Jeremy Howard & Sylvain Gugger

Course Code: CBC2504	Block Chain Architecture Design	L-T-P- C	3	0	0	3
Version No.	1.0					
Course Pre- requisites	CBC 1701 Introduction to Block Chain Platforms					
Anti-requisites	NIL					
Course Description	This course introduces the core concepts and arc It covers decentralized ledger structures, consen and cryptographic techniques. Students will analy platforms, including Ethereum and Hyperledge design, scalability, and security of blockchain- case studies illustrate blockchain's transformativ	sus algorit ze public a er. The co based app	hms, s and priv ourse e olicatio	mart vate mph	t cor bloc nasiz Real	ntracts, kchain es the -world



	Understand the fundamental concepts, architecture, and components of blockchain technology.
Course Objectives	 Analyze various consensus mechanisms and evaluate their role in securing blockchain networks. Design and develop smart contracts and decentralized applications using suitable blockchain platforms. Evaluate the scalability, security, and real-world applicability of blockchain solutions across domains.
Course Out Comes	 CO1 – Understand the fundamental architecture and core components of blockchain systems, including data structures, cryptographic principles, and peer-to-peer networks. CO2 – Analyze the design and implementation of consensus mechanisms and assess their impact on decentralization, performance, and security. CO3 – Analyze the architectural differences and scalability approaches of leading blockchain platforms like Ethereum, Hyperledger Fabric, and Corda. CO4 – Analyze the design patterns, security considerations, and architectural trade-offs in developing robust and scalable blockchain solutions.

Course Content:

Module 1	Fundamentals of Blockchain		Understand	No. of
iviouule i	Architecture		Onder stand	Sessions: 10
Introduction to	blockchain, Distributed ledger tech	nolog	gy, Blockchain str	ucture, Blocks and
chaining, Merk	le trees, Hash functions, Digital signat	ures,	Public and private	keys, P2P networks
Cryptographic	fundamentals.			
Module 2	Consensus Mechanisms and		A malayaa	No. of
viouule 2	Protocol Design		Analyse	Sessions: 12
Consensus prin	nciples, Proof of Work (PoW), Proof	of S	Stake (PoS), Practi	cal Byzantine Fault
Tolerance (PB)	FT), Delegated PoS, Proof of Authorit	ty, B	lock propagation, H	Forking and finality
Impact on dece	ntralization and security.			
Comparative Blockchain			No. of	
Module 3	Platform Architectures			Sessions: 11
Ethereum arch	itecture, Smart contract execution wi	ith E	VM, Hyperledger	Fabric components
Channel archi	tecture and endorsement policy, Co	orda	design principles,	Platform use-case
suitability, Scal	ability and performance consideration	s.		
	Design Patterns, Security, and			No. of
Module 4	Scalability in Blockchain			Sessions: 12
Systems				Sessions: 12
		4	e-offs Privacy la	ware and off shair
Blockchain so	lution design process, Architectural	trad	ie onis, i nivacy na	yers and on-chain
	lution design process, Architectural ding, Sidechains, Layer 2 solutions, S		•	•



Textbook(s):

- 4. Daniel Drescher, "Blockchain Basics: A Non-Technical Introduction in 25 Steps", Apress, 2017.
- **5.** Imran Bashir, "Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications", Packt Publishing, 2023 (4th Edition).

References:

R1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press, 2016.

R2. Sina Esfandyari, "Architecting Blockchain Solutions: A Guide to Design and Development", Packt Publishing, 2021.

R3. Mouftah H.T., Al-Anbagi I. (Eds.), "Blockchain for Cybersecurity and Privacy: Architectures and Applications", Springer, 2020.

R4. Rajeev Agrawal, Abhishek Kumar, Kamlesh Dutta, "Blockchain Technology: Architecture and Applications", CRC Press, 2021.

Weblinks

IBM Blockchain Architecture Overview

Mttps://www.ibm.com/blockchain/architecture

Hyperledger Fabric Documentation (Blockchain Architecture Focus) <u>https://hyperledger-fabric.readthedocs.io/en/release-2.2/</u>

Blockchain Technology Overview – NIST Report Marcon Marco Marco

Mastering Blockchain GitHub Resources by Imran Bashir Mastering-Blockchain-Third-Edition

Blockchain Hub – Educational Resources on Blockchain <u>https://blockchainhub.net/</u>

CoinDesk – Blockchain 101 Guides

Mattheway Arrow Mathematical Structure Structure



Course Code:	Course Title: Mobile A	Applications and						
	Development	The second s	L- T-P- C	2	0	0	2	
CSE2508	-		L- 1-1 - C	2	U	U	2	
	Type of Course: Theor	У						
Version No.	2.0							
Course Pre-	CSE3514 Object Orient	ed Programming Using J	ava					
requisites								
Anti-requisites	NIL	IL						
Course		ne basics of android platfo				•		
Description	-	s to develop mobile appli					-	
		ving phone material comp le GUI applications and v						
		opics include user interfac						
		dling; network technique	-				-	
	_	d application framework a			-			
	management, Screen resolution, Touch interface, Store data on the device.							
Course	The objective of the cou	arse is to familiarize the le	earners with	the c	conc	epts o	of	
Objective	Mobile Applications and Development as mentioned above and attain							
Employability Skills through Experiential Learning Techniques.								
Course	On successful completion of the course the students shall be able to:							
Outcomes	1. Discuss the fundamentals of mobile application development and its							
	architecture. (Comprehension)							
	2. Illustrate mobile applications with appropriate android view. (Application)							
	3. Demonstrate the use of services, broadcast receiver, Notifications and content							
	provider.(Application)							
	4. Apply data persistence techniques, to perform CRUD operations. (Application)							
	5. Use advanced concepts for mobile application development. (Application)							
Course								
Content:								
	Introduction and							
Module 1	Architecture of	Assignment	Simulation	/Dat	a	5 Se	ssions	
	Android		Analysis					
Topics:								
Android: Histor Life cycle.	y and features, Architectu	re, Development Tools, A	ndroid Debu	ıg Bı	idge	e (AD	B), and	
Module 2	User Interfaces, Intent	Term paper/Assignment	Simulation	/Data	a	6 Se	ssions	



	•	
	DICS:	
10	pics.	
	L	

Views, Layout, Menu, Intent and Fragments.

Module 3	Components of Android	Term paper/A	Assignment	ents of Term paper/Assignment Simulation/Data Analysis		6 Sessions
Topics:						
Activities, Ser	vices, Broadcast rec	eivers, Content provi	ders, User N	avigation		
Module 4	Notifications and Data Persistence	Term paper/Assignment	Simulati Analysis		6 Ses	sions
Topics:						
Notification, S	Shared Preferences, S	QLite database, And	roid Room	with a View,	Firebas	e.
Module 5	Advance App Development	Term paper/Assignment	Simula Analysi	tion/Data s	7 Se	ssions
Topics:	I		I		I	
Applications:	lication & Tools th	al can de used:				
	droid Applications					
	5 Applications					
Cross Plat	form mobile Apps					
	form mobile Apps b Applications					
	b Applications					
Mobile we Text Book(s):	b Applications	lication Developmen	t - Black Bo	ok", dreamt	echpress	3
Mobile we Text Book(s): T1. Pradeep ke	b Applications	lication Developmen			-	
Mobile we Text Book(s): T1. Pradeep ke T2. Barry Bur	b Applications othari "Android App d (Author), "Android	-	pment" ALl	L – IN – ON	E FOR I	
Mobile we Text Book(s): T1. Pradeep ke T2. Barry Bur T3. Jeff Mche	eb Applications othari "Android App d (Author), "Android rter (Author),Scott G	Application Develo	pment" ALl fessional m	L – IN – ON	E FOR I	
Mobile we Text Book(s): T1. Pradeep ke T2. Barry Bur T3. Jeff Mche Development'	b Applications othari "Android App d (Author), "Android rter (Author),Scott G ' paperback, Wrox - `	d Application Develo	pment" ALl fessional m .imited	L – IN – ON obile Applic	E FOR I	Dummies
Mobile we Text Book(s): T1. Pradeep ke T2. Barry Bur T3. Jeff Mche Development'	eb Applications othari "Android App d (Author), "Android rter (Author),Scott G ' paperback, Wrox - g Lee (Author) "Begi	d Application Develo iowell (Author), "Pro Wiley India Private L	pment" ALl fessional m .imited	L – IN – ON obile Applic	E FOR I	Dummies



Reference(s):

1. Bill Phillips, Chris Stewart, and Kristin Marsicano (Author) "Android Programming" 3rd edition,

2017. The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 5. The Big Nerd Ranch Guide, by"

2. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.

3. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD

Publishers, 2015.

4. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt

Ltd, 2016. ISBN-13: 978-8126565580

5. Anubhav Pradhan, Anil V Deshpande, "Composing Mobile Apps" using Android, Wiley 2014,

ISBN: 978-81-265-4660-2

6. Reto Meier "Professional Android Application Development"

E-Resources: https://puniversity.informaticsglobal.com/login Or http://182.72.188.193/

Catalogue	
prepared by	
Recommended	
by the Board of	
Studies on	
Date of	
Approval by the	
Academic	
Council	
Approval by the Academic	

Course Code: CBC2503 | Course Title: Distributed Ledger Technology Laboratory | L:T:P:C = 0:0:2:1

| Version 1.0 |

Course Pre-requisites: Anti-requisites: NIL



Course Description:

This laboratory course provides hands-on experience in working with blockchain-based distributed ledger platforms such as Ethereum and Hyperledger. Students will learn to develop, deploy, and test smart contracts, create blockchain networks, and simulate real-world DLT use cases using open-source tools.

Course Objectives:

- 1. To provide practical understanding of blockchain platforms like Ethereum and Hyperledger.
- 2. To develop and test smart contracts using Solidity and Chaincode.
- 3. To simulate peer-to-peer blockchain networks and transaction flows.
- 4. To integrate DLT with applications for real-world solutions.

Course Outcomes:

CO1: Understand the setup and configuration of blockchain environments.

CO2: Apply skills to write, deploy, and test smart contracts on Ethereum.

CO3: Implement and manage blockchain networks using Hyperledger Fabric.

CO4: Apply integration and debugging techniques to test and deploy decentralized applications.

Lab Experiments (15 Weeks):

- 1. Installation and setup of blockchain development environment (Tools: Node.js, Ganache, MetaMask, Remix IDE)
- 2. Creating a local Ethereum blockchain using Ganache CLI (Tool: Ganache CLI)
- 3. Creating Ethereum wallets and sending Ether between accounts (Tools: MetaMask, Web3.js)
- 4. Writing and deploying a basic smart contract in Solidity (Tool: Remix IDE)
- 5. Solidity programming: control structures, data types, modifiers (Tool: Remix IDE)
- 6. Deploying smart contracts on Ganache and interacting with Web3.js (Tools: Ganache, Web3.js, Node.js)
- 7. Smart contract functions: Events, state variables, and mappings (Tool: Remix IDE)
- 8. Testing smart contracts using Truffle framework (Tools: Truffle, Mocha/Chai for test cases)
- 9. Setup of a Hyperledger Fabric blockchain network using Docker



(Tools: Hyperledger Fabric, Docker)

- 10. Writing and deploying Chaincode (smart contracts) on Fabric (Languages: Go or Node.js)
- 11. Invoking transactions and querying the ledger in Fabric (Tools: Fabric CLI or SDK)
- 12. Developing a basic asset transfer DApp on Ethereum (Tools: Solidity, Web3.js, HTML/JS frontend)
- 13. Smart contract security: Detecting vulnerabilities (e.g., reentrancy) (Tools: MythX, Slither)
- 14. End-to-end DApp project integration and deployment (Tools: Truffle/Hardhat + Web3.js + frontend)
- 15. Mini Project Demo: Real-world use case using DLT (group work) (Students choose Ethereum or Fabric for implementation)

Textbooks:

T1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 3rd Edition, 2020

T2: Melanie Swan, *Blockchain: Blueprint for a New Economy*, O'Reilly Media, 2015

Reference Books:

R1: Arshdeep Bahga and Vijay Madisetti, *Blockchain Applications: A Hands-On Approach*, VPT, 2017

- R2: Andreas M. Antonopoulos and Gavin Wood, *Mastering Ethereum*, O'Reilly Media, 2018
- R3: Narayan Prusty, *Building Blockchain Projects*, Packt Publishing, 2018
- R4: Nitin Gaur et al., *Hands-On Blockchain for Python Developers*, Packt, 2020

Web Resources:

- W1: https://ethereum.org/en/developers/
- W2: https://hyperledger.org/use/fabric
- W3: https://www.ibm.com/blockchain
- W4: https://www.blockchain-council.org/
- W5: https://developer.algorand.org/



Course Code:	Course Title: Mobile A	Applications and					
CSE2509	Development Lab		L- T-P- C	0	0	4	2
	Type of Course: Lab						
Version No.	2.0		1				1
Course Pre-	CSE1514 Object Orient	ed Programming using Ja	va				
requisites							
Anti-requisites	NIL	IL					
Course	The course provides har	nds-on experience in desig	gning, devel	opin	g, ar	ld dep	loying
Description	mobile applications for	Android and iOS platform	ns. Students	will	wor	k with	nativo
	development framework	ks such as Android Studio	(Java/Kotli	n) aı	nd X	code (Swift)
	as well as explore cross	-platform tools like Flutte	r or React N	lativ	e.		
Course	The objective of the cou	urse is to develop Native a	nd Cross-Pl	atfo	rm N	Iobile	
Objective		eractive and Responsive U					
U	Backend Services and APIs, implement State Management and Performance						
	Optimization, ensure Mobile App Security and Data Protection						
Course	On successful completion	on of the course the studer	nts shall be a	able	to:		
Outcomes	On successful completion of the course the students shall be able to:						
	1. Develop Functional Mobile Applications						
	2. Design and Implement Interactive UIs						
	3. Integrate Cloud Services and APIs						
	4. Integrate Backend Sy	Backend Systems and Data Management					
	5. Deploy, Publish, and	Maintain advanced Mobi	le Applicati	on			
Course							
Content:							
	Introduction and		Simulation	/Dat	0		
Module 1	Architecture of	Assignment	Analysis	Dat	a	8 Ses	ssions
	Android		¹ marysis				
1.a. Design an ap	p to read user inputs usir	g edit text and display the	e result of ar	rithm	netic	opera	tions
using toast messa		6 1 7				I	
1.b. Create an an	droid app to calculate the	current age of yourself, s	elect your D	OB	usin	g date	•
picker.	11		5			0	
2 Design an ann	to input your personal in	formation. Use an autocor	mnlete text	view	, to e	elect	Vollr
2. Design an app place of birth.	to input your personal in			V ICW	10 5	cicci .	your
r							
	User Interfaces, Intent	Term paper/Assignment	Simulation	/Dat	a	13	
Module 2	and Fragments	Paper/ 1001/11001	Analysis	Dut	u	Sessi	ons
	und i ruginonito		4 Mar y 515			56991	0115



3. a. Design an app to select elective course using spinner view and on click of the display button,

toast your ID and selected elective course.

3. b. Design a restaurant menu app to print the total amount of orders.

Module 3	Components of	Term paper/Assignment	Simulation/Data	13
wiodule 5	Android		Analysis	Sessions

4. Develop an android app that uses intent to maintain the following scenario.

Check the eligibility criteria for voting. Input the Aadhar no., Name & age in the first activity. If the age is above 18, display the voter's detail in the second activity. Else, display, "You are not eligible to vote" in the second Activity.

5. Demonstrate the use of fragment with list of buttons representing various colors, and on click of these buttons, the appropriate color is filled in the next fragment. Create an Android application to input the vitals of a person (temperature, BP). If the vitals are abnormal, give proper notification to the user.

6. Create an android app to for movie ticket booking. Save the user name of the customer using shared preferences. After completion of booking, retrieve the username from the shared preferences and print the ticket details.

Module 4	Notifications	Term	Simulation/Data	13 Sessions
	and Data	paper/Assignment	Analysis	
	Persistence			

7. Create an android application to manage the details of students' database using SQLite.Use necessary UI components, which perform the operations such as insertion, modification, removal and

view.Presidency University needs an APP for Admission eligibility checking for students, for that you need to take the following information from the Student: registration ID, physics, chemistry and mathematics marks (PCM), fees is allotted as below criteria.

PCM (Total marks %) Fee concession

90 above 80 %

70 to 89 60 %

Below 69 % no concession

On click on the button "Registration" details should be stored in the database using SQLite. Create button DISPLAY ALL (full students list) on click on the button it should display the students list per the fee

concession.



8. A company need to design an app that plays soft music automatically in the background. Create an app to achieve this functionality.

9. Create an android application such that your view object in the Activity can be Animated with fade-in effect. Create an appropriate XML file named fade-in and write the application to perform the property animation.

Module 5	Advance App	Term	Simulation/Data	13 Sessions
	Development	paper/Assignment	Analysis	

10. Demonstrate how to send SMS and email.

11. Create an android application to transfer a file using WiFi. Create an android application "Where am I" with an Activity that uses the GPS Location provider to find the device's last known location.

Targeted Application & Tools that can be used:

Applications:

- 1. Native Android Applications (Java/Kotlin)
- Android Mobile Apps built for Android smartphones and tablets using Java or Kotlin programming languages.
- Target audience: Android users.
- 2. Native iOS Applications (Swift)
- iOS Mobile Apps designed for iPhone and iPad using Swift.
- Target audience: iOS users (Apple ecosystem).
- 3. Cross-Platform Mobile Apps (Flutter, React Native)
- Cross-platform apps designed to run on both Android and iOS from a single codebase using frameworks like Flutter or React Native.
- Target audience: Users on both Android and iOS platforms.
- 4. Mobile Web Applications (Progressive Web Apps PWA)
- Mobile-optimized web applications using HTML5, CSS3, and JavaScript that run in a browser with native-like functionality (offline support, push notifications).
- \circ $\;$ Target audience: Users accessing apps via mobile browsers.

Development Tools and Frameworks

- 1. Integrated Development Environments (IDEs)
- Android Studio (for Android): The official IDE for Android development, supporting Java, Kotlin, and Android SDK.



- Xcode (for iOS): The official IDE for iOS development with Swift and Objective-C, providing a comprehensive suite of development tools for iPhone/iPad applications.
- Visual Studio Code (VS Code): Lightweight IDE for working with Flutter, React Native, and web development projects.
- 2. Cross-Platform Development Frameworks
- Flutter: Open-source UI framework by Google for building natively compiled applications for mobile, web, and desktop from a single codebase.
- React Native: Open-source framework developed by Facebook for building cross-platform apps with JavaScript and React.
- 3. Backend & Cloud Tools
- Firebase: Google's backend-as-a-service (BaaS) platform offering authentication, real-time databases, cloud storage, and push notifications for mobile apps.
- AWS Amplify: Cloud platform for backend services (API, storage, authentication) and mobile deployment.
- SQLite / Realm: Local storage solutions for mobile apps to manage data storage and retrieval on-device.
- 4. Mobile App Testing and Debugging Tools
- Android Emulator (for Android): A virtual device to run and test Android apps without needing physical devices.
- Xcode Simulator (for iOS): A tool to simulate different iOS devices and test apps during development.
- Appium: Open-source tool for automated testing across native, hybrid, and mobile web applications.
- 5. Version Control and Collaboration
- Git: Version control system for managing code changes and collaborating with teams.
- GitHub / GitLab / Bitbucket: Online platforms for hosting Git repositories, collaboration, and version control management.
- 6. Mobile App Deployment Tools
- Google Play Console: For managing Android app publishing, distribution, and monitoring.
- Apple App Store Connect: For managing iOS app submissions, reviews, and releases on the Apple App Store.
- 7. UI/UX Design Tools
- Figma / Adobe XD: Tools for UI/UX design and wireframing to create the visual elements of mobile applications before development.



• Sketch: Vector-based design tool for iOS UI design and prototyping

Text Book(s):

T1. Pradeep kothari "Android Application Development - Black Book", dreamtechpress

T2. Barry Burd (Author), "Android Application Development" ALL – IN – ONE FOR Dummies

T3. Jeff Mcherter (Author), Scott Gowell (Author), "Professional mobile Application

Development" paperback, Wrox - Wiley India Private Limited

T4. Wei-Meng Lee (Author) "Beginning Android Application Development" Wrox – Wiley

India Private Limited

Reference(s):

1. Bill Phillips, Chris Stewart, and Kristin Marsicano (Author) "Android Programming" 3rd edition,

2017. The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 5. The Big Nerd Ranch Guide, by"

2. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.

3. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD

Publishers, 2015.

4. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt

Ltd, 2016. ISBN-13: 978-8126565580

5. Anubhav Pradhan, Anil V Deshpande, "Composing Mobile Apps" using Android, Wiley 2014,

ISBN: 978-81-265-4660-2

6. Reto Meier "Professional Android Application Development"

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Catalogue prepared by



Recommended	
by the Board of	
Studies on	
Date of	
Approval by the	
Academic	
Council	

Course Code:	Course Title: Essentials of AI LAB	L- T-P-		0		
CSE1701	Type of Course: Lab	С	0	0	4	2
Version No.	2.0	·				
Course	Basic Java Programming Knowledge, Mathema	atics: Linear Alg	ebra	and	Probal	bility,
Prerequisites	Basic Data Structures and Algorithms, Familian	rity with Librarie	es an	d To	ols,	
	Understanding of Basic Machine Learning Con	ncepts.				
Anti-requisites	NIL					
Course	This course introduces students to the essential	l concepts and te	chni	ques	ofAr	tificial
Description	Intelligence (AI) with a focus on practical imple	ementation using	Pyth	on. S	Studen	ts will
	explore core AI topics such as search algorithm	ns, knowledge rej	prese	ntati	on, m	achine
	learning, and neural networks, while gaining	proficiency in u	ısing	pop	oular F	ython
	libraries like NumPy, pandas, scikit-learn, and	d TensorFlow. Th	nroug	gh a	series	of lab
	exercises and projects, students will apply AI principles to solve real-world problems,					
	develop intelligent applications, and understand how AI systems function at a					
	foundational level.					
Course	The primary objectives of the course are to Gain Proficiency in AI Concepts and					
Objective	Python Implementation, Develop and Implement Machine Learning Models,					
	Understand and Build Neural Networks, Apply AI to Real-World Problems					
0		1 4 1 11 1 1. 1	1			
Course	On successful completion of the course the students shall be able to:					
Outcomes	1. Proficiency in Implementing AI Algorithms Using Python					
	2. Ability to Build and Evaluate Machine Learning Models					
	3. Hands-on Experience with Neural Networks and Deep Learning					
	4. Practical Application of AI to Solve Real-World Problems					
Course						
Content:						
				8.9	Sessio	ns
Module 1	Introduction to AI and Assignment mp	olementation		U K		
	Python for AI					
Lab Assignment	<i>1: Setting Up the Python Environment</i>					
6 61 7						



- **Objective:** Get familiar with setting up a Python environment for AI projects.
- Tasks:
 - 1. Install Python, Anaconda, and Jupyter Notebook.
 - 2. Set up a virtual environment for AI development.
 - 3. Install essential Python libraries: numpy, pandas, matplotlib, and scikit-learn.
 - 4. Write and execute simple Python code to verify installation (e.g., print a "Hello AI" message).

Lab Assignment 2: Basic Python Programming for AI

- **Objective:** Understand and practice the basic Python syntax and data structures used in AI.
- Tasks:
 - 1. Write Python code to work with basic data types (integer, float, string, boolean).
 - 2. Implement and manipulate Python lists, tuples, sets, and dictionaries.
 - 3. Create basic control flow structures: if-else, for loops, while loops.
 - 4. Use functions and lambda functions to solve small AI-related problems, such as calculating factorial or Fibonacci numbers.

Lab Assignment 3: Data Exploration and Preprocessing

- **Objective:** Learn how to work with data for AI models.
- Tasks:
 - 1. Load a dataset (e.g., Titanic or Iris dataset) using pandas.
 - 2. Clean the dataset by handling missing values, removing duplicates, and converting data types if needed.
 - 3. Explore the dataset by visualizing it using matplotlib and seaborn.
 - 4. Perform basic data preprocessing tasks such as feature scaling, encoding categorical variables, and splitting data into training and testing sets.

Module 2	Data Processing, Visualization	Assignment Implementation		8 Sessions	
Lab Assignment 1: Data Preprocessing with Pandas					

Objective:

Learn the fundamentals of data preprocessing, including cleaning, handling missing values, and performing basic transformations using **Pandas**.

Tasks:

1. Load and Inspect the Dataset:

- Load a dataset (e.g., Iris, Titanic, Wine Quality dataset) using pandas.read_csv() or pandas.read_excel().
- Inspect the first few rows of the dataset using .head() and check basic information using .info().

2. Handle Missing Values:

- Identify missing values in the dataset using .isnull() or .isna().
- Handle missing data by imputing with mean, median, or mode using SimpleImputer from sklearn, or remove rows with missing data using .dropna().

3. Data Transformation:

• Convert categorical variables to numerical values using one-hot encoding or label encoding.



• Normalize/standardize numerical columns using StandardScaler or MinMaxScaler from sklearn.

4. Subset and Filter Data:

- Create subsets based on certain conditions (e.g., select rows where a specific feature value is greater than a threshold).
- Filter outliers from numerical data using interquartile range (IQR).

Lab Assignment 2: Data Aggregation and Grouping with Pandas

Objective:

Master aggregation and grouping techniques using **Pandas** for summarizing data. *Tasks:*

1. Group Data by Category:

- Group data by one or more categorical features (e.g., "class" in the Iris dataset or "embarked" in Titanic dataset).
- Use .groupby() to calculate aggregate statistics such as mean, median, sum, and count.

2. Pivot Tables:

- Create a pivot table to summarize data (e.g., aggregate the average age of passengers in the Titanic dataset by class and gender).
- Use .pivot_table() to perform multi-dimensional aggregation.

3. Data Aggregation and Custom Functions:

• Apply custom aggregation functions to the grouped data (e.g., calculate custom metrics or perform complex transformations within each group).

4. Sorting and Ranking Data:

- Sort the dataset by multiple columns (e.g., sorting by "age" or "fare").
- Rank data based on specific metrics (e.g., assign ranks to passengers by fare in the Titanic dataset).

Lab Assignment 3: Data Visualization with Matplotlib and Seaborn

Objective:

Learn to visualize datasets using **Matplotlib** and **Seaborn** for better understanding and insights. *Tasks:*

1. Basic Plotting with Matplotlib:

- Create simple plots like line plots, bar plots, and histograms using Matplotlib.
- Customize the plots by setting titles, labels, and legends.
- Create scatter plots to visualize relationships between two variables.

2. Advanced Plotting with Seaborn:

- Use **Seaborn** to create advanced visualizations like pair plots, heatmaps, box plots, and violin plots.
- Customize visualizations with color palettes, styling, and themes.
- Create a correlation heatmap to visualize correlations between features in the dataset.

3. Distribution Visualizations:

• Plot distributions of continuous variables using **Seaborn's** distplot() or kdeplot().



• Create bar plots for categorical variables to understand their frequency distribution.

4. Multi-Plot Grid Layouts:

• Use **Matplotlib's** subplots() function to create multiple plots in a grid layout for comparison (e.g., scatter plot and histogram in the same figure).

Lab Assignment 4: Visualizing Relationships and Feature Importance

Objective:

Understand how to visualize relationships between features and evaluate feature importance for predictive models.

Tasks:

1. Scatter Plot Matrix:

- Use **Seaborn's** pairplot() to create a scatter plot matrix to visualize the relationships between multiple features.
- Analyze the pairwise relationships between features and identify any patterns or correlations.

2. Heatmap of Correlation Matrix:

- Use **Pandas** to calculate the correlation matrix of numeric features.
- Visualize the correlation matrix using **Seaborn's** heatmap() to understand feature correlations and multicollinearity.

3. Feature Importance from Models:

- Train a decision tree or random forest model using **scikit-learn** on a dataset (e.g., **Iris** or **Titanic**).
- Visualize feature importance using a bar chart to understand which features have the most impact on the model.

4. Visualizing Predictions vs. Actual Values:

- For regression tasks, visualize the predicted values against the actual values using a scatter plot.
- For classification tasks, visualize the classification results with a confusion matrix.

Lab Assignment 5: Time Series Data Visualization and Processing

Objective:

Learn how to process and visualize time series data, which is common in AI applications like forecasting and trend analysis.

Tasks:

1. Load and Preprocess Time Series Data:

- Load a time series dataset (e.g., stock market data, weather data).
- Parse dates properly and set the date column as the index using pd.to_datetime() and .set_index().

2. Plot Time Series Data:

- Plot a time series line chart using **Matplotlib** to visualize trends over time.
- Create rolling averages (e.g., 7-day, 30-day) to smooth out short-term fluctuations in the time series data.



3. Seasonal Decomposition of Time Series:

- Use **statsmodels** to decompose a time series into seasonal, trend, and residual components.
- Visualize the decomposed components to understand seasonal variations.

4. Forecasting with Simple Models:

- Use simple forecasting models (e.g., moving average, ARIMA) to predict future values.
- Visualize the forecasted data along with actual historical data.

Modulo 3	Introduction to Machine	Assignments	Implementation	8 Sessions
Module 3	Learning			

Lab Assignment 3: Implementing Linear Regression

- Tasks:
 - 1. Load a real-world dataset (e.g., **Boston Housing Price** dataset).
 - 2. Train a Linear Regression model using LinearRegression() from scikit-learn.
 - 3. Evaluate the model using Mean Squared Error (MSE) and R-squared Score.
 - 4. Visualize the regression line using Matplotlib.

Lab Assignment 4: Logistic Regression for Classification

- Tasks:
 - 1. Load the Iris or Breast Cancer dataset.
 - 2. Preprocess the dataset (handle missing values, encode categorical variables, scale data).
 - 3. Train a Logistic Regression model using LogisticRegression().
 - 4. Evaluate performance using Accuracy, Precision, Recall, F1-score.
 - 5. Plot the **Confusion Matrix** and **ROC Curve**.

Lab Assignment 5: Implementing K-Nearest Neighbors (KNN)

- Tasks:
 - 1. Load the **Iris dataset** and split it into training and testing sets.
 - 2. Train a KNN classifier using KNeighborsClassifier().
 - 3. Experiment with different values of **K** and evaluate performance.
 - 4. Visualize decision boundaries using a scatter plot.

Lab Assignment 6: Decision Trees and Random Forests

- Tasks:
 - 1. Train a **Decision Tree classifier** on the Titanic dataset.
 - 2. Visualize the tree structure using plot_tree().
 - 3. Train a Random Forest classifier and compare performance with the decision tree.
 - 4. Determine the **feature importance** using feature_importances_.



26.2.2.4				
Module 4	Neural Networks	Quiz	Implementation	6 Sessions
	and Deep Learning			
Lab Assi	gnment 7: Introduction t	o Perceptron	and Activation Functions	
Tasks:				
	nt a single-layer percep	tron using N	umPv	
-	perceptron to classify A	-	•	
		· · ·	s (Sigmoid, ReLU, Tanh).	
-	e decision boundaries.		s (Signold, Rello, Tulli).	
i. vibuuliz				
 Lab Assi	gnment 8: Building a Sir	nple Neural I	Network with Keras	
Tasks:				
1. Load the	MNIST dataset from k	eras.datasets.		
2. Preproce	ss the data (normalize pi	xel values, re	shape input).	
3. Create a	fully connected neural	network usir	ng Sequential API.	
4. Train and	d evaluate the model usir	ng categorica	l cross-entropy loss and ac	curacy.
Lab Assignment	9: Implementing CNN f	rom Scratch		
Tasks:				
1. Load the	CIFAR-10 dataset.			
2. Build a C	CNN with Conv2D, Max	Pooling2D,	Flatten, Dense, Dropout lay	yers.
	m optimizer and catego	0	· · ·	, ,
	d visualize loss/accuracy		10	
_				
Lab Assignment	10: Image Augmentation	n & Regulariz	zation	
Tasks:				
	ata augmentation (rotati	ion, zoom, fli	pping) using ImageDataGen	erator.

- Add dropout and batch normalization to prevent overfitting.
- 3. Compare model performance with and without augmentation.

Lab Assignment 11: Transfer Learning with Pre-trained Models

Tasks:

- 1. Use VGG16 or ResNet50 pre-trained on ImageNet.
- 2. Replace the output layer to classify **new images**.
- 3. Freeze earlier layers and fine-tune deeper layers.
- 4. Evaluate the model on a custom **dataset (e.g., Cats vs. Dogs)**.



Lab Assignment 12: Implementing RNN for Text Classification

Tasks:

- 1. Load IMDB movie reviews dataset from keras.datasets.
- 2. Preprocess text (tokenization, padding sequences).
- 3. Build an RNN with Embedding, SimpleRNN, Dense layers.
- 4. Train and evaluate the model.

Lab Assignment 13: Building an LSTM for Time Series Prediction

Tasks:

- 1. Load a time series dataset (e.g., stock prices, temperature data).
- 2. Preprocess the data (normalize, reshape).
- 3. Build an LSTM-based model.
- 4. Predict future values and visualize trends.

Targeted Application & Tools that can be used:

Applications:

- 1. **Data Preprocessing**: Clean and manipulate data from various sources such as CSV, Excel, SQL databases, and APIs.
- Exploratory Data Analysis (EDA): Gain insights into datasets by identifying trends, patterns, and outliers.
- **Predictive Modeling**: Build models for classification (e.g., spam detection) and regression (e.g., house price prediction).
- **Clustering**: Group data into clusters for unsupervised learning tasks (e.g., customer segmentation).
- **Model Evaluation**: Assess model performance using appropriate metrics such as accuracy, precision, recall, and F1-score.

Tools:

- **Pandas**: For data manipulation and cleaning (e.g., handling missing values, merging datasets).
- NumPy: For numerical operations and working with arrays and matrices.
- Matplotlib: For creating static, animated, and interactive visualizations.
- Seaborn: For advanced data visualizations (e.g., heatmaps, pair plots).
- Plotly: For creating interactive visualizations, especially useful for large datasets.
- Scikit-learn: The go-to library for implementing machine learning algorithms (e.g., linear regression, decision trees, k-means clustering).
- **XGBoost**: For advanced gradient boosting models, particularly for large-scale machine learning tasks.
- **TensorFlow** (for deep learning in Module 4): A powerful open-source library for building machine learning and deep learning models.



• **Keras**: High-level neural network API, built on top of TensorFlow, to easily create deep learning models.

NLTK: The Natural Language Toolkit for various text processing tasks like tokenization, stemming, and part-of-speech tagging.

spaCy: A fast NLP library for advanced NLP tasks such as named entity recognition and dependency parsing.

Transformers (by Hugging Face): A powerful library for using pre-trained Transformer-based models like BERT, GPT, and others for advanced NLP tasks.

Text Book(s):

T1: Essentials of Python for Artificial Intelligence and Machine Learning by Pramod Gupta and Anupam Bagchi

Reference(s):

- 1. "Artificial Intelligence with Python" Prateek Joshi
- 2. "Python Machine Learning" Sebastian Raschka & Vahid Mirjalili
- 3. "Hands-On Artificial Intelligence with Python" Teet Straus
- 4. "Deep Learning for Coders with Fastai and PyTorch" Jeremy Howard & Sylvain Gugger

Course Code: CSE7000 Version No.	Course Title: Internship Type of Course: 1.0	L- T-P- C	_	-	-	2
Course Pre- requisites Anti-requisites	Knowledge and Skills related to all the courses studied in previous semesters.					
Course Description	NIL Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno- economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems.		see, oout ass, ing, ino- n to ills, n as used ols,			



	The objective of the course is to familiarize the learners with the concepts of				
Course Objectives	Professional Practice and attain Employability Skills through Experiential				
	Learning techniques.				
	On successful completion of this course the students shall be able to:				
	1. Identify the engineering problems related to local, regional, national or				
	global needs. (Understand)				
Course Outcomes	2. Apply appropriate techniques or modern tools for solving the intended				
	problem. (Apply)				
	3. Design the experiments as per the standards and specifications. (Analyz				
	4. Interpret the events and results for meaningful conclusions. (Evaluate)				

| Course Code: CBC2000 | Course Title: Blockchain Technology and Applications | L:T:P:C = 3:0:0:3

| Version 1.0 |

Course Pre-requisites: Basics of Computer Networks, Database Systems

Anti-requisites: NIL

Course Description:

This course introduces the core concepts of blockchain technology, including its structure, consensus algorithms, and cryptographic foundations. It explores the various applications of blockchain in sectors such as finance, healthcare, supply chain, and digital identity. Students will also understand the legal, ethical, and scalability challenges of blockchain systems.

Course Objectives:

- 1. Understand the foundational principles of blockchain technology.
- 2. Explore blockchain architecture, cryptographic elements, and consensus mechanisms.
- 3. Analyze real-world blockchain use cases and evaluate their effectiveness.
- 4. Examine privacy, scalability, legal, and governance issues in blockchain ecosystems.

Course Outcomes:

CO1 (Understand): Describe blockchain architecture, key components, and cryptographic elements.

CO2 (Analyze): Compare different types of blockchains and consensus mechanisms.

CO3 (Apply): Demonstrate blockchain use cases across various industries.

CO4 (Apply): Analyze the social, legal, and ethical implications of blockchain adoption.

Course Content:



Module 1: Introduction to Blockchain and Cryptographic Foundations | No. of Sessions: 11 Distributed systems, Introduction to Blockchain, Properties of blockchain, Cryptographic hash functions, Merkle trees, Digital signatures, Public key infrastructure (PKI), Blockchain transactions

Module 2: Blockchain Types and Consensus Mechanisms | No. of Sessions: 11 Permissioned vs Permissionless blockchains, Public vs Private vs Consortium blockchains, Bitcoin architecture, Ethereum overview, Consensus algorithms: PoW, PoS, DPoS, PBFT

Module 3: Blockchain Platforms and Applications | No. of Sessions: 12 Smart contracts and dApps, Ethereum use cases, Hyperledger Fabric, Blockchain in finance (DeFi, tokenization), Healthcare, Supply chain, Identity verification, Voting systems

Module 4: Challenges, Governance, and Future Trends | No. of Sessions: 11 Scalability and interoperability, Energy consumption, Privacy challenges, Legal and regulatory frameworks, Blockchain governance models, Emerging trends: CBDCs, NFTs, Web3, DAOs

Textbooks:

T1: Melanie Swan, *Blockchain: Blueprint for a New Economy*, O'Reilly Media, 2015 T2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 3rd Edition, 2020

Reference Books:

R1: Arshdeep Bahga, Vijay Madisetti, *Blockchain Applications: A Hands-on Approach*, VPT, 2017

R2: Andreas M. Antonopoulos, *Mastering Bitcoin*, O'Reilly Media, 2nd Edition, 2017

R3: Bettina Warburg, *Basics of Blockchain*, LTS Publishing, 2019

R4: Nitin Gaur et al., *Blockchain for Business*, Pearson Education, 2021

Web Resources:

W1: https://ethereum.org

W2: https://hyperledger.org

W3: https://bitcoin.org/en/

W4: https://blockchainhub.net

W5: https://web3.foundation



Course Code: CBC2504

Course Title: Blockchain Security and Performance **L:T:P:C** – 3:0:0:3

Course Description

This course delves into the security and performance aspects of blockchain systems. It covers consensus attacks, smart contract vulnerabilities, performance bottlenecks, and secure protocol design. Emphasis is laid on techniques to improve resilience, scalability, and privacy while preserving decentralization.

Course Objectives

- Understand blockchain-specific threats and security principles
- Analyze performance metrics in blockchain platforms
- Explore security techniques for smart contracts and consensus algorithms
- Evaluate design strategies to enhance scalability and privacy

Course Outcomes

CO1 (Understand): Identify and describe security challenges in blockchain platforms **CO2 (Analyze):** Evaluate consensus attacks and performance issues in different blockchain frameworks

blockchain frameworks

CO3 (Apply): Implement security-aware smart contracts and mitigation techniques **CO4 (Apply):** Analyze and optimize blockchain performance under diverse network loads

Course Content (45 Hours Total)

Module 1: Blockchain Security Foundations – 11 Sessions

Security principles in distributed systems, Blockchain threat models, Sybil attacks, Eclipse attacks, 51% attack, Cryptographic assumptions, Consensus vulnerabilities, Double-spending

Module 2: Smart Contract Security – 11 Sessions

Ethereum vulnerabilities, DAO attack analysis, Reentrancy, Arithmetic overflow/underflow, Front-running, Best practices in secure smart contract design, Tools for smart contract auditing

Module 3: Blockchain Performance Metrics – 11 Sessions

Performance benchmarks: latency, throughput, block size, transaction rate, Bottlenecks in scalability, Network propagation delay, Chain growth and quality, Trade-offs in performance vs security

Module 4: Enhancing Blockchain Performance and Privacy – 12 Sessions

Layer-2 scaling (State Channels, Rollups), Sharding, DAG-based architectures, ZKPs, Mixers and Privacy coins, Secure multi-party computation, Formal verification of performance



Textbooks

T1: Joseph Bonneau et al., *SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies*, IEEE Security & Privacy, 2015

T2: Imran Bashir, Mastering Blockchain, Packt Publishing, 3rd Edition, 2020

Reference Books

R1: Antonopoulos & Wood, *Mastering Ethereum*, O'Reilly MediaR2: Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press

R3: Koshy & Arvind, Blockchain Security and Performance, Springer, 2021

R4: Bonneau et al., Security Analysis of Blockchain Protocols, ACM Reviews

Web Resources

W1: <u>https://consensys.net</u>

W2: https://ethereum.org/en/developers/docs/security/

W3: https://chainsecurity.com/

W4: <u>https://cryptozombies.io</u>

W5: https://bitcoin.org/en/security

Course Code: CBC2505

Course Title: Blockchain Security and Performance lab **L:T:P:C** – 3:0:0:3

Course Description

This course delves into the security and performance aspects of blockchain systems. It covers consensus attacks, smart contract vulnerabilities, performance bottlenecks, and secure protocol design. Emphasis is laid on techniques to improve resilience, scalability, and privacy while preserving decentralization.

Course Objectives

- Understand blockchain-specific threats and security principles
- Analyze performance metrics in blockchain platforms
- Explore security techniques for smart contracts and consensus algorithms
- Evaluate design strategies to enhance scalability and privacy

Course Outcomes

CO1 (Understand): Identify and describe security challenges in blockchain platforms **CO2 (Analyze):** Evaluate consensus attacks and performance issues in different blockchain frameworks



CO3 (Apply): Implement security-aware smart contracts and mitigation techniques **CO4 (Apply):** Analyze and optimize blockchain performance under diverse network loads

Course Content (45 Hours Total)

Module 1: Blockchain Security Foundations – 11 Sessions

Security principles in distributed systems, Blockchain threat models, Sybil attacks, Eclipse attacks, 51% attack, Cryptographic assumptions, Consensus vulnerabilities, Double-spending

Module 2: Smart Contract Security – 11 Sessions

Ethereum vulnerabilities, DAO attack analysis, Reentrancy, Arithmetic overflow/underflow, Front-running, Best practices in secure smart contract design, Tools for smart contract auditing

Module 3: Blockchain Performance Metrics – 11 Sessions

Performance benchmarks: latency, throughput, block size, transaction rate, Bottlenecks in scalability, Network propagation delay, Chain growth and quality, Trade-offs in performance vs security

Module 4: Enhancing Blockchain Performance and Privacy – 12 Sessions

Layer-2 scaling (State Channels, Rollups), Sharding, DAG-based architectures, ZKPs, Mixers and Privacy coins, Secure multi-party computation, Formal verification of performance

Week	Lab Experiment Title	Tools/Platforms
1	Introduction to Blockchain Security Concepts and Tools	Ganache, MetaMask
2	Setup and Configuration of Private Ethereum Network	Geth, Truffle
3	Smart Contract Vulnerability Assessment (Reentrancy Attack)	Remix IDE, Solidity
4	Implementing Access Control in Smart Contracts	Solidity, Truffle
5	Role-based Authorization with OpenZeppelin Libraries	OpenZeppelin, Remix
6	Timestamp Manipulation Attack Analysis	Remix, MetaMask
7	Replay Attack Detection and Prevention	Hardhat, Wireshark
8	Gas Optimization Techniques for Smart Contracts	Remix IDE, Truffle
9	DoS (Denial of Service) Attack Simulation and Handling	Solidity, Ganache
10	Event Logging and Auditing in Blockchain Systems	Web3.js, Ethers.js
11	Zero Knowledge Proof (ZKP) based Smart Contract Implementation	ZoKrates, Hardhat
12	Analyzing Blockchain Performance – Throughput and Latency	Hyperledger Caliper



	REACH GREATER HEIGHTS	*MAENIC **
13	Implementing Multi-signature Wallets	Solidity, Gnosis Safe
14	Secure Orocle Integration in Plackshein	
14	Secure Oracle Integration in Blockchain	Chainlink, Hardhat
15	Mini Project Presentation – Secure & Performance-oriented Blockchain Application	Tools as per project
Text	books	
	oseph Bonneau et al., SoK: Research Perspectives and Challen, tocurrencies, IEEE Security & Privacy, 2015	ges for Bitcoin and
T2: I	mran Bashir, Mastering Blockchain, Packt Publishing, 3rd Editi	ion, 2020
Refe	rence Books	
R1: <i>A</i>	Antonopoulos & Wood, Mastering Ethereum, O'Reilly Media	
R2: 1	Narayanan et al., Bitcoin and Cryptocurrency Technologies, Prin	nceton University
Press		
R3:]	Koshy & Arvind, Blockchain Security and Performance, Spring	er, 2021
R4:]	Bonneau et al., Security Analysis of Blockchain Protocols, ACM	I Reviews
Web	Resources	
W1:	https://consensys.net	
W2:	https://ethereum.org/en/developers/docs/security/	
W3:	https://chainsecurity.com/	
W4:	https://cryptozombies.io	
W5:	https://bitcoin.org/en/security	

Course Code: CSE2510	Course Title: Competitive Programming and Problem Solving Type of Course: Program Core	L-T-P-C	0	0		
Version No.	1.0					
Course Pre- requisites	NIL					
Anti-requisites	NIL					
Course Description	The Competitive Programming and P students with efficient problem-solving skills world challenges. Starting with brute-for optimize time and space complexity using a programming, greedy algorithms, and bac platforms like CodeChef and Codeforces number theory, data structures, and algorith CP constraints and fostering a strateg	for coding co ce solutions dvanced tech ktracking. Ha helps tackle mic paradigm	ompo , stu nniqu ands prc ns. B	etitio uden ues li s-on blem y und	ns ar ts le ke d prac ns in derst	nd real- earn to ynamic tice on volving anding



	confidence to excel in competitions, technical interviews, and practical applications.
Course Out Comes	 On successful completion of the course the students shall be able to: CO1 : Understanding the issues of online platforms and Competitive Programming (CP) and developing brute force coding for commonly asked CP problems. CO2 : Analyzing the space and time complexity of brute force solutions and designing efficient solutions. CO3 : Evaluating the applicability of suitable algorithmic approaches to solve relevant CP problems. CO4: Creating efficient solutions of CP problems using the learnt algorithmic approaches.
Course Objective	The objective of the course is to familiarize the learners with the concepts of Competitive Programming and Problem Solving and attain Skill Development through Experiential Learning techniques.
Overview of Efficient (CP); revisit of comp	ction to Competitive Programming Coding for Problem Solving and CP: Introduction to competitive programming lexity analysis; introduction to online platforms such as codechef, codeforces ssion: constraints during CP online testing process and common errors such

(CP); revisit of complexity analysis; introduction to online platforms such as codechef, codeforces etc and online submission; constraints during CP, online testing process and common errors such as TLE; use of STL

Module 2: Number Theory for Problem-Solving

Use of Number Theory for problem-solving: reducing time/space complexity of brute force coding solution of Sieve Method, Inverse Module, Euclidian Method of factorization; efficient coding

for Permutation Combination; XORing based and pattern-based solutions.

Module 3: Optimizing Time & Space Using Sequential Storage

Coding for Optimizing time and Space using Sequential Storage: two pointer approach; problem-solving using arrays and strings such as rotation on sorted arrays, duplicate removal, string

matching algorithms; Kadane's algo, stacks, priority-queues and hashing based efficient coding; median based problems and alternate solutions.

Module 4: Non-Linear Data Structures

Applying Non-Linear Data Structures for real-life problems: design of efficient solutions for problems such as finding loops in a linked list, memory efficient DLL, block reversal in LL; problem solving using trees and binary trees, Catalan numbers, applications of graphs, spanning tree and path

algos for CP problems with reduced time/space complexity.

Module 5: Problem Solving using Advanced Topics

CP Problem Solving using Advanced Topics: concept of disjoint sets and their efficient representation, algorithmic approaches such as Greedy, Backtracking, Dynamic Programming and applying them for CP problems using bottom-up dynamic programming.

List of Laboratory Tasks:



- 31. You are given the finishing times of 'N' runners in a marathon. Write a program to find the runner who finished in the third position. **Focus:** Basic data structures (arrays), sorting algorithms (e.g., insertion sort, selection sort), and basic input/output.
- 32. In the same marathon, you are given the finishing times of 'N' runners and their bib numbers. Write a program to efficiently find the top 10 runners and their corresponding bib numbers. Focus: Efficient sorting algorithms (e.g., merge sort, quick sort), data structures like priority queues, and optimizing for large datasets.
- 33. A library maintains a list of books with their unique IDs. Write a program to check if a given book ID is present in the library. Focus: Searching algorithms (linear search), basic data structures (arrays or lists).
- 34. The library wants to implement a system to quickly find books by their titles. Suggest an efficient data structure (e.g., a hash table or a trie) and explain how to implement it to achieve fast book lookups. Focus: Understanding the trade-offs between different data structures, choosing the most appropriate data structure for a specific problem, and implementing efficient search operations.
- 35. An online store sells products with different prices. Write a program to calculate the total cost of a given list of products. **Focus:** Basic arithmetic operations, working with arrays or lists to store product prices.
- 36. The online store offers discounts based on the total purchase amount. Design an algorithm to efficiently calculate the final cost of an order, considering different discount rules (e.g., percentage discounts, fixed amount discounts, tiered discounts). Focus: Algorithmic design, conditional statements, handling complex scenarios with multiple rules, and potentially using dynamic programming techniques for optimization.
- 37. You are given two integers, 'a' and 'm'. Calculate 'a' raised to the power 'm' modulo a large prime number 'p'. **Focus:** Basic modular arithmetic operations (modular exponentiation), understanding the modulo operator.
- 38. In a secure communication system, you need to efficiently compute the modular exponentiation for very large values of 'm'. Implement and analyze the efficiency of the binary exponentiation algorithm for this task. **Focus:** Efficient algorithms for modular exponentiation (binary exponentiation), time complexity analysis, and understanding the importance of efficient algorithms in cryptography.
- 39. You have a deck of 'N' cards. Calculate the total number of possible hands of size 'K' that can be drawn from the deck. **Focus:** Basic combinatorics (combinations), factorial calculations.
- 40. In a card game, you need to calculate the probability of drawing certain combinations of cards (e.g., a pair, a three-of-a-kind) from a shuffled deck. Design an efficient algorithm to calculate these probabilities. **Focus:** Advanced combinatorics (permutations and combinations with repetitions), probability calculations, and optimizing calculations to avoid overflows.
- 41. You are given a network of devices represented as a graph. Determine if there is a path between two given devices in the network. **Focus:** Graph traversal algorithms (depth-first search or breadth-first search).
- 42. In a secure network, you need to detect and isolate compromised devices. Design an algorithm that efficiently identifies devices that exhibit anomalous behavior (e.g., unusual traffic patterns) using XOR-based techniques for data comparison and pattern matching. Focus: Applying XOR operations for data comparison and pattern recognition, understanding the properties of XOR (e.g., commutative, associative), and designing algorithms for network anomaly detection.
- 43. You are given an array representing the speeds of cars on a highway. Find the minimum time required for all cars to pass a certain point. **Focus:** Basic array traversal, finding the minimum element in an array.
- 44. In a more realistic scenario, cars have different lengths. Implement a two-pointer approach to simulate the movement of cars and determine the minimum time for all cars to pass a



given point. **Focus:** Two-pointer technique, simulating real-world scenarios with arrays, optimizing time complexity.

- 45. Given a string, find the number of occurrences of a specific substring within the string. **Focus:** Basic string manipulation, string matching (brute-force approach).
- 46. Implement the KMP (Knuth-Morris-Pratt) string matching algorithm to efficiently find all occurrences of a given pattern within a large text document. **Focus:** Advanced string matching algorithms, understanding the concept of the "next" array in KMP, optimizing for large input sizes.
- 47. An online auction platform receives bids for different items. Implement a data structure (e.g., a priority queue) to efficiently track the highest bid for each item. **Focus:** Priority queues, insertion and extraction operations on priority queues, basic implementation of a priority queue using an array or a suitable library.
- 48. The auction platform needs to handle a large number of bids concurrently. Design and implement a system that efficiently processes bids, updates the highest bid for each item, and handles potential race conditions. **Focus:** Concurrent data structures and algorithms, thread safety, handling race conditions, optimizing for high-throughput scenarios.
- 49. A social network can be represented as a graph where users are nodes, and connections between users are edges. Write an algorithm to find if two given users are connected in the network. **Focus:** Graph traversal algorithms (depth-first search or breadth-first search), basic graph representation (adjacency list or adjacency matrix).
- 50. In a large social network, efficiently finding the shortest path between two users is crucial. Implement Dijkstra's algorithm to find the shortest paths between users in the network, considering edge weights (e.g., representing the strength of connections). **Focus:** Shortest path algorithms (Dijkstra's algorithm), graph algorithms with weighted edges, optimizing for large graphs.
- 51. A file system can be modeled as a tree structure. Implement a function to traverse the file system and print the names of all files and directories. **Focus:** Tree traversal algorithms (depth-first search or breadth-first search), basic tree representation (using nodes and pointers).
- 52. Design and implement a file system that supports efficient operations like creating directories, deleting files, and finding files based on their names or paths. Consider using a combination of tree structures and hash tables for efficient indexing and searching. **Focus:** Designing and implementing file system structures, using multiple data structures together, optimizing for common file system operations.
- 53. An online shopping cart can be represented as a tree, where each node represents an item or a category of items. Write an algorithm to calculate the total price of all items in the shopping cart. **Focus:** Tree traversal, calculating sums within a tree structure.
- 54. Implement a system that allows customers to apply discounts and coupons to their shopping carts. Consider using a combination of trees and other data structures (e.g., hash tables) to efficiently apply discounts and calculate the final price. **Focus:** Applying discounts and promotions to tree-like structures, efficient implementation of discount rules, optimizing for complex pricing scenarios.
- 55. In a social network, users can form groups. Given a list of friendships, determine if all users in a specific group are connected (directly or indirectly) through friendships. **Focus:** Disjoint set union (DSU) data structure, basic connectivity checks.
- 56. Design an efficient algorithm to find the minimum number of new friendships needed to connect all users in the social network into a single, connected component. **Focus:** Applying DSU for finding connected components, greedy algorithms, optimization for minimizing connections.
- 57. A treasure hunt involves a series of clues leading to the final treasure. Given a list of possible paths and their associated costs, find the cheapest path to reach the treasure. **Focus:** Greedy algorithms (e.g., Dijkstra's algorithm for shortest paths), basic graph representation.



58. In a more complex treasure hunt, there are time constraints associated with each path. Design an algorithm to find the fastest path to the treasure while considering both path costs and time constraints.

Focus: Combining greedy approaches with other techniques (e.g., priority queues), handling multiple constraints, optimizing for time-critical scenarios.

- 59. In a simplified chess game with only rooks, determine the minimum number of moves required for a rook to reach a specific target square on an empty board. **Focus:** Breadth-first search (BFS) on a graph (the chessboard), basic graph traversal.
- 60. In a more realistic chess game with multiple pieces and obstacles, implement a minimax algorithm with alpha-beta pruning to determine the best move for a player. **Focus:** Game tree search, minimax algorithm, optimization techniques like alpha-beta pruning, handling complex game states.

Targeted Application & Tools that can be used:

- 10. C or C++ Compiler (g++): The standard compiler for CP. Familiarize students with compilation flags (e.g., -O2 for optimization).
- 11. IDE (Integrated Development Environment): Code:: Blocks, Visual Studio, CLion, or similar IDEs. These provide debugging capabilities, code completion, and other helpful features.
- 12. Online Judges (CodeChef, Codeforces, LeetCode, HackerRank): Essential for practicing and submitting solutions.
- 13. Debugger (gdb): Crucial for understanding code execution and finding bugs. Origin, excel and Mat lab soft wares for programming and data analysis.
- 14. Number Theory Libraries: Some libraries provide pre-built functions for number theory operations (though often it's better to implement them yourself for learning).
- 15. Wolfram Alpha: A useful tool for verifying number theory calculations and exploring concepts.
- 16. String Libraries: Familiarize students with the string manipulation functions available in C++.
- 17. **Graph Visualization Tools:** Tools like Graphviz can be helpful for visualizing graphs and understanding graph algorithms.
- 18. **DP Debugging Techniques:** Practice debugging DP solutions, as they can be complex. Visualizing the DP table can be helpful.

Text Books:

- 3 Guide to Competitive Programming: Learning and Improving Algorithms Through Contests" (3rd Edition), *Antti Laaksonen, springer, 2024*
- 4 "Data Structures and Algorithms in Java: A Project-Based Approach" Dan S. Myers, Cambridge University Press

Reference Books:

- 3. Data Structures and Algorithmic Thinking with Python/C++/Java", Narasimha Karumanchi, 5th Edition, Career Monk, 2017.
- 4. Introduction to Algorithms, <u>Thomas H. Cormen</u> (Author), <u>Charles E.</u> <u>Leiserson</u> (Author), <u>Ronald L. Rivest</u>, fourth edition April 2022

Web Resources

- 3. https://nptel.ac.in/courses/106106231
- 4.

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Assessment Type

Midterm exam



- Assignment (review of digital/ e-resource from PU link given in references section mandatory to submit screen shot accessing digital resource.)
 Quiz
 - End Term Exam
- Self-Learning

Course Code: CSE 7300	Course Title: Capstone Project Type of Course:	L- T-P- C	0	0	0	10		
Version No.	1.0							
Course Pre- requisites	Knowledge and Skills related to all the course	es studied in	prev	ious s	semeste	ers.		
Anti-requisites	NIL							
Course Description	Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/Company/ Research Laboratory, or Internship Program in an Industry/Company.							
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Professional Practice and attain Employability Skills through Experiential Learning techniques.							
Course Outcomes	 On successful completion of this course the students shall be able to: Identify problems based on societal /research needs. (Understand) Apply Knowledge and skill to solve societal problems in a group. (Apply) Develop interpersonal skills to work as member of a group or leader. (Apply) Analyze the inferences from available results through theoretical / Experimental / Simulations. (Analyze) Analyze the impact of solutions in societal and environmental context for sustainable development. (Analyze) Improve in written and oral communication. (Create) Demonstrate capabilities of self-learning in a group, which leads to lifelong learning. (Understand) 							





Course Code:	Course Title: Numerical Computing	L-T-P-				2	
MAT2064	Type of Course:1] School Core	C	3	0	0	3	
Version No.	1.0	I				I	
Course Pre- requisites	Calculus, Linear Algebra, Differentia	l Equations					
Anti-requisites	NIL						
Course Description	complex problems that are difficu- computers to perform calculation interpolation, numerical differentiation equations, and approximating so applications across various scientific understanding the theoretical basis b	The course explores mathematical techniques used to approximate solutions to complex problems that are difficult to solve analytically, often utilizing computers to perform calculations, including methods for root finding, interpolation, numerical differentiation and integration, solving systems of linear equations, and approximating solutions to differential equations, with applications across various scientific and engineering fields. It focuses on understanding the theoretical basis behind these methods, their implementation in programming languages, and analyzing their accuracy and stability.					
Course Objective	apply various numerical technique mathematical problems that are dif particularly focusing on areas like so functions, interpolation, numerical di	The objective of the course is to equip students with understanding and ability to apply various numerical techniques to approximate solutions to complex mathematical problems that are difficult or impossible to solve analytically, particularly focusing on areas like solving systems of equations, finding roots of functions, interpolation, numerical differentiation, and integration, often utilizing computational tools to implement these methods.					
Course Out Comes	On successful completion of the course the students shall be able to: CO1 - Calculate errors induced in the values by truncation of a series						
	expansion. CO2 - Demonstrate the applications of numerical methods to find the roots of						
	polynomial equations and eigen values of real symmetric matrices.						
	CO3 - Apply the knowledge of numerical methods in modelling of various physical and engineering phenomena.						
	CO4 - Apply various numerical meth differential equations arising in engin		ng linear (Ordinar	y & Par	tial	
Course Content:							
Module 1	Solution of Linear Systems of Equation				(12 Cla	asses	
Error, Truncation	utation: Motivation and Objectives, Number Repr Error, Random Number Generation.						
method, Newton- = 0 and $g(x,y) = 0$ elimination metho Sufficient condition	raic and transcendental equations: Various types of Raphson method, Graffe's method - Bairstow's me), secant method, Fixed point iteration method, Sc od, Pivoting, Gauss Jordan method, Iterative methons for convergence - LU decomposition method, and for summetric metrices	ethod - Newto plution of line ods of Gauss	on's metho ar system Jacobi an	od for s of equa d Gaus	olving f ations, (s Seidel	î(x,y) Gauss I,	

and Jacobi's method for symmetric matrices.

Module 2	Interpolation and Approximation	Assignment	(8 Classes)
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Interpolation with equal intervals, Newton's forward and backward difference formulae, Interpolation with unequal intervals, Lagrange's interpolation, Newton's divided difference interpolation, Cubic Splines, Difference operators and relations.

	Numerical Differentiation and		(10 Classes)				
Module 3	Integration		(10 Classes)				
Numerical differentiation, Approximation of derivatives using interpolation polynomials, Numerical							
integration using Trapezoidal rule, Simpson's one-third rule, Simpson's three-eighth rule, Weddle's rule,							
Romberg's Meth	od, Two point and three point Gaussian quadr	Romberg's Method, Two point and three point Gaussian quadrature formulae, Evaluation of double integrals					

by Trapezoidal rule and Simpson's one-third rule

Madala 4	Initial & Boundary Value Problems for		(15 Classes)
Module 4	Ordinary & Partial Differential Equations	Assignment	(

Single step methods — Taylor's series method, Modified Euler's method, Fourth order Runge-Kutta method for solving first order equations, Multi step methods, Milne's and Adams, Bash forth predictor corrector methods for solving first order equations.

Finite difference methods for solving second order, two-point linear boundary value problems, Finite difference techniques for the solution of two-dimensional Laplace's and Poisson's equations on rectangular domain, One-dimensional heat flow equation by explicit and implicit (Crank Nicholson) methods, One-dimensional wave equation by explicit method.

Targeted Application & Tools that can be used:

The contents of this course has direct applications in most of the core engineering courses for problem formulations, Problem Solution and system Design.

Tools Used: Python.

Assignment:

6. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book

- 3. C.F.Gerald and P.O.Wheatley", Applied Numerical Analysis", McGraw-Hill, 1981.
- 4. Cheneg and Kincaid, "Introduction to Numerical Computing", Tata McGraw-Hill, 1998.

References:

- 4. SRK Iyengar & RK Jain, Numerical Methods, New Age Internationals.
- 5. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition
- 6. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

E-resources/ Web links:

- 13. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniqu</u> <u>e_id=EBSCO95_30102024_135224</u>
- 14. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniqu</u> e_id=EBSCO95_30102024_141727
- 15. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uniqu</u> e_id=EBSCO95_30102024_217628
- 16. <u>http://.ac.in/courses.php?disciplineID=111</u>
- 17. <u>http://www.class-central.com/subject/math(MOOCs)</u>
- 18. <u>http://academicearth.org/</u>
- 19. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html
- 20. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and



analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.



Course Code: CBC3400 Course Title: Cryptography and Security in Blockchain L:T:P:C – 3:0:0:3 Prereguisite: Nil

Course Description

This course provides a deep dive into the **cryptographic principles and security mechanisms** that underpin blockchain technology. It explores key cryptographic algorithms, consensus protocols, wallet security, smart contract vulnerabilities, and advanced security features essential for safeguarding decentralized systems.

Course Objectives

- Understand core cryptographic techniques used in blockchain ecosystems
- Explore consensus protocols and their security implications
- Analyze common attacks and vulnerabilities in blockchain networks
- Apply cryptographic methods for secure blockchain applications and smart contracts

Course Outcomes

CO1 (Understand): Explain the role of cryptographic primitives in securing blockchain data and identity

CO2 (Analyze): Evaluate consensus protocols and blockchain attack surfaces **CO3 (Apply):** Implement and test cryptographic algorithms and secure wallet mechanisms

CO4 (Apply): Identify and mitigate security flaws in smart contracts and blockchain systems

Course Content (45 Hours Total)

Module 1: Cryptographic Foundations – 11 Sessions (Understand) Symmetric vs. asymmetric cryptography, Hash functions (SHA-256, Keccak), Digital signatures (ECDSA), Message integrity and non-repudiation, Merkle trees, Zero-knowledge proofs basics

Module 2: Consensus and Blockchain Security – 11 Sessions (Analyze) Proof of Work (PoW), Proof of Stake (PoS), PBFT, Delegated PoS, Sybil attacks, 51% attack, Forking issues, Blockchain scalability vs. security trade-offs

Module 3: Wallets and Transaction Security – 11 Sessions (Apply)

Public/private key generation, Wallet types (hot, cold, hardware), Multisig wallets, Transaction signing and verification, Secure key storage, Replay protection

Module 4: Smart Contract and Platform Security – 12 Sessions (Apply) Smart contract vulnerabilities (reentrancy, overflow), DAO case study, Formal verification, Auditing tools (Mythril, Slither), Secure coding standards, Layer-2 security (ZK-rollups, state channels), Privacy coins (ZCash, Monero)

Textbooks

T1: Kelsey Hightower et al., *Blockchain Security and Privacy*, Wiley, 2023T2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 4th Edition, 2023

Reference Books

R1: Arvind Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press, **2022**

R2: William Stallings, Cryptography and Network Security, Pearson, 7th Edition, 2022

R3: Andreas M. Antonopoulos, *Mastering Bitcoin*, O'Reilly Media, 2022 R4: Nipun Jaswal, *Mastering Blockchain Security*, Packt Publishing, 2022

Web Resources



W1: <u>https://cryptozombies.io</u>

W2: https://soliditylang.org/security

W3: <u>https://ethereum.org/en/developers/docs/security</u>

W4: https://z.cash/technology

W5: <u>https://slither.readthedocs.io</u>

Course Code: CBC3401 Course Title: Crypto Trading Strategies & Risk Management L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course provides an in-depth understanding of **crypto trading mechanisms**, **investment strategies**, and **risk management techniques**. It covers technical and fundamental analysis, trading indicators, automated strategies, and regulatory considerations. Emphasis is placed on market psychology, portfolio diversification, and risk mitigation in highly volatile crypto markets.

Course Objectives

- Understand cryptocurrency markets, exchanges, and trading instruments
- Learn technical and fundamental analysis techniques for crypto assets
- Explore risk assessment models and portfolio protection strategies
- Apply trading strategies and automation tools within regulatory frameworks

Course Outcomes

CO1 (Understand): Explain cryptocurrency market structures, instruments, and volatility characteristics

CO2 (Analyze): Evaluate and compare crypto trading strategies and their performance indicators

CO3 (Apply): Apply risk management techniques and portfolio diversification methods

CO4 (Apply): Use tools to implement, simulate, or automate crypto trading strategies

Course Content (45 Hours Total)

Module 1: Cryptocurrency Markets & Exchanges – 11 Sessions (Understand) Overview of crypto assets, Exchanges (CEX vs DEX), Trading pairs, Order types (market, limit, stop-loss), Market liquidity and volatility, Understanding spreads, slippage, and fees

Module 2: Trading Strategies and Analytics – 11 Sessions (Analyze) Technical indicators (MACD, RSI, Bollinger Bands), Candlestick patterns, Moving averages, Breakout and momentum strategies, Arbitrage and swing trading, Volume analysis, On-chain analytics

Module 3: Risk Management in Crypto Trading – 11 Sessions (Apply) Position sizing, Risk-reward ratio, Stop-loss vs trailing stops, Leverage and margin risks, Portfolio diversification, Drawdown analysis, Hedging strategies

Module 4: Automation, Tools & Regulations – 12 Sessions (Apply)

Trading bots and scripting basics (Python, Pionex), Backtesting tools (TradingView, CryptoCompare), Trading APIs (Binance, Coinbase), Regulatory risks, KYC/AML, Taxation, Real-world strategy simulation

Textbooks

T1: Glen Goodman, *The Crypto Trader: How Anyone Can Make Money Trading Bitcoin and Other Cryptocurrencies*, Harriman House, **2023**



T2: Rolf Schlotmann, *Crypto Trading: A Comprehensive Beginner's Guide*, Independently Published, **2022**

Reference Books

R1: Steve Burns, Technical Analysis for Crypto Traders, New Trader U, 2022

- R2: Michael Radkay, Cryptocurrency Risk Management, Wiley, 2023
- R3: Victor Lucas, *The Cryptocurrency Trading Guide*, Kindle Edition, 2022
- R4: Nik Patel, An Altcoin Trader's Handbook, Amazon Publishing, 2021

Web Resources

- W1: <u>https://www.tradingview.com</u>
- W2: <u>https://coinmarketcap.com</u>
- W3: https://pionex.com
- W4: https://academy.binance.com
- W5: <u>https://cryptoquant.com</u>

Course Code: CBC3402 Course Title: Bitcoin and Ethereum Protocols L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course offers an in-depth exploration of the **technical protocols behind Bitcoin and Ethereum**, the two most prominent blockchain platforms. It focuses on consensus algorithms, cryptographic structures, transaction lifecycles, smart contract execution, protocol upgrades, and governance models. Students will gain foundational knowledge to build, secure, and innovate on these platforms.

Course Objectives

- Understand the architecture and protocols of Bitcoin and Ethereum blockchains
- Explore the transaction mechanisms and consensus protocols of both platforms
- Learn how Ethereum enables smart contracts and decentralized applications
- Analyze protocol limitations, upgrades, and scalability efforts

Course Outcomes

CO1 (Understand): Describe the technical components and operation of Bitcoin and Ethereum

CO2 (Analyze): Compare consensus mechanisms and data structures used in both platforms

CO3 (Apply): Trace transaction flow and analyze smart contract execution **CO4 (Apply):** Evaluate scaling solutions, forks, and governance in decentralized networks

Course Content (45 Hours Total)

Module 1: Bitcoin Protocol Internals – 11 Sessions (Understand)

Bitcoin architecture, UTXO model, SHA-256 and ECDSA cryptography, Merkle trees, Block structure and mining, Proof-of-Work (PoW), Difficulty adjustment, Nakamoto consensus

Module 2: Ethereum Platform and EVM – 11 Sessions (Analyze)

Ethereum accounts model (EOA vs Contract), Gas and transaction fees, Ethereum Virtual Machine (EVM), Solidity basics, State transitions, Keccak-256 hashing, Contract storage and execution



Module 3: Transaction Lifecycle & Security – 11 Sessions (Apply) Transaction creation, mempool, mining and validation, Transaction finality, Smart contract deployment, Reentrancy and gas-related vulnerabilities, Forking and transaction replay

Module 4: Protocol Upgrades, Governance & Scaling – 12 Sessions (Apply) Bitcoin forks (SegWit, Taproot), Ethereum forks (Byzantium to Shanghai), Ethereum 2.0 and Proof-of-Stake (PoS), Rollups and Layer 2 scaling, DAO governance models, Limitations and innovations

Textbooks

T1: Andreas M. Antonopoulos, *Mastering Bitcoin*, O'Reilly Media, 2nd Edition, 2023
T2: Andreas M. Antonopoulos & Gavin Wood, *Mastering Ethereum*, O'Reilly Media, 2023

Reference Books

R1: Arvind Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press, 2022
R2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023

R3: Ritesh Modi, *Introducing Ethereum and Solidity*, Apress, **2022**

R4: Roger Wattenhofer, The Science of the Blockchain, InTechOpen, 2021

Web Resources

W1: https://bitcoin.org/en/developer-documentation

W2: <u>https://ethereum.org/en/developers/docs</u>

W3: <u>https://soliditylang.org</u>

W4: <u>https://github.com/ethereum/EIPs</u>

W5: <u>https://bitcoin.stackexchange.com</u>

Course Code: CBC3403 Course Title: Blockchain for Digital Identity Management L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course explores how **blockchain technology** is revolutionizing **digital identity management** by enabling decentralized, secure, and privacy-preserving solutions. Topics include identity lifecycle, verifiable credentials, decentralized identifiers (DIDs), self-sovereign identity (SSI), and regulatory compliance. Real-world platforms and government use cases are also covered.

Course Objectives

- Understand the challenges of traditional identity management systems
- Explore blockchain-based identity frameworks and standards
- Learn to design and implement decentralized digital identity models
- Evaluate security, privacy, and compliance aspects in identity solutions

Course Outcomes

CO1 (Understand): Describe the principles and components of blockchain-based digital identity systems

CO2 (Analyze): Compare centralized and decentralized identity models and their implications

CO3 (Apply): Design verifiable credentials and DIDs using standard protocols **CO4 (Apply):** Evaluate use cases and compliance aspects of blockchain-enabled identity frameworks



Course Content (45 Hours Total)

Module 1: Digital Identity Concepts & Challenges – 11 Sessions (Understand) Digital identity basics, Authentication vs authorization, Centralized identity systems, Federated login issues, Identity theft and fraud, Introduction to identity on blockchain

Module 2: Decentralized Identity & Standards – 11 Sessions (Analyze) Decentralized Identifiers (DIDs), Verifiable Credentials (VCs), Self-Sovereign Identity (SSI), DIDComm, W3C standards, Privacy-preserving principles (ZKP, selective disclosure)

Module 3: Platforms & Architecture – 11 Sessions (Apply)

Sovrin, uPort, Hyperledger Indy, Aries, Trust over IP (ToIP), Blockchain identity layers, Wallets and credential holders, Issuer-verifier-holder architecture

Module 4: Implementation & Regulatory Compliance – 12 Sessions (Apply) Smart contract-enabled identity, GDPR compliance, KYC/AML on blockchain, Identity in banking and e-governance, Cross-border identity solutions, Use cases: Aadhaar on blockchain, eIDAS, decentralized healthcare ID

Textbooks

T1: Alex Preukschat & Drummond Reed, *Self-Sovereign Identity*, Manning Publications, **2023**

T2: Mearian Lucas, Blockchain for Digital Identity, BPB Publications, 2022

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023
R2: Arvind Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press, 2022
R3: Phillip J. Windley, *Digital Identity*, O'Reilly Media, 2021
R4: Sovrin Foundation Whitepapers and ToIP Framework Documents

Web Resources

W1: <u>https://www.w3.org/TR/did-core/</u>

W2: <u>https://identity.foundation</u>

W3: https://www.hyperledger.org/use/hyperledger-indy

- W4: https://www.sovrin.org
- W5: <u>https://trustoverip.org</u>

Course Code: CBC3404 Course Title: Cryptocurrency Wallet Development L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course focuses on the **design**, **development**, **and security of cryptocurrency wallets**, which are essential tools for interacting with blockchain networks. Students will learn about wallet types, key management, transaction signing, wallet APIs, and user interface design, along with best practices for developing secure and user-friendly crypto wallets.

Course Objectives

Understand the fundamentals of cryptocurrency wallets and key management
 Learn to build and secure wallets for Bitcoin, Ethereum, and other blockchains



Explore wallet SDKs, libraries, and integration techniques
 Apply secure coding practices to prevent theft, fraud, and misus

Apply secure coding practices to prevent theft, fraud, and misuse

Course Outcomes

CO1 (Understand): Explain the architecture and functionality of cryptocurrency wallets

CO2 (Analyze): Compare wallet types and evaluate their security mechanisms **CO3 (Apply):** Design and develop wallets with secure key storage and transaction capabilities

CO4 (Apply): Integrate wallet features with DApps and blockchain networks using APIs and SDKs

Course Content (45 Hours Total)

Module 1: Wallet Architecture & Key Management – 11 Sessions (Understand) Wallet types (hot, cold, custodial, non-custodial), Mnemonic phrases and HD wallets (BIP32/39/44), Public-private key pairs, Address generation, Key encryption, Backup and recovery mechanisms

Module 2: Wallet Security & Compliance – 11 Sessions (Analyze)

Threats and attack vectors (phishing, malware, keylogging), Secure enclave and HSM, 2FA and biometric protection, Anti-fraud mechanisms, KYC/AML integration, Regulatory frameworks (FATF, GDPR)

Module 3: Wallet Development – 11 Sessions (Apply)

Bitcoin and Ethereum transaction lifecycle, Signing and broadcasting transactions, Wallet SDKs (Web3.js, ethers.js, bitcoinjs-lib), QR code integration, Multi-currency support, UI/UX for wallet apps

Module 4: DApp Integration & Advanced Features – 12 Sessions (Apply) Interfacing with smart contracts, MetaMask integration, Web3 wallets, WalletConnect protocol, Hardware wallet integration (Ledger, Trezor), Lightning wallets, Token swap

and staking support

Textbooks

T1: Andreas M. Antonopoulos, *Mastering Bitcoin*, O'Reilly Media, **2nd Edition**, **2023 T2:** Chris Dannen, *Introducing Ethereum and Solidity*, Apress, **2022**

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023

R2: Tim Coulter, Blockchain Developer's Guide, Packt Publishing, 2022

R3: Joseph Bonneau et al., *SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies*, IEEE Security & Privacy, **2022**

R4: Ledger Academy and Trezor Docs (for practical wallet development)

Web Resources

W1: <u>https://web3js.readthedocs.io</u>

W2: https://docs.ethers.org

W3: https://bitcoin.org/en/developer-guide

- W4: https://developer.metamask.io
- W5: <u>https://walletconnect.com</u>

Course Code: CBC3405 Course Title: Blockchain Security & Ethical Hacking L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description



This course focuses on **security challenges and ethical hacking techniques** specific to blockchain systems. It explores vulnerabilities in smart contracts, consensus mechanisms, cryptographic exploits, and network-level attacks. Students will gain hands-on knowledge in penetration testing, auditing, and securing decentralized applications in a responsible and ethical manner.

Course Objectives

- Understand blockchain security principles and ethical hacking frameworks
- Explore attack vectors in consensus, smart contracts, wallets, and networks
- Learn secure development practices and ethical exploitation techniques
- Apply auditing tools and mitigation strategies to secure blockchain ecosystems

Course Outcomes

CO1 (Understand): Describe blockchain security models, attack surfaces, and ethical hacking methodologies

CO2 (Analyze): Identify and assess vulnerabilities in blockchain components and smart contracts

CO3 (Apply): Simulate blockchain-specific attacks in a controlled environment **CO4 (Apply):** Use auditing tools and secure coding techniques to mitigate real-world blockchain threats

Course Content (45 Hours Total)

Module 1: Blockchain Threat Landscape & Security Models – 11 Sessions (Understand)

Security principles in decentralized systems, Attack surfaces in blockchain, Common vulnerabilities (51% attack, Sybil attack, DDoS), Smart contract security flaws, Wallet security risks, Ethics and legalities in hacking

Module 2: Ethical Hacking & Penetration Testing – 11 Sessions (Analyze) Reconnaissance and scanning, Blockchain-specific enumeration, Network sniffing, Exploit development for smart contracts, Bug bounty frameworks (Immunefi, HackenProof), Legal compliance and scope setting

Module 3: Secure Development & Mitigation – 11 Sessions (Apply)

Secure coding standards (Solidity), Gas optimization and fallback protection, Reentrancy guards, Rate limiting and throttling, Smart contract auditing lifecycle, Continuous security integration (DevSecOps)

Module 4: Tools & Real-World Case Studies – 12 Sessions (Apply)

Tools: Mythril, Slither, Hardhat, Truffle Security, Wireshark, Metasploit, Analysis of DAO hack, Poly Network breach, DeFi protocol exploits, Wallet draining scams, Building a secure DApp from scratch

Textbooks

T1: Rajneesh Gupta, *Blockchain Security and Ethical Hacking*, BPB Publications, 2023
T2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 4th Edition, 2023

Reference Books

R1: Joseph Bonneau et al., *SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies*, IEEE, **2022**

R2: Mudit Gupta, *Smart Contract Hacking Handbook*, Immunefi Community Docs, **2022**

R3: Damilare Daramola, *Ethereum Smart Contract Security*, Apress, 2023 R4: Kevin Mitnick, *The Art of Invisibility*, Little Brown, 2022

Web Resources

W1: <u>https://ethereum.org/en/developers/docs/security</u>

W2: https://consensys.github.io/smart-contract-best-practices/

W3: <u>https://cryptozombies.io</u>



W4: https://immunefi.com/learn **W5:** <u>https://github.com/crytic/slither</u>

Course Code: CBC3406

Course Title: Introduction to Artificial Intelligence in Blockchain L:T:P:C – 3:0:0:3

Prerequisite: Nil

Course Description

This course introduces how **Artificial Intelligence (AI)** can be integrated with **blockchain technology** to create intelligent, secure, and autonomous decentralized systems. Topics include AI-driven smart contracts, secure data sharing, AI model integrity on-chain, blockchain for AI auditability, and applications in finance, healthcare, and supply chain.

Course Objectives

- Understand the synergy between AI and blockchain technologies

 Explore architectures that combine decentralized data with intelligent decisionmaking

- Learn use cases of AI-powered blockchain applications

 Analyze challenges in data privacy, trust, and model governance in AI-blockchain systems

Course Outcomes

CO1 (Understand): Explain the fundamentals of AI and blockchain and their convergence

CO2 (Analyze): Evaluate use cases and architectures of AI-powered blockchain systems

CO3 (Apply): Integrate AI models into smart contracts and decentralized applications **CO4 (Apply):** Examine the challenges and ethical concerns of deploying AI on the blockchain

Course Content (45 Hours Total)

Module 1: Fundamentals of AI and Blockchain – 11 Sessions (Understand) Overview of AI (ML, DL, NLP), Blockchain structure, consensus, and smart contracts, AI vs blockchain roles, Benefits of integration, Blockchain for AI audit trails and data provenance

Module 2: Intelligent Smart Contracts & AI Models On-Chain – 11 Sessions (Analyze)

Embedding decision-making into contracts, Oracle networks, AI-driven DApps, Federated learning and blockchain, Edge AI and decentralized AI agents

Module 3: Use Cases in Industry – 11 Sessions (Apply)

AI in DeFi fraud detection, Healthcare diagnostics with secure sharing, Predictive analytics in blockchain logistics, Tokenizing AI models, Model training marketplaces, NFT + AI systems

Module 4: Challenges, Ethics & Future Directions – 12 Sessions (Apply)

Data privacy, GDPR, Explainable AI (XAI) on blockchain, Resource constraints, Model verification and updates, Regulatory landscape, Ethical implications, Roadmap to autonomous decentralized AI

Textbooks

T1: Arshdeep Bahga & Vijay Madisetti, *Blockchain Applications: A Hands-On Approach*, VPT, **2023**



T2: Mohammad Rezaul Karim, *AI and Blockchain for Beginners*, Packt Publishing, **2023**

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023

R2: Kai-Fu Lee, *AI Superpowers: China, Silicon Valley, and the New World Order*, HMH, **2022**

R3: Bhaskar Krishnamachari, *Blockchain and AI for Internet of Things*, Springer, **2022 R4:** Jaspreet Bindra, *The Tech Whisperer: On Digital Transformation and the Technologies That Enable It*, Penguin, **2021**

Web Resources

W1: https://ai.google

W2: https://ethereum.org/en/developers/docs/oracles

W3: <u>https://deeplearning.ai</u>

W4: <u>https://oceanprotocol.com</u>

W5: https://h2020bonseyes.eu

Course Code: CBC3407 Course Title: Machine Learning for Cyber Threat Detection L:T:P:C - 3:0:0:3 Prerequisite: Nil

Course Description

This course focuses on the application of **machine learning techniques** for detecting and preventing **cybersecurity threats**. It explores supervised, unsupervised, and deep learning methods for anomaly detection, intrusion detection systems (IDS), malware analysis, and phishing detection. Real-time threat analytics, datasets, and evaluation metrics are emphasized.

Course Objectives

- Understand the fundamentals of cyber threats and threat detection strategies
- Learn to apply machine learning models to identify malicious activities
- Explore threat datasets, feature engineering, and evaluation metrics
- Analyze and compare ML techniques for cybersecurity use cases

Course Outcomes

CO1 (Understand): Explain the types of cyber threats and the role of machine learning in threat detection

CO2 (Analyze): Evaluate datasets and select appropriate ML models for different security tasks

CO3 (Apply): Build and train ML models for intrusion detection and malware classification

CO4 (Apply): Implement real-time threat detection and evaluate model performance

Course Content (45 Hours Total)

Module 1: Introduction to Cybersecurity and Threat Types – 11 Sessions (Understand)

Cyber threat landscape, Attack vectors (phishing, malware, DoS, ransomware), Indicators of compromise (IOCs), Traditional IDS vs ML-based IDS, Need for intelligent threat detection

Module 2: Machine Learning for Threat Modeling – 11 Sessions (Analyze) Supervised vs unsupervised learning, Feature selection from logs/packets, Preprocessing and encoding, Cyber threat datasets (NSL-KDD, CICIDS, CTU-13), Model selection strategies



Module 3: Model Development and Application – 11 Sessions (Apply) Logistic regression, Decision trees, SVM, Random Forests, K-means, Autoencoders, Neural networks for classification, Evaluation metrics (precision, recall, F1, ROC-AUC)

Module 4: Advanced Detection and Real-World Use Cases – 12 Sessions (Apply)

Deep learning for APT and malware detection, Threat intelligence integration, Adversarial ML, Real-time IDS with streaming data, SOC and SIEM integration, Case studies: phishing, botnet, zero-day detection

Textbooks

T1: Emmanuel Tsukerman, *Machine Learning for Cybersecurity Cookbook*, Packt Publishing, **2023**

T2: Clarence Chio & David Freeman, *Machine Learning and Security*, O'Reilly Media, **2023**

Reference Books

R1: Xiaofeng Chen, AI in Cybersecurity, Springer, 2022
R2: Richard MacDonald, Practical Machine Learning for Cybersecurity, Apress, 2021
R3: Mark Stamp, Information Security: Principles and Practice, Wiley, 2022
R4: Kim Crawley, Hacking AI: The Security Threat of Artificial Intelligence, Wiley, 2022

Web Resources

- W1: https://www.kaggle.com/datasets
- W2: https://www.unb.ca/cic/datasets
- W3: <u>https://github.com/nu11secur1ty</u>
- W4: https://scikit-learn.org/stable/
- **W5:** https://cybersecurity.att.com

Course Code: CBC3408 Course Title: AI-Powered Fraud Detection in Blockchain L:T:P:C – 3:0:0:3 Prereguisite: Nil

Course Description

This course explores the application of **Artificial Intelligence (AI)** for detecting **fraudulent activities** in blockchain-based systems. It covers anomaly detection, behavioral analysis, graph-based fraud detection, and ML techniques to identify suspicious patterns in transactions, smart contracts, and decentralized applications. Real-world case studies and tools for fraud prevention are also included.

Course Objectives

- Understand the nature of fraud in blockchain networks and DeFi systems
- Explore AI and ML techniques for fraud detection
- Apply anomaly detection and classification models on blockchain datasets
- Learn to deploy real-time fraud detection pipelines and interpret alerts

Course Outcomes

CO1 (Understand): Describe types of fraud in blockchain systems and the role of AI in detecting them

CO2 (Analyze): Evaluate transaction patterns using AI algorithms to identify anomalies

CO3 (Apply): Implement supervised and unsupervised models for fraud detection in smart contracts and wallets

CO4 (Apply): Build and test AI-driven fraud analytics dashboards for real-time monitoring



Course Content (45 Hours Total)

Module 1: Blockchain Fraud & Risk Landscape – 11 Sessions (Understand) Types of fraud: double-spending, Sybil attacks, wash trading, flash loan exploits, rug pulls, Ponzi schemes in DeFi, Anti-fraud mechanisms, AML/KYC challenges, Role of explainable AI (XAI)

Module 2: ML Techniques for Fraud Detection – 11 Sessions (Analyze) Supervised learning (logistic regression, decision trees, SVM), Unsupervised methods (k-means, Isolation Forest, PCA), Graph-based approaches (Graph Neural Networks), Transaction feature engineering, Datasets (EtherScan, Elliptic, AMLSim)

Module 3: Smart Contract & Wallet Behavior Analysis – 11 Sessions (Apply) Contract flow analysis, Malicious patterns in Solidity, Detecting honeypots and backdoors, Wallet profiling, Time-series analysis of transfers, API integration for behavioral monitoring

Module 4: Tools, Visualization & Real-Time Analytics – 12 Sessions (Apply) Building fraud dashboards with Kibana/Grafana, Stream analytics for fraud signals, Alerting engines, Case studies (DAO exploit, PolyNetwork hack), Integration with Chainalysis, CipherTrace, AML Bot APIs

Textbooks

T1: M. Rezaul Karim, Artificial Intelligence for Blockchain, Packt Publishing, 2023
T2: Sudeep Tanwar et al., Blockchain and AI for Cybersecurity and Privacy, Springer, 2022

Reference Books

R1: Thomas Holt, *Cybercrime Through the Blockchain*, Routledge, 2022
R2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023
R3: Ashish Mishra, *AI in Finance and Blockchain*, Wiley, 2022
R4: Yulia Timofeeva, *Detecting Fraud and Financial Crime Using Machine Learning*, Springer, 2023

Web Resources

W1: https://www.chainalysis.com
W2: https://ciphertrace.com
W3: https://www.amlbot.com

- W4: https://etherscan.io
- W5: https://elliptic.co/resources

Course Code: CBC3409 Course Title: Optimizing Blockchain Networks with AI L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course focuses on leveraging **Artificial Intelligence (AI)** to enhance the **performance, scalability, and security of blockchain networks**. It explores optimization techniques for transaction throughput, consensus efficiency, node management, and predictive maintenance using AI models. The course emphasizes both theoretical foundations and practical applications of AI in blockchain infrastructure.

Course Objectives

- Understand performance challenges in blockchain networks
- Explore AI techniques for optimizing consensus, throughput, and latency



Learn predictive models for network behavior and threat detection

- Apply intelligent algorithms to improve scalability and resource management

Course Outcomes

CO1 (Understand): Explain the performance and scalability limitations of blockchain networks

CO2 (Analyze): Evaluate the role of AI in enhancing consensus mechanisms and throughput

CO3 (Apply): Design and test AI models to predict congestion, detect anomalies, and optimize node behavior

CO4 (Apply): Integrate AI algorithms for energy efficiency, resource allocation, and real-time network tuning

Course Content (45 Hours Total)

Module 1: Blockchain Network Architecture & Bottlenecks – 11 Sessions (Understand)

Node types and network topology, Transaction processing pipeline, Consensus protocol overview (PoW, PoS, PBFT), Throughput and latency issues, Scalability trilemma, Gas fee dynamics

Module 2: AI Techniques for Network Optimization – 11 Sessions (Analyze) Reinforcement Learning for block size tuning, Neural networks for congestion prediction, Anomaly detection in peer behavior, AI-assisted block propagation, ML models for dynamic fee estimation

Module 3: Resource & Energy Optimization – 11 Sessions (Apply)

AI for miner/validator selection, Load balancing, Smart node clustering, Energyefficient scheduling, Predictive fault detection in blockchain nodes, Real-time node health monitoring

Module 4: Intelligent Consensus & Future Directions – 12 Sessions (Apply) AI-enhanced consensus models, Swarm intelligence, Federated learning for decentralized AI, Hybrid optimization architectures (AI + DLT), Use cases in DeFi, supply chain, and CBDC networks

Textbooks

T1: Sudeep Tanwar et al., *Blockchain with AI and Machine Learning*, Springer, **2023 T2:** M. Rezaul Karim, *Artificial Intelligence for Blockchain*, Packt Publishing, **2023**

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 4th Edition, 2023
R2: Zheng Zibin, *Blockchain Technologies for AI Applications*, Springer, 2022
R3: Md. Sadek Ferdous, *AI and Blockchain for Smart Systems*, CRC Press, 2022
R4: Qusay H. Mahmoud, *Cognitive Blockchain*, Springer, 2021

Web Resources

- W1: https://ethereum.org/en/developers/docs/scaling
- W2: https://deeplearning.ai

W3: <u>https://github.com/OpenMined</u>

- W4: https://developer.ibm.com/blogs/blockchain-ai
- **W5:** https://research.ibm.com/blog/ai-blockchain

Course Code: CBC3410 Course Title: Generative AI for Blockchain Applications L:T:P:C - 3:0:0:3 Prerequisite: Nil



Course Description

This course introduces the integration of **Generative AI** with **Blockchain technology** to develop intelligent, decentralized, and automated applications. It focuses on the use of models like GPT, LLMs, and diffusion networks to enhance smart contracts, autonomous agents, decentralized content creation, NFT generation, and AI transparency using blockchain.

Course Objectives

- Understand the fundamentals of Generative AI and its potential in blockchain ecosystems

- Explore the use of LLMs and generative models for smart contracts, NFTs, and decentralized apps

Apply decentralized storage and blockchain for provenance and model verification
 Investigate real-world use cases and ethical implications of AI-generated content on-chain

Course Outcomes

CO1 (Understand): Describe the principles of Generative AI and how it enhances blockchain use cases

CO2 (Analyze): Evaluate generative models for decentralized identity, content, and NFTs

CO3 (Apply): Design applications that combine smart contracts with LLM-generated outputs

CO4 (Apply): Implement provenance, audit trails, and ownership models using blockchain for AI-generated assets

Course Content (45 Hours Total)

Module 1: Introduction to Generative AI & Blockchain – 11 Sessions (Understand)

Overview of Generative AI: GPT, GANs, VAEs, Diffusion Models, Blockchain basics: smart contracts, transactions, oracles, Benefits of integrating AI with blockchain (immutability, trust, decentralization)

Module 2: Generative AI for NFTs and Smart Contracts – 11 Sessions (Analyze)

AI-generated NFTs and metadata, Smart contract-driven art/music/token generation, Prompt engineering for blockchain use, Ethereum, IPFS, and Arweave for content storage, Creative commons and licensing on-chain

Module 3: Autonomous Agents & Decentralized AI Apps – 11 Sessions (Apply)

Autonomous AI agents for DeFi and DAO governance, Blockchain-based prompt markets, Agent verification and staking, AI for DAO proposals and decision-making, Combining LLMs with Chainlink oracles

Module 4: Security, Ethics & Use Cases – 12 Sessions (Apply)

AI model validation and IP protection using blockchain, Verifiable credentials, Combatting AI-generated misinformation, Case studies: OpenAI tokens, Alethea AI, Bittensor, Web3 AI marketplaces, Regulatory landscape and ethical concerns

Textbooks

T1: Rex St. John, *Generative AI on Web3: LLMs and Blockchain Integration*, Independently Published, **2023**

T2: M. Rezaul Karim, *Artificial Intelligence and Blockchain for Beginners*, Packt Publishing, **2023**

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, **2023 R2:** Peter Van Hardenberg, *Understanding Large Language Models*, O'Reilly Media,



2023

R3: Sudeep Tanwar et al., *Blockchain and AI for Cybersecurity and Privacy*, Springer, **2022**

R4: OpenAI Research Papers & Alethea Whitepapers

Web Resources

- **W1:** <u>https://platform.openai.com/docs</u>
- W2: <u>https://ethereum.org/en/developers</u>
- W3: <u>https://ipfs.tech</u>
- W4: https://alethea.ai
- W5: <u>https://bittensor.com</u>

Course Code: CBC3411

Course Title: Quantum Computing & Blockchain-AI Security L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course provides an interdisciplinary overview of **quantum computing** and its implications for the **security of blockchain and AI systems**. It covers quantum algorithms, post-quantum cryptography, quantum-safe blockchain protocols, and the impact of quantum advancements on AI model integrity, smart contracts, and decentralized security mechanisms.

Course Objectives

- Understand the fundamentals of quantum computing and its threat to classical cryptography

- Explore quantum-resistant cryptographic techniques and blockchain adaptations
- Analyze the vulnerabilities in AI and blockchain systems in a post-quantum world
- Apply hybrid security models combining quantum safety, blockchain, and AI

Course Outcomes

CO1 (Understand): Explain the principles of quantum computing and quantum threats to cryptographic systems

CO2 (Analyze): Evaluate the impact of quantum algorithms on blockchain consensus and AI model security

CO3 (Apply): Implement basic post-quantum algorithms and analyze their integration in blockchain

CO4 (Apply): Propose secure architectures combining AI, blockchain, and quantum-safe techniques

Course Content (45 Hours Total)

Module 1: Foundations of Quantum Computing – 11 Sessions (Understand) Qubits, superposition, entanglement, quantum gates and circuits, Quantum parallelism, Quantum vs classical models, Introduction to quantum programming (Qiskit, Cirq)

Module 2: Quantum Threats to Blockchain and AI – 11 Sessions (Analyze) Shor's algorithm, Grover's algorithm, Breaking RSA/ECC, Threats to Bitcoin and Ethereum, Risks to AI model integrity, Quantum attacks on hashes and signatures

Module 3: Post-Quantum Cryptography & Blockchain – 11 Sessions (Apply) Lattice-based, hash-based, code-based cryptography, NIST PQC candidates, Blockchain modifications for quantum resistance, Quantum key distribution (QKD), Hybrid encryption in smart contracts



Module 4: Secure Architectures & Use Cases – 12 Sessions (Apply) Combining AI with quantum-safe blockchains, Use cases: quantum voting, decentralized identity, healthcare AI security, IBM Q and Google Quantum AI tools, Regulatory and ethical considerations

Textbooks

T1: Mikio Nakahara & Tetsuo Ohmi, *Quantum Computing: An Applied Approach*, Springer, **2023**

T2: Mehran Mozaffari, Post-Quantum Blockchain, Springer, 2023

Reference Books

R1: Imran Bashir, Mastering Blockchain, Packt Publishing, 2023

R2: Scott Aaronson, *Quantum Computing Since Democritus*, Cambridge University Press, **2022**

R3: Ronald de Wolf, *Quantum Computing: Lecture Notes*, CWI Amsterdam, **2022 R4:** NIST PQC Project Resources and IBM Q Experience Whitepapers

Web Resources

W1: https://qiskit.org

W2: https://quantumai.google

W3: <u>https://csrc.nist.gov/projects/post-quantum-cryptography</u>

W4: <u>https://quantum-computing.ibm.com</u>

W5: <u>https://ethereum.org/en/developers/docs/security/</u>

Course Code: CBC3412

Course Title: Introduction to Decentralized Finance (DeFi) L:T:P:C – 3:0:0:3

Prerequisite: Nil

Course Description

This course provides a foundational understanding of **Decentralized Finance** (**DeFi**)—an open financial ecosystem built on blockchain networks. It covers core DeFi primitives such as lending, staking, token exchanges, liquidity pools, stablecoins, DAOs, and yield farming. Emphasis is placed on smart contract mechanics, platform security, and regulatory considerations.

Course Objectives

- Understand the architecture and protocols that power DeFi systems
- Explore key DeFi applications including lending, trading, and insurance
- Learn how smart contracts automate financial services in DeFi
- Analyze risks, governance, and compliance challenges in decentralized finance

Course Outcomes

CO1 (Understand): Explain the foundational concepts, architecture, and drivers of DeFi

CO2 (Analyze): Evaluate DeFi protocols such as DEXs, lending markets, and stablecoins

CO3 (Apply): Simulate DeFi operations such as liquidity provision and staking on testnets

CO4 (Apply): Analyze risks (smart contract, liquidity, governance) and suggest mitigation strategies

Course Content (45 Hours Total)

Module 1: Introduction to DeFi and Blockchain Infrastructure – 11 Sessions (Understand)

What is DeFi?, DeFi vs TradFi, Ethereum and EVM, Smart contracts in DeFi, Token



standards (ERC-20, ERC-721), Role of oracles, Introduction to wallets (MetaMask, Ledger)

Module 2: DeFi Applications & Protocols – 11 Sessions (Analyze)

Decentralized exchanges (Uniswap, Curve), Lending/borrowing protocols (Aave, Compound), Stablecoins (DAI, USDC, algorithmic types), Derivatives and synthetic assets, Cross-chain DeFi

Module 3: Participation in DeFi Ecosystem – 11 Sessions (Apply)

Liquidity provision, Yield farming, Staking and governance tokens, DAO voting, Token bonding curves, Farming simulations on testnets (Ropsten, Mumbai)

Module 4: Security, Risks & Regulation – 12 Sessions (Apply)

Smart contract bugs and audits, Flash loan attacks, Liquidity risks, Rug pulls, DeFi insurance, Regulatory overview (FATF, SEC, MiCA), DeFi compliance tools and trends

Textbooks

T1: Camila Russo, *The Infinite Machine*, Harper Business, 2022
T2: Lasse Clausen, *Mastering DeFi: Decentralized Finance for Everyone*, Independently Published, 2023

Reference Books

R1: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 2023
R2: Ashwin Ramachandran et al., *The DeFi Stack: A Guide to Decentralized Finance*, Github Release, 2023
R3: Rainer Böhme, *Cryptoassets and DeFi*, Springer, 2022

R4: Binance Academy & CoinGecko Research Papers

Web Resources

W1: <u>https://defillama.com</u> W2: https://ethereum.org/en/defi

W3: <u>https://aave.com</u>

W4: https://uniswap.org

W5: https://dappradar.com

Course Code: CBC3413 Course Title: Blockchain in Financial Services L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course explores how **blockchain technology is transforming the financial services industry**, from traditional banking to insurance and capital markets. Topics include decentralized clearing and settlement, digital identity, smart contracts, CBDCs, and regulatory frameworks. Emphasis is placed on architecture, security, scalability, and practical applications.

Course Objectives

- Understand blockchain fundamentals in the context of financial services

Explore real-world applications in payments, lending, trade finance, and capital markets

- Learn about digital identity, regulatory compliance, and tokenization
- Analyze challenges of adoption, scalability, and integration with legacy systems

Course Outcomes

CO1 (Understand): Explain how blockchain redefines processes in financial services **CO2 (Analyze):** Evaluate blockchain use cases across banking, insurance, and investment sectors



CO3 (Apply): Design secure blockchain-based workflows for financial operations **CO4 (Apply):** Assess integration, scalability, and regulatory strategies for blockchain solutions in finance

Course Content (45 Hours Total)

Module 1: Blockchain Basics for Finance – 11 Sessions (Understand) Distributed ledgers and consensus, Cryptographic primitives (hashing, digital signatures), Smart contracts, Tokenization of assets, Permissioned vs permissionless blockchains, Architecture of financial blockchain platforms (Corda, Quorum)

Module 2: Applications in Core Financial Services – 11 Sessions (Analyze) Cross-border payments (Ripple, Stellar), Clearing and settlement, Lending & credit scoring (DeFi, tokenized loans), Trade finance (Letter of credit digitization), Digital identity and KYC/AML

Module 3: Capital Markets, Insurance & Emerging Trends – 11 Sessions (Apply)

Tokenized securities and STOs, Fractional ownership, Reinsurance on chain, Parametric insurance, CBDCs and stablecoins, Robo-advisors with blockchain backend, ESG finance with smart contracts

Module 4: Risk, Regulation & Integration – 12 Sessions (Apply)

Security risks (51%, front-running, reentrancy), Regulatory standards (MiCA, FATF), Auditability and traceability, Integration with core banking systems, Blockchain sandboxing, Interoperability (Polkadot, Cosmos)

Textbooks

T1: Antony Welfare, *Commercializing Blockchain: Strategic Applications in the Real World*, Wiley, **2023**

T2: Imran Bashir, Mastering Blockchain, Packt Publishing, 4th Edition, 2023

Reference Books

R1: Arvind Narayanan et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press, **2022**

R2: David Shrier, Basic Blockchain, Little Brown, 2022

R3: Ash Costello, *Blockchain in Banking and Finance: Innovating with Purpose*, Springer, **2022**

R4: Deloitte and World Bank Blockchain Reports

Web Resources

W1: https://r3.com

W2: https://www.weforum.org/projects/blockchain

W3: <u>https://www.bis.org</u>

W4: https://coincenter.org

W5: https://www2.deloitte.com/global/en/pages/financial-

services/articles/blockchain-in-banking.html

Course Code: CBC3414 Course Title: Building Decentralized Applications (DApps) for Finance L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course focuses on the **design and development of Decentralized**

Applications (DApps) for financial use cases using blockchain platforms. Students



will explore smart contract programming, Web3 integration, decentralized finance protocols, and wallet connectivity. The course emphasizes security, UX design, and compliance in DApp development.

Course Objectives

- Understand DApp architecture and smart contract fundamentals
- Learn to build secure, finance-focused DApps using Ethereum and Web3 tools
- Explore UI/UX design, wallet integration, and backend connectivity
- Analyze security, scalability, and deployment challenges in real-world DApps

Course Outcomes

CO1 (Understand): Explain the architecture and components of decentralized financial applications

CO2 (Analyze): Evaluate DApp frameworks, smart contract interactions, and Web3 interfaces

CO3 (Apply): Build and test secure DApps for financial services using blockchain tools **CO4 (Apply):** Deploy and optimize DApps with wallet, API, and decentralized storage integration

Course Content (45 Hours Total)

Module 1: DApp Architecture & Financial Use Cases – 11 Sessions (Understand)

Overview of DApps, Differences between traditional apps and DApps, Financial DApp use cases (wallets, lending, insurance), Blockchain platforms (Ethereum, Polygon), DApp lifecycle

Module 2: Smart Contracts for DApps – 11 Sessions (Analyze)

Solidity fundamentals, Contract structure, Inheritance and modifiers, Events and data flow, Interaction with oracles, Audit practices, Gas optimization, Contract upgradeability

Module 3: DApp Frontend, Wallet & Web3 Integration – 11 Sessions (Apply) Web3.js/ethers.js setup, MetaMask and WalletConnect integration, DApp UI design principles, React.js frontend, Reading/writing contract data from frontend,

Decentralized authentication

Module 4: Deployment, Storage & Real-World DApps – 12 Sessions (Apply)

IPFS and Arweave for decentralized storage, Hardhat/Truffle for testing and deployment, DeFi API integration (Uniswap, Aave), Use cases: DApp lending platform, staking, NFT marketplace, Compliance and user privacy

Textbooks

T1: Nader Dabit, *Full Stack DApp Development*, O'Reilly Media, 2023
T2: David Hoover, *Decentralized Applications: Harnessing Ethereum & Solidity*, Manning, 2023

Reference Books

R1: Andreas M. Antonopoulos, *Mastering Ethereum*, O'Reilly Media, 2023

- R2: Greg Lim, Beginning Ethereum and Solidity Smart Contracts, Packt, 2022
- R3: Imran Bashir, Mastering Blockchain, Packt Publishing, 2023
- R4: OpenZeppelin Docs, Ethereum Dev Community Resources

Web Resources

W1: <u>https://ethereum.org/en/developers</u>

W2: https://docs.metamask.io

- W3: <u>https://web3js.readthedocs.io</u>
- W4: https://hardhat.org
- W5: <u>https://openzeppelin.com</u>



Course Code: CBC3415 Course Title: Smart Contracts for Financial Products L:T:P:C - 3:0:0:3

Prerequisite: Nil

Course Description

This course focuses on the **design**, **development**, **and deployment of smart contracts** specifically for **financial products and services**. It introduces smart contract logic, digital agreements, automated settlements, and programmable finance using platforms like Ethereum and Hyperledger. Use cases include insurance, lending, escrow, tokenized assets, and derivatives.

Course Objectives

- Understand the fundamentals and architecture of smart contracts
- Learn how to model financial instruments using code-based contracts
- Build and deploy secure smart contracts for DeFi and traditional finance applications
- Explore risks, audit strategies, and compliance issues in financial smart contracts

Course Outcomes

CO1 (Understand): Explain the architecture, lifecycle, and legal implications of smart contracts in finance

CO2 (Analyze): Compare financial product types and model them using Solidity or other smart contract languages

CO3 (Apply): Build, test, and deploy smart contracts for loans, insurance, and tokenized securities

CO4 (Apply): Audit and optimize smart contracts for security, gas usage, and regulatory alignment

Course Content (45 Hours Total)

Module 1: Introduction to Smart Contracts – 11 Sessions (Understand) Concept and origin, Contract lifecycle, Ethereum and EVM, Benefits and risks in finance, Platforms (Solidity, Vyper, DAML), Role of oracles and event logs

Module 2: Modeling Financial Instruments – 11 Sessions (Analyze)

Smart contracts for loans (collateralized, flash), Escrow services, Insurance contracts (parametric, peer-to-peer), Structured products, Tokenized bonds and equities

Module 3: Development, Testing & Deployment – 11 Sessions (Apply) Solidity contract structure, Events and modifiers, Testing with Truffle/Hardhat, Gas optimization, Upgradable contracts using proxies, Remix and blockchain testnets

Module 4: Security, Audits & Compliance – 12 Sessions (Apply)

Smart contract vulnerabilities (overflow, reentrancy), Audit frameworks (Mythril, Slither), Access control (OpenZeppelin), Compliance considerations (MiCA, SEC), Real-world failures (DAO, Wormhole), Best practices

Textbooks

T1: Ritesh Modi, *Building Smart Contracts and DApps on Ethereum*, BPB Publications, **2023**

T2: Imran Bashir, *Mastering Blockchain*, Packt Publishing, 4th Edition, 2023

Reference Books

R1: Andreas M. Antonopoulos & Gavin Wood, *Mastering Ethereum*, O'Reilly Media, 2023

R2: Chris Dannen, Introducing Ethereum and Solidity, Apress, 2022

R3: S. Seijas et al., Financial Smart Contracts and the Future of Banking, Springer,



2021

R4: OpenZeppelin Docs and Solidity Audit Guides

Web Resources

W1: https://soliditylang.org

W2: https://remix.ethereum.org

W3: <u>https://openzeppelin.com</u>

W4: https://consensys.net

W5: https://chain.link

Course Code: CBC3416

Course Title: Decentralized Autonomous Organizations and Risk Management in Finance

L:T:P:C – 3:0:0:3 Prerequisite: Nil

Course Description

This course explores **Decentralized Autonomous Organizations (DAOs)** and their application in **financial risk management**. It delves into governance models, treasury operations, legal status, and smart contract-driven automation of financial processes. It also covers various risk types—operational, smart contract, and market— and their mitigation strategies in decentralized environments.

Course Objectives

- Understand the structure and operational logic of DAOs
- Explore DAO use cases in investment, lending, and decentralized governance
- Learn how risk is modeled and managed within decentralized financial systems
- Analyze legal, regulatory, and technical frameworks for DAO-based finance

Course Outcomes

CO1 (Understand): Describe the architecture, governance, and funding mechanisms of DAOs

CO2 (Analyze): Evaluate DAO-based models for financial services and risk exposure **CO3 (Apply):** Build and simulate DAO smart contracts and voting systems **CO4 (Apply):** Develop risk mitigation strategies for DAO-managed financial operations

Course Content (45 Hours Total)

Module 1: DAO Fundamentals and Governance – 11 Sessions (Understand) Definition and DAO structure, Key smart contracts in DAOs, Voting mechanisms (token-based, quadratic), Treasury management, Governance tokens, DAO platforms (Aragon, DAOstack)

Module 2: DAO Use Cases in Finance – 11 Sessions (Analyze)

DAO-based lending platforms, Investment DAOs, Yield aggregators, DAO-managed stablecoins, DAO for insurance and asset management, Real-world case studies (MakerDAO, Yearn Finance, ConstitutionDAO)

Module 3: Risk Management in DAO Ecosystems – 11 Sessions (Apply)

Types of risks: protocol, liquidity, operational, regulatory, Risk scoring systems, DAO treasury risk modeling, Smart contract vulnerabilities, Flash loan attacks, DAO governance attacks

Module 4: Legal Frameworks and Compliance – 12 Sessions (Apply) Legal entity status of DAOs, Jurisdictions (Wyoming, Malta, Liechtenstein), DAO



compliance toolkits, Auditing and reporting in DAO finance, Security vs utility tokens, Regulatory overlaps (SEC, MiCA, FATF)

Textbooks

T1: Oriol Caudevilla et al., *Decentralized Finance and DAOs*, Springer, 2023
T2: Linda Xie, *A Beginner's Guide to DAOs*, Ethereum Foundation Series, 2023

Reference Books

R1: Imran Bashir, Mastering Blockchain, Packt Publishing, 2023

R2: Nathan Schneider, *Exit to Community: DAO Governance and the Future of Finance*, Yale University Press, **2022**

R3: Primavera De Filippi et al., *Blockchain and the Law: The Rule of Code*, Harvard Press, **2022**

R4: DAO Research Collective Whitepapers & LexDAO Legal Templates

Web Resources

W1: https://daostack.io

W2: <u>https://aragon.org</u>

W3: https://ethereum.org/en/dao

W4: https://makerdao.com

W5: https://lexdao.substack.com

Course Code: CBC3417

Course Title: Regulatory and Compliance Challenges in DeFi L:T:P:C - 3:0:0:3

Prerequisite: Nil

Course Description

This course explores the **regulatory**, **legal**, **and compliance frameworks** surrounding **Decentralized Finance (DeFi)**. It analyzes how DeFi challenges traditional financial regulation and examines global responses, such as MiCA, FATF, SEC guidance, and KYC/AML implementations. The course includes real-world case studies, compliance tools, and ethical considerations for DeFi innovation.

Course Objectives

- Understand the regulatory landscape for DeFi and decentralized platforms
- Examine compliance obligations related to KYC, AML, and taxation

- Analyze global approaches to DeFi oversight, classification of tokens, and enforcement trends

- Explore solutions for integrating compliance into decentralized systems

Course Outcomes

CO1 (Understand): Identify the key regulatory concerns and frameworks applicable to DeFi systems

CO2 (Analyze): Evaluate compliance challenges in decentralized lending, trading, and asset issuance

CO3 (Apply): Implement KYC/AML procedures and governance models in DeFi applications

CO4 (Apply): Assess risk and compliance strategies using real-world legal and technical tools

Course Content (45 Hours Total)

Module 1: Introduction to DeFi Regulation – 11 Sessions (Understand)

What is DeFi and why it's difficult to regulate, Regulatory bodies (FATF, SEC, EU, BIS), Principles-based vs rules-based regulation, Legal identity and anonymity, Public vs permissioned protocols



Module 2: Global Regulatory Frameworks – 11 Sessions (Analyze) MiCA (EU), FinCEN (USA), MAS (Singapore), FCA (UK), Taxation of crypto assets, Classifying tokens (security, utility, hybrid), Regulatory sandbox models, DAO regulation

Module 3: Compliance Integration in DeFi Platforms – 11 Sessions (Apply) On-chain KYC/AML, Decentralized identity (DID, VC), Risk scoring and monitoring tools, AML compliance engines (Chainalysis, TRM Labs), Oracle-based compliance feeds, Smart contract-based compliance controls

Module 4: Case Studies, Ethics & Emerging Trends – 12 Sessions (Apply) Notable enforcement actions (SEC vs Ripple, Tornado Cash sanctions), DeFi rug pulls and litigation, Data privacy (GDPR in DeFi), Self-regulatory organizations (SROs), Compliance-by-design models, Future of regulated DeFi

Textbooks

T1: Jason Gottlieb, *Crypto Regulation: Navigating Compliance in the Decentralized World*, Wiley, **2023 T2:** Christopher Giancarlo, *CryptoDad: The Eight for the Euture of Money*, Wiley, **202**

T2: Christopher Giancarlo, *CryptoDad: The Fight for the Future of Money*, Wiley, **2023**

Reference Books

R1: Primavera De Filippi & Aaron Wright, *Blockchain and the Law*, Harvard University Press, **2022**

R2: Imran Bashir, Mastering Blockchain, Packt Publishing, 2023

R3: World Economic Forum, DeFi Policy Toolkit, WEF, 2022

R4: Global Financial Stability Reports – IMF, BIS, FATF Recommendations

Web Resources

W1: https://www.fatf-gafi.org

- W2: https://www.sec.gov/spotlight/cybersecurity
- W3: <u>https://www.european-union.europa.eu</u>
- W4: <u>https://www.chainalysis.com</u>
- W5: <u>https://trmlabs.com</u>

Course Code: MAT2301	Course Title: Calculus and Differential Equations Type of Course: BSC	L-T-P-C	3	1	0	4
Version No.	1.0					
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	Calculus and differential equations are mathematics, statistics and operations resea able to build upon the foundations of calculus repertoire of theory and practice in these are differential equations in the description and will also be considered. This unit will extend knowledge and use of techniques in different focuses on the concepts of Calculus and Diff specific engineering problems. The course i type in nature.	rch. In this cours s established to g eas. The applicat modelling of r the problem-sol ial and integral c erential Equatio	rse, st reatly tion o eal-w ving s calcul ns wi	tuden v enha f calo orld skills us. T th ref	ts can ance t culus probl , rang he co cerenc	n be their and ems ge of urse ce to



GJ RE		Phateac work		
Course Objective	The goal of the course Calculus and Differential Equations is to facilitate the students with a concrete foundation of differential calculus and to solve the first and higher-order ordinary differential equations enabling them to acquire the knowledge of these mathematical tools.			
Course Out	On successful completion of the course the	students shall be abl	e to:	
Comes	 Apply the knowledge of calculus curves and its applications in determinin Apply the principles of integral calc Learn the notion of partial different multivariate functions and solve problen Jacobian. Solve first-order linear/nonlinear analytically using standard methods. 	ng the bentness of a sulus to evaluate inte- tiation to calculate r ns related to compos	curve. grals. ate of change of ite functions and	
Course Content:				
Module 1	Differential Calculus		(10 Classes)	
curves, pedal equat Limit, continuity a	polar curves, angle between radius vector a ions, curvature and radius of curvature. nd partial derivatives, directional derivatives, na, minima and saddle points; Method of Lag	, total derivative; Ta	ngent plane and	
Module 2	Integral Calculus	Assignment	(10 Classes)	
their properties; A revolutions. Rolle	utes; Evaluation of definite and improper integrapplications of definite integrals to evaluate statement, Mean value theorems, Taylor minate forms and L'Hospital's rule; Maxima statement of the	nte surface areas a r's and Maclaurin	and volumes of	
Module 3	Multivariable Calculus		(10 lectures)	
Change of variables (constant and varia Simple application	n: Double integrals (Cartesian), change of ord s (Cartesian to polar), Applications: areas and able densities); Triple integrals (Cartesian), s involving cubes, sphere and rectangular pa s, scalar surface integrals, vector surface integ	volumes, Center of r orthogonal curvilin arallelepipeds; Scala	nass and Gravity ear coordinates, ar line integrals,	
Module 4	Differential Equations	Assignment	(15 lectures)	
linear and Bernoull for p, equations sol Linear differential	f Differential Equations, Applications, Variab i's equations, Euler's equations, Equations no vable for y, equations solvable for x and Clair equations of second and higher order of the type $Q(x) = e^{ax}$, Sin ax, Cosax, $e^{ax}ve$	ot of first degree: eq raut's type. with constant coef	uations solvable ficients - Non-	
Targeted Application Differential calculu motion, velocity, ac	on & Tools that can be used: is is used extensively in science and engineer cceleration, angles of incline or curve on a sur ons are used to model the behavior of electror	face, etc.		

design of antennas, microwave ovens, and other devices. Biology: PDEs are used to model biological processes, such as the spread of diseases and the development of biological tissues.



Tools Used: Python.

Assignment:

7. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book

3. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition

4. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

21. Victor Henner, Tatyana Belozerova, Mickhail Khenner, Ordinary and Partial Differential Equations, CRC Press, Edition, 2013.

22. Walter Ledermann, Multiple integrals, Springer, 1st edition

23. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

24. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

E-resources/ Web links:

12.https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUEBASED&unique_id=EBSCO95_30102024_103205

13.https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_id=EBSCO95_30102024_106839

14.https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_id=EBSCO95_30102024_61605

15. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_134719</u>

16. <u>https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html</u>

17. <u>https://www.scu.edu.au/study-at-scu/units/math1005/2022/</u>

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course Code: MEC1006	Course Title: Engineering Graphics Type of Course: School Core & Theory Only	L- T-P- C	2	0	0	2
Version No.	1.2					
Course Pre- requisites	NIL					
Anti-requisites	NIL					
Course Description	The course is designed with the objective engineering graphics. It is introductory in nate with the techniques used to create engin emphasizes on projection of points, lines, pla projections.	ure and accerted acce	quai awin	nts th gs. T	estud he co	ents ourse
Course Objective	The objective of the course is to familiarize the of "Engineering Graphics" and attain SKILL DE Problem solving methodologies.				-	ots



	On successful	completion of this cou	rse the students shall be able	e to:					
			ineering Graphics as per BIS o	conventions					
	and standa								
	•		ction for drawing projections	of Points,					
		Lines and Planes under different conditions.							
	^	Prepare multiview orthographic projections of Solids by visualizing							
Course		ferent positions.							
Outcomes		_	g the principles of isometric p	rojections					
	to visualize	objects in three dime	ensions.						
Course Content	-								
Module 1	Introduction	Assignment	Standard technical drawing	02					
	to Drawing			Sessions					
Topics:									
Introduction, dra	awing instrume	nts and their uses, rel	evant BIS conventions and sta	andards,					
Lettering, Lineco	onventions, dim	ensioning, Selection	of drawing sheet size and scal	e.					
	Orthographic								
	projections of								
	Points,		Projection methods	10					
Module 2	Straight	Assignment	Analysis	Sessions					
	Linesand		1 mary 515	563510115					
	Plane								
Tanica	Surfaces								
Topics:	nitions – Flomon	ts of projection and me	thods of projection, Planes of pr	rojection					
				-					
	i conventions aut	opteu. Fil st aligie aliu ti	nird angle projections. Projection	I OI POIIItS					
inall 4 quadrants.									
	• •		st angle projection only): True a						
_			es. (No application problems). faces – triangle, square, rectang						
-	• • •	, , ,	the planes using change of pos						
only.			the planes using change of pos	nion methou					
5									
	Orthographi								
Module 3	c Projections	Assignment	Multi-view drawing Analysis	10					
unio U	of			Sessions					
	Solids								
Topics:	-								

Introduction, Projection of right regular prisms, pyramids, cone, hexahedron and tetrahedron indifferent positions (Problems resting on HP only and First angle projection).

Module 4	Isometric Projections of Solids (Using isometric scale only)	Assignment	Spatial Visualization	8 Sessions
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Topics:

Introduction, Isometric scale, Isometric projections of right regular prisms, cylinders, pyramids, cones and their frustums, spheres and hemispheres, hexahedron (cube), and combination of 2 solids, conversion of orthographic view to isometric projection of simple objects.

[8 Hours: Application Level]

Text Book:

1.N. D. Bhatt, "Engineering Drawing: Plane and Solid Geometry," Charotar Publishing House Pvt. Ltd.

References:

1. K.R. Gopalakrishna, "Engineering Graphics", Subhash Publishers, Bangalore.

2. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, "Engineering Graphics with AutoCAD," Prentice Hall.

3. D. A. Jolhe, "Engineering Drawing with Introduction to AutoCAD," Tata McGraw Hill.

Web resources:

https://nptel.ac.in/courses/112103019

Topics relevant to "SKILL DEVELOPMENT": Projection in first and third angle for **SKILL DEVELOPMENT** through **Problem Solving methodologies**. This is attained through the assessment component mentioned in the course handout.

ENG2501	Advanced English	L- T- P- C	2	0	0	2	
Version No.	2.0	1				.1	
Course Pre- requisites	ENG1900 - English for Technical Communicati	on					
Anti-requisites	NIL	ĨIL –					
Course Description	This course is designed to equip students to enabilities in Listening, Speaking, Reading, and covers interpersonal communication principles, a delivery (including impromptu speaking), strat reading, the identification of logical fallacie Furthermore, the course will introduce students and the techniques of prompt engineering to e skills in the digital age. Upon course complet prepared to communicate effectively and critic professional environments.	d Writing. T the art of spe- tegic approa- s, and persu- to the poten levate their of tion, students	The echy ches uasiv tial com	curr writh to ve v of A mun 11 b	ing a criti writin A to icati e we	um und cal ng. ols ion ell-	
Course Out Come	 On successful completion of the course the stude 5. Recognize the elements of interpersonal communication to address communication communication to address communication communication communication the ability to deliver structure Speeches using effective speaking technique 	and cross-cu hallenges eff ired and imp	ltura ectiv	al vely.			



Module 4	Writing Effective Arguments	Assignment	Clear and Coherent Writing	9 Classes
	U		Clear and	9
•	Critical Reading Work	sheet/Identifying Bias in	News Articles	
Appeal Activities:	to Authority, Sunk Co	st, Appeal to ignorance		
		Straw Man, Bandwagon,	No True Scotsman, Re	d Herring,
		Fallacies: Slippery Slope,		
Logic o	of an Argument, Recog	nizing Emotional Manipu	lation, Analysing Visua	als
-	Critical Reading Strat	egies: Contextualizing, I	Figurative Language, H	Evaluating
Topics:	v ··· ···	1	1	1
	Analysis		ana 1 mary 515	
Module 3	Reading and Logical	Worksheet	Critical Thinking and Analysis	Classes
	Critical			12
•	Impromptu Speech		1	1
	Speech Writing			
• Activities:	Practice Speech Deliv	ciy		
•	-	ve Impromptu Speaking		
•	Speech Preparation an	e		
•	Introduction to Promp			
Topics:				
	Speech Delivery	GIRINE	Confidence	Classes
Module 2	Mastering	JAM	Public Speaking	12
		T	T	
		versations/Observation E	-	-
	-	Tone and Emotion Exper	riment/Mixed Messages	3
•	Instagram/YouTube Vo	cabulary Activity		
Activities:				
	Common Errors in Co	-		
	Active Listening Tech	•	1 Dimensions).	
•		d Paraverbal communica leory (Hofstede's Cultura		
•		personal Communication		
Topics:				
	Communication	play	Competency	
Module 1	Effective	Case Studies/ Role	Cross-Cultural	Classes
	Foundations of			12
Course Conte	nt:			
	argumentation	n techniques and structure	ed writing strategies.	
	-	ersuasive and analytical e	-	
	strategies to e	valuate arguments, logic,	and persuasion.	
	7. Interpret t	extual and visual materia	ls using critical reading	
	REACH GREATER HEIGHTS	IIV LILUII I	Alene No	



Topics:

- Understanding Critical Writing
- Building Arguments (Pathos, Ethos, Logos)
- Techniques for Persuasion

Activities:

- Causes or Effects/Appeal Mash-Up/Debates on Controversial Topics
- Opinion Writing

Targeted Application & Tools that can be used: Quizziz, Chatgpt, Gemini, Youtube, Instagram, Quillbot, Grammarly, Padlet

References

- 6. Adler, R. B., Rodman, G., & DuPré, A. (2019). Understanding human communication (14th ed.). Oxford University Press.
- 7. Moore, B. N., & Parker, R. (2020). *Critical thinking* (13th ed.). McGraw-Hill Education.
- 8. Hamilton, C. (2020). Communicating for success (2nd ed.). Routledge.
- Ting-Toomey, S., & Dorjee, T. (2018). Intercultural competence: A model for teaching and assessing cross-cultural communication. *Journal of Intercultural Communication*, 47(2), 213–229. https://doi.org/10.1016/j.jicc.2018.03.004
- 10. https://www.ted.com/

Topics Relevant to "employability": Teamwork and Collaboration, Critical Thinking and Problem-Solving

Topics Relevant to "Human Values and Professional Ethics": Critical reasoning, Inclusivity and Fairness

Course Code: ECE2022	Course Title: Digital Design Type of Course: ESC	L- T-P- C	2	0	0	2		
Version No.	1.0							
Course Pre- requisites	[1] Elements of Electronics/Electrical Engineering, 2] Basic concepts of number representation, Boolean Algebra							
Anti-requisites	NIL							
Course Description	The purpose of this course is to enable fundamentals of digital logic circuits and Be combinational and sequential logic circuit minimization techniques for making canon implementations. This course deals with electronic circuits. The course also creates which includes Computer Architecture, Micro Embedded Systems etc. The course enhances the Design, Implement through laboratory tasks. The associated lal to verify the theoretical knowledge.	colean algeb s. The coun- ical and low analysis and a foundation processors, N tation and Pr	ra fo rse /-cos d de n for /licro	emp emp it dig esign futu cont	ng on hasize gital of of of ure co rollers ing at	both son circuit digital burses s, and pilities		



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	Circuit Generation," 2021 IEEE East-West Design & Test Symposium (EWDTS), 2021, pp. 1-
Expe	4, doi: 10.1109/EWDTS52692.2021.9581029 riment No.11. Determination of dielectric constant of given materials 8. A. Matrosova, V. Provkin and E. Nikolaeva, Masking Internal Node Faults and Trojan Circuits
Leve	18. A. Matrosova, V. Provikin and E. Nikolaeva, "Masking Internal Node Faults and Trojan Circuits
	1: Hereffrenetherby ferendis with attended by the state of the position (EWDTS), 2019, pp. 1- 2: compare the positive addition of the positive attended by the state of the positive attended by the positive attended by the state of the positive attended by the positive attende
Expe	riment No. 12: determine the wavelength of monochromatic light, such as sodium light, using Topics relevant to "SKILL DEVELOPMENT": Adders, Multiplexers, Decoders / Encoders; Flip-
Nev	Topics relevant to "SKILL DEVELOPMENT": Adders, Multiplexers, Decoders / Encoders; Flip-
Leve	Flops and Registers for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout. 2. determine the radius of curvature of the Plano-convex lens.
Leve	12. determine the radius of curvature of the Plano-convex lens.
Taro	eted Application & Tools that can be used:
5	
-	computing software, electronic devices using transistors and diodes, memory devices,
	endoscopy, SQUIDS in MRI, Advanced material characterizations using SEM and STM.
6	
Pro	ject work/Assignment: Mention the Type of Project /Assignment proposed for this course
Ass	sessment Type
	Midterm exam
	Assignment (review of digital/ e-resource from PU link given in references section - mandatory to submit screen shot accessing digital resource.)
	Quiz
	End Term Exam

• Self-Learning



1. Prepare a comprehensive report on non-conventional energy resources in Karnataka and their pros and cons.

2. Write a report on importance of quantum entanglement in supercomputers.

Course Code:	Course Title: Probability and Statistics	L-T- P- C	3	1	0	4
MAT2402	Type of Course: BSC		5		U	4
Version No.	1.0					<u> </u>
Course Pre- requisites						
Anti- requisites	NIL					
Course Description	The course introduces the concepts of p covering how to collect, organize, interpr mathematical models to understand rando across various fields like science, enginee	et, and draw infer	ences tainty, v	from with a	data ι pplica	using itions
Course Objective	The objective of the course is to equip stu probability theory and statistical methods, data, and make informed decisions base various situations, often applied across diff business.	enabling them to co d on the likelihood	ollect, a l of eve	inalyz ents o	e, inte ccurri	erpret ng in
Course Out Comes	 On successful completion of the course the 5. Be able to compute conditional probability and check for independence of events 6. Be able to set up and work with discress particular, to understand the Bernoulli, distributions, uniform, normal, and exp 7. Identifying different types of data relatility logarithmic). 8. Be able to use specific significance test sample), and chi-squared test 	vilities directly and te & continuous ra binomial, geometr onential distributio onships (linear, po	using E ndom v ic, Pois ns. Iynomia	Bayes Pariabl Sson al, exp	les; in bonen	tial,
Course Conte	nt:					
Module 1	Basic Probability			(6	Clas	ses)
-	n Event, multiplication rule, combinations, al Probability, Bayes's Theorem and Probler		ition La	iw, Mu	ultiplic	ation
Module 2	Random Variables and Bivariate Distributions	Assignment		(15	Clas	ses)
Expectations, c	bles (discrete and continuous), Probability liscrete probability distributions - Binomial d ontinuous uniform distribution - exponential ariate distributions and their properties, distributions	istribution, Poissor distribution, norm	n distrib nal dist	ution, ributic	geon on, ga	netric mma



Module 3	Curve Fitting & Statistical Methods		(13 Classes)
Curve Fitting (S	Straight Line (y = a + bx), Parabola (y = a +	+ bx + cx ²), Exponentia	al Curves (y = ae ^{bx} , y
$= ab^x and y = b^x$	ax ^b) Measures of Central tendency, Mome	ents, skewness and Ki	urtosis, Correlation -
Karl Pearson's	coefficient of correlation and rank correl	lation (with & Without	t repetition, Multiple
Correlation - Pr	oblems. Regression analysis - lines of regr	ression, Multiple regres	ssion - Problems.

Module 4	Joint Probability Distribution and Sampling Theory	Assignment	(15 Classes)

Joint Probability distribution for two discrete random variables, expectation and covariance.

Random sampling, sampling distributions, Standard Error, Type I & Type II errors, Testing of Hypothesis, Test of significance - Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations, Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Targeted Application & Tools that can be used:

The contents of this course has direct applications in most of the core engineering courses for problem formulations, Problem Solution and system Design.

Tools Used: R software (Open Source)

Assignment:

2. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book

- 3. Ronald .E. Walpole, Raymond. H. Myers, Sharon. L Myers, and Keying E. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Delhi-9th edition, 2012.
- 4. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

- 4. Miller and Freund, Probability and Statistics for Engineers, Pearson Education Ltd.
- 5. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition.
- 6. Douglas C. Montgomery & George Runger, Applied Statistics and Probability for Engineers, , Wiley Publications

E-resources/ Web links:

- 9. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_10427</u>
- 10. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_100198</u>
- 11. https://nptel.ac.in/courses/109104124
- 12. https://nptel.ac.in/courses/111106051
- 13. https://nptel.ac.in/courses/111102137



14. https://www.math.hkust.edu.hk/~magian/ma006_0607F.html

15. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

16. Presidency University's Knimbus library URL is: presiuniv.knimbus.com

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course	Course Title: Foundations of Integrated							
Code:	Engineering	L- T-P-	2	0	0	2		
CIV1200	Type of Course: ESC	С						
Version No.	1.0			•	•			
Course Pre- requisites	NIL							
Anti- requisites	NIL							
Course Description	This interdisciplinary course introduces first-year eng principles and practices across key engineering d problem-solving, sustainability, and ethical innovat mechanical, electrical, and IT systems intersect with AI, and geomatics to address global challenges. Thr deeper understanding of smart infrastructure, pr systems, and securing IT solutions. Topics include monitoring, GIS-enabled urban planning, renew cybersecurity fundamentals. The course cultivate engineering's role in sustainable development, safe preparing students to contribute meaningfully to technology-driven world.	omains, er ion. Stude o emerging ough case ototyping bioinforma vable ene es a holis ety, and eth	mpha nts e tech studi mech tics fo rgy stic u nical o	sizing xplore nolog es, le nanica or env integr nders decisi	real- e how ies lik arners al/elec vironn ation, standin	world civil, e IoT, s gain tronic nental and ng of aking,		
Course Objective	The objective of the course is skill development of Learning techniques.	of student	by us	sing F	Partici	oative		
Course Outcomes	 On successful completion of this course the students 1] Recall key principles of Agile, DevOps interdisciplinary engineering contexts. 2] Explain the role of GIS, LiDAR, and sustaina infractructure and disaster management systems 	s, and bio ble materia	oinfor	matic				
	 infrastructure and disaster management systems. 3] Describe core components of mechanical systems and their real-world applications. 4] Describe the functionality of IoT-enabled wearable devices, embedded 							
	 4] Describe the functionality of IoT-enabled systems, and renewable energy integration in sm 5] List foundational IT concepts such as cybersecurity threats, and blockchain application 	nart grids. cloud com						



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Emerging Fiel	ds: Autor	nation, and	d Introdu	ction	n to bioinforr	matics ar	nd its application	n			
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requisi	tes	ngineering	. 0								
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Moduceourse	Electric Engine	The obje	ctive of	the	course is '	SKILL D	DEVELOPMEN	JT' o	f the	stuc	lent
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hardware plat	•	, ,	•		0	•					
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Core IT Topics	s: Networ	king basics	<u>gnize a</u> s, Cloud	çom	puting,	iutions f	or the challen	jes (conn Jogic	ecte	3 10
Cybersecurity	& Data:	Encryption	, phishin	g pre	evention, ze	en and ro-trust	sustainable le models, Databa	se n	lanag	ieme	nt.
Emerging Tec	h: Blockc	hain for su with e	in ine o pply cha environn	uain Ins, nent	AI/ML basic	ers o l er s, 101 in ors.	or the challeng sustainable te models, Databa legration with c	oud	platic	SOCIE	llea
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Text Book:	nt:										
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8. Supratim Cho	udiand Bisplay System Seg	inners: ^t Genes,	, Geno	anae atraisvole	ecular
9Robert McGin University Press.	my Systems Entronduction, n. "The Ethical Engineer: Cont pactor, charge "transfer a "ist Edition, 2020	classification temporary Con nd Resistor,	of ele cepts types	ectronic memo and Cases", P of materials	ory devices- rinceton 5 - organic,
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	ooks, Christopher Grow, & Phil	ip Craig, "Cybe	rsecu	rity Essentials	
Edition, 2021 Module 3	Nanomaterials based Smart Sensors and	Assignmen	Data	a Collection	09
b-resources:	Devices	t	an	d analysis	Classes
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and sequestra				•	·
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Module 5		Quiz/Sen	ninar	Data Collec	
Module 5	Energy Science	Quiz/Sen		and analys	sis
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Module 5 Topics: Batte electrochemic	Energy Science ry technology:Fundamenta al storage devices: battery (Quiz/Sen als of electroo Lithium-ion ba	chemi attery-	and analys stry, Introduct LiMnO ₂ , LiC	tion to 0O ₂ , metal
Module 5 Topics: Batte electrochemic air batteries- L	Energy Science ry technology:Fundamenta al storage devices: battery (iO ₂) and supercapacitors-In	Quiz/Sen als of electroo Lithium-ion ba	chemi attery-	and analys stry, Introduct LiMnO ₂ , LiC	tion to 0O ₂ , metal
Module 5 Topics: Batter electrochemic air batteries- L and asymmetr	Energy Science ry technology:Fundamenta al storage devices: battery (iO ₂) and supercapacitors-In ic capacitor.	Quiz/Sen als of electroo Lithium-ion ba troduction, Pr	chemi attery- rinciple	and analys stry, Introduct LiMnO ₂ , LiC e, Types - ED	tion to 0O ₂ , metal LC, pseudo
Module 5 Topics: Batter electrochemic air batteries- L and asymmetr Photovoltaics	Energy Science ry technology:Fundamenta al storage devices: battery (iO ₂) and supercapacitors-In ic capacitor. s: Solar cells - Construction	Quiz/Sen als of electroo Lithium-ion ba troduction, Pr	chemi attery- rinciple	and analys stry, Introduct LiMnO ₂ , LiC e, Types - ED	tion to 0O ₂ , metal LC, pseudo
Module 5 Topics: Batter electrochemic air batteries- L and asymmetr Photovoltaics	Energy Science ry technology:Fundamenta al storage devices: battery (iO ₂) and supercapacitors-In ic capacitor.	Quiz/Sen als of electroo Lithium-ion ba troduction, Pr	chemi attery- rinciple	and analys stry, Introduct LiMnO ₂ , LiC e, Types - ED	tion to 0O ₂ , metal LC, pseudo
Module 5 Topics: Batte electrochemic air batteries- L and asymmetr Photovoltaics Organic and q	Energy Science ry technology:Fundamenta al storage devices: battery (iO ₂) and supercapacitors-In ic capacitor. s: Solar cells - Construction	Quiz/Sen als of electroo Lithium-ion ba troduction, Pr on and workin SSC's).	chemi attery- rinciple ng pri	and analys stry, Introduct LiMnO ₂ , LiC e, Types - ED nciple; types	tion to 0O ₂ , metal LC, pseudo

Targeted Application & Tools that can be used:



Application areas are Data storage and analysis, logistics, Biomedicine, Energy, Environment and sustainability

Tools: Molview, chemdraw, excel etc

Project work/Assignment:

Assessment Type

- Midterm exam
- Assignment (review of digital/ e-resource from PU link given in references section - mandatory to submit screenshot accessing the digital resource.)
- Quiz/Student Seminar
- End Term Exam
- Self-learning

Text Book

- 1. Wiley, "Engineering Chemistry", Wiley.
- 2. G.A. Ozin and A.C. Arsenault, Nanochemistry: A chemical approach to nanomaterials, Royal Society of Chemistry, 2009

Reference Books

- 1. Functional and smart materials, Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2020, CRC Press,
- 2. ISBN: 978-036-727-510-5.
- 3. E-waste recycling and management: present scenarios and environmental issues, Khan, Anish, and
- 4. Abdullah M. Asiri. 2019, Springer, Vol. 33. ISBN: 978-3-030-14186-8.
- 5. Essentials of computational chemistry: theories and models, Christopher J Cramer, 2013, John Wiley &
- 6. Sons. ISBN: 978-0-470-09182-1.
- 7. Energy storage and conversion devices: Supercapacitors, batteries and hydroelectric cells, Anurag Gaur,
- 8. L. Sharma, Anil Arya. 2021, CRC press, 1st edition, ISBN: 978-1-003-14176-1.
- 9. Fundamentals of analytical chemistry: An introduction, Douglas A. Skooget etal., 2004 Thomson Asia pte
- 10. Ltd., 8th, ISBN: 978-0-495-55828-6
- 11. Functional and smart materials, Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2020, CRC Press,
- 12. ISBN: 978-036-727-510-5.
- 13. Electrical and electronic devices, circuits and materials: Technological challenges and solutions. Tripathi,
- 14. L., Alvi, P. A., & Subramaniam, U, 2021, John Wiley & Sons, ISBN: 978-0367564261.
- 15. F. Jensen, Introduction to Computational Chemistry, 3rd edition, Wiley, 2017.

E resources

- 1. <u>https://presiuniv.knimbus.com/user#/searchresult?searchId=computational%20che</u> <u>mistry&_t=1738054970142</u>
- 2. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_48504</u>
- 3. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_147967</u>
- 4. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> E_BASED&unique_id=EBSCO95_30102024_130301
- 5. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_87297</u>
- 6. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_67006</u>



- 7. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> E_BASED&unique_id=EBSCO95_30102024_137261
- 8. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_86712</u>

Skill Sets

All topics in theory component are relevant to Environment and Sustainability.

Course	Course Title: Program Solvin	ng Using C								
Code:	Type of Course: Theory	-9		L- T-P-C	2	0	0	2		
CSE2200	- PCC									
Version No.	1.0									
Course Pre-	NIL									
requisites										
Anti-requisites	NIL									
Course Description	will be able to develop logi									
Course Object	The objective of the course is t	The objective of the course is to familiarize the learners with the concepts of Problem SolvingUsing C and attain Employability through Problem Solving								
Course Outcomes	 On successful completion of this course the students shall be able to: 1. Write algorithms and to draw flowcharts for solving problems 2. Demonstrate knowledge and develop simple applications in C programming constructs 3. Develop and implement applications using arrays and strings 4. Decompose a problem into functions and develop modular reusable code 5. Solve applications in C using structures and Union 6. Design applications using Sequential and Random Access File Processing. 									
Course Content:										
Module 1	Introduction to C Language	Quiz	Problem Solving	6 Sessi	ions	}				
Preprocessor Direct types – Operators a	Topics: Introduction to Programming – Algorithms – Pseudo Code - Flow Chart – Compilation – Execution – Preprocessor Directives (#define, #include, #undef) - Overview of C – Constants, Variables and Data types – Operators and Expressions – Managing Input and Output Operations – Decision Making and Branching - Decision Making and Looping.									
	Strings		Solving							
Programs – Sorting Arrays – Initializati Introduction – Decl Variables – Reading	Topics: Arrays: Introduction – One Dimensional Array – Initialization of One Dimensional Arrays – Example Programs – Sorting (Bubble Sort, Selection Sort) – Searching (Linear Search) - Two Dimensional Arrays – Initialization of Two Dimensional Arrays. Example Programs – Matrix operations. Strings: Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal – Writing String to Screen – String Handling Functions.							onal ngs:		
Module 3	Functions and Pointers	Quiz	Problem Solving	6 Sessi	ions					



Topics:

Functions: Introduction – Need for User-defined functions – Elements of User-Defined Functions: declaration, definition and function call–Categories of Functions – Recursion. **Pointers:** Introduction – Declaring Pointer Variables – Initialization of Variables – Pointer Operators – Pointer Arithmetic –

Arrays and Pointers – Parameter

Passing: Pass by Value, Pass by Reference.

U				
Module 4	Structures and Union	Quiz	Problem	6 Sessions
			Solving	

Topics:

Structures: Introduction – Defining a Structure – Declaring Structure Variable – Accessing Structure Members – Array of Structures – Arrays within Structures – **Union:** Introduction – Defining and Declaring Union – Difference Between

Union and Structure.

Module 5	File handling	Case Study	Problem Solving	6 Sessions
Taniaa				

Topics:

Files: Defining and Opening a File – Closing a File – Input / Output Operations on File – Random Access Files

Text Book(s):

1. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316- 513-0.

Reference Book(s):

- 6. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
- 7. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
- 8. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015

9. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.

10. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Web Links and Video Lectures:

- 1. https://nptel.ac.in/courses/106/105/106105171/
- 2. https://archive.nptel.ac.in/courses/106/104/106104128/

Course Code: EEE1200	Course Title: Basics of Electrical and Electronics Engineering. Type of Course: Theory - ESC	L-T-P-C	3	0	0	3
Version No.	2.0					
Course Pre-requisites	NIL					
Anti-requisites	NIL					
Course Description	This is a fundamental Course which is de of electrical and electronics engineering p of Engineering. The course emphasis applications of electrical and electron emphasizes on the working, analysis and both active & passive components. Add foundation for the future courses such system, power electronics Linear Communication and Digital Communica	rinciples occu ses on the c nic devices. lesign of elect litionally, this as Electrical Integrated	rs in hara The rical s cou mac	var cter co circ urse chin	ious istic urse cuits cre es,	a fields and a also a using ates a power



Course Objective	The objective of the course is to familiarize the learners with the concepts of Basics of Electrical and Electronics Engineering and attain Skill Development through Participative Learning techniques.					
Course Outcomes	Apply basic laws and other parame Discuss various f of semiconductor Summarize the op amplifiers.	mpletion of this course the of Electrical Engineering ters in the circuits. undamental parameters a devices and their applica perations of different biast formance characteristics es.	g to compute volu ppearing in the c tions. ing configuration	tage, currents haracteristics s of BJTs and		
Course Content:						
Module 1	Introduction to Electrical Circuits	Assignment/ Quiz	Numerical solving Task	10 Sessions		
AC Circuits: Funda of active power, rea	active power and Powe ee phase system and r	e circuits - Series RL, RC er factor, Numerical exam- elation between line and	ples.			
Module 2	Semiconductor and Diode applications	Assignment/ Quiz	Memory Recall based Quizzes	10 Sessions		
practical behaviour	r, Modelling the Diod	emiconductor, Types of S e Forward Characteristic l its applications like volta	, and Diode app			
Module 3	Transistors and its Applications	Assignment/ Quiz	Memory Recall- based Quizzes	10 Sessions		
and their current ga amplifier. JFET (C off voltage, Compa	ains. Operating point, E Construction, principal arison of BJT and FE	nents, BJT Configurations Biasing, Fixed Bias, and lo of Operation and Volt –A I. MOSFET (Constructio ancement and Depletion r	bad line analysis. Empere characterion, principal of C	Single Stage stics). Pinch-		



	REACH GREATER HEIGHTS FUNDAMENTALS		Numerical	
Module 4	of Electrical Machines	Assignment/ Quiz	Numerical solving Task	10 Sessions
Numerical examp	oles. DC Motor: principl	sformers: principle of o le of operation, Back EM of Induction Motors and	F, torque equatio	-
Self-Learning Topics:				
factor, Multist Special Mach 	tage amplifier, Darlingto	cial electrical machines a	-	
 supply unit, reable to join a period Professional Besides the Generators, 	egulator unit, embedded profession which involv ly Used Software: Mu se software tools har Power Supplies, C circuit testing and anal	dware equipment sucl Oscilloscopes etc., c	nics etc.). The stue electronic circuit	idents will be design. rs, Function
students. They ne		article topic will be given sources and write a repor		
		sentation, where the stude king and discuss the applic	-	
circuits like Pow	er Amplifier, Signal/Fur rt which will include Circ	e students will be given a nction Generator etc. as a cuit Diagrams, Design, Wo	a case study. Stu	dents will be
Text Book(s):				
 Hill Education Theraja B.L. Engineering" A.P.Malvino, 	and Theraja A.K., "A in S.I. System of Units, 2 Electronic Principles,7t C. Halkias and C. D. P	Electrical and Electronics Textbook of Electrical 23rd ed., New Delhi: S. C hEdition, Tata McGraw H Parikh, "Millman's Integra	Technology: Bas Chand, 2002. Hill,2007	sic Electrical
	ctrical & Electronics Lab	ooratory Manual.		

• John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and Electronic Technology", 10th Edition (Indian Edition published by Dorling Kindersley),



Pearson,2011

- Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007.
- K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd
- R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition.
- A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition
- A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition
- Online Resources (e-books, notes, ppts, video lectures etc.):
- https://presidencyuniversity.linways.com
- https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples"
- Seminar Topic: https://nptel.ac.in/courses/108/105/108105153/ "Electrical Measurements"
- Video lectures on "Electronic Devices" by Prof. Dr. A. N. Chandorkar, IIT Bombay http://www.satishkashyap.com/2013/03/video-lectures-on-electron-devices-by.html
- Video lectures on "Analog Electronics" by Prof. S.C. Dutta Roy, IIT Delhi https://nptel.ac.in/courses/108/102/108102095/
- Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati,
- https://nptel.ac.in/courses/117/103/117103063/
- E-content:
- "Introduction to Electrical Machines https://nptel.ac.in/courses/108/102/108102146/"
- M. -Y. Kao, H. Kam and C. Hu, "Deep-Learning-Assisted Physics-Driven MOSFET Current Voltage Modeling," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 974-977, June 2022, doi: 10.1109/LED.2022.3168243
- https://ieeexplore-ieee-org-resiuniv.knimbus.com/document/9758727
- F. Bonet, O. Aviñó-Salvadó, M. Vellvehi, X. Jordà, P. Godignon and X. Perpiñà, "Carrier
- Concentration Analysis in 1.2 kV SiC Schottky Diodes Under Current Crowding," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 938-941, June 2022, doi: 10.1109/LED.2022.3171112. https://ieeexplore-ieeeorg-presiuniv.knimbus.com/document/9764749
- M. Chanda, S. Jain, S. De and C. K. Sarkar, "Implementation of Subthreshold Adiabatic Logic for Ultralow-Power Application," in IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. .23, no. 12, pp. 2782-2790, Dec. 2015.
- https://ieeexplore.ieee.org/document/7018053
- R. Raut and O. Ghasemi, "A power efficient wide band trans-impedance amplifier in submicron
- CMOS integrated circuit technology," 2008 Joint 6th International IEEE Northeast Workshop on Circuits and Systems and TAISA Conference, 2008, pp. 113-116, doi: 0.1109/NEWCAS.2008.4606334. https://ieeexplore.ieee.org/document/4606334

Topics relevant to "SKILL DEVELOPMENT": Performing suitable experiments to compute the electric circuit parameters, performance operation of machines, and operation of semiconductor devices for Skill Development through Participative Learning techniques. This is attained through assessment component mentioned in course plan.

Course Code: CSE2201	Course Title: Program Solving Using C Lab Type of Course: Lab - PCC	L- T-P-C	0	0	4	2
Version No.	1.0		ļ			
Course Pre- requisites	NIL					



Anti-requisites	NIL
Course	The course is designed to provide complete knowledge of C language. Students
Description	will be able to develop logics which will help them to create programs and
	applications in C. ACAlso by learning the basic programming constructs they can
	easily switch over
	to any other language in future.
Course Object	The objective of the course is to familiarize the learners with the concepts of
	Problem Solving Using C and attain Employability through Problem Solving
	Methodologies.
Course Outcomes	On successful completion of this course the students shall be able to:
	7. Write algorithms and to draw flowcharts for solving problems
	8. Demonstrate knowledge and develop simple applications in C
	programming constructs
	9. Develop and implement applications using arrays and strings
	10. Decompose a problem into functions and develop modular reusable code
	11. Solve applications in C using structures and Union
	12. Design applications using Sequential and Random Access File
	Processing.
Course Content:	

List of Practicals: Lab Sheet 1: 10 Sessions

Program 1: Sum of Two Numbers

Program 2: Find the Greatest of Three Numbers

Program 3: Check Even or Odd using Conditional Operator

Program 4: Print Multiplication Table using Loop

Program 5: Count Digits in a Number using While Loop

Program 6: Demonstration of Preprocessor Directives

Program 7: Simple Calculator using Switch Case

Lab Sheet 2: 10 Sessions

Program 1: Check Whether a Number is Positive, Negative or Zero

Program 2: Find the Sum of First N Natural Numbers

Program 3: Check Whether a Number is Prime or Not

Program 4: Find Factorial of a Number

Program 5: Reverse a Number

Program 6: Simple Number Guessing Game

Lab Sheet 3: 10 Sessions

Program 1: Linear Search in a One-Dimensional Array

Program 2: Bubble Sort on an Integer Array

Program 3: Matrix Addition (2D Arrays)

Program 4: Count Vowels in a String

Program 6: Selection Sort on an Array



Program 2: Factorial Using Recursion

Program 3: Swap Two Numbers Using Call by Value (No Swap)

Program 4: Swap Two Numbers Using Call by Reference (With Swap)

Program 5: Pointer Basics - Access and Modify Variable via Pointer

Program 6: Accessing Array Elements Using Pointers

Lab Sheet 5: 10 Sessions

Program 1: Basic Structure Usage

Program 2: Input and Display Array of Structures

Program 3: Array Inside Structure (Student Marks)

Program 4: Structure with Nested Structures (Date of Birth)

Program 5: Union Example and Member Access

Lab Sheet 6: 10 Sessions

Program 1: Write to a File (Text Mode)

Program 2: Read from a File (Text Mode)

Program 3: Append Data to a File

Program 4: Count Characters, Words and Lines in a File

Program 5: Write and Read Structure to/from a Binary File

Program 6: Random Access in File (Update a Record)

Text Book(s):

1. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316- 513-0.

Reference Book(s):

- 11. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
- 12. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
- 13. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015
- 14. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.
- 15. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Web Links and Video Lectures:

- 3. <u>https://nptel.ac.in/courses/106/105/106105171/</u>
- 4. https://archive.nptel.ac.in/courses/106/104/106104128/

Course Code: PPS1026	Course Title: Industry Readiness Program – II (Audited Course) Type of Course: Practical Only Course	L- T - P- C	0	0	2	0
Version No.	1.0					
Course Pre- requisites						
Anti- requisites	NIL					



Course Description	This course is designed to enable students learn styles of communication, team building and use empathy in leadership. The course will benefit learners in preparing themselves effectively through various activities and learning methodologies.						
Course Objective	concepts of "Industry Read SKILL DEVELOPMENT techniques.	e is to familiarize the learn liness for Young Professional through PARTICIPATIVE	ls" and attain LEARNING				
Course Out Comes	On successful completion of this course the students shall be able to: CO 1 Apply different communication skills for success in workplace CO 2 Practice team building skills for career success CO3 Demonstrate ethical leadership skills in workplace						
Course							
Content Module 1	Effective Communication	Classroom activities	10 Hours				
Topics: Practice	l e effective communication skills	(Verbal, Non-verbal, Written an	d Visual)				
Activity: Use se	ocial media prompts to prepare	e self-introduction videos					
Module 2	Team Building	Group Activity	10 Hours				
Topics: Skills of	f an effective team player						
Activity: Studer	nt group activity to build class no	etworking					
Module 3	Leadership	Case study	10 Hours				
Topics: Types	of leadership, using empathy ir	ı leadership					
Activity: Indivi	dual presentation by students o	on corporate leaders.					
Faculty : L&D							
Targeted Applic 1. TED Tall	cation & Tools that can be used: <s< td=""><td>:</td><td></td></s<>	:					
2. You Tub							
3. Activities							
Assignment pro	posed for this course						
Assignment 1: One minute reel							
Assignment 2: Team building assignment							
Continuous Ind	ividual Assessment						
Module 1: L-S-R-W class assessment							
Module 2: Team Presentation							



Module 3: Individual Assessment

The topics related to skill development:

Students acquire knowledge on effective communication skills, team building skills and how to prepare themselves to be leaders in workplace using empathy and implement various skill sets during the course of their time in the university.

Course Code: ECE1511	Course Title: Design Work Course Type : ESC	cshop	L- T-P- C	1	0	2	2
2021011							
Version No.	1.0						
Course Pre- requisites	NIL						
Anti- requisites	NIL						
Course Description	This course is designed to pro Raspberry pi and their applic Throughout the course, stude programming and gain hands explore how to connect and i sensor data, and use it to com beginners who are interested applications using Arduino, H	ation in various real ents will learn the fun s-on experience with nterface sensors with trol various output de in exploring the wor	time projects involvin adamentals of Arduino a wide range of senso a Arduino and Raspbe evices This course is s d of electronics and o	g sens and l rs. Stu rry Pi uitabl	sors. Raspl udent board le for	berry s will ds, re	Pi l ad
Course Objective	The objective of the co PARTICIPATIVE LEAR	ourse is Employ:	ability Skills of s	stude	nt b	y us	sing
Course Outcomes	 On successful completion of the course the students shall be able to 5. Explain the main features of the Arduino & the Raspberry Pi prototype board. 6. Demonstrate the hardware interfacing of the peripherals to Arduino and Raspberry Pi system. 7. Understand the types of sensors and its functions 8. Demonstrate the functioning of live projects carried out using Arduino and Raspberry Pi system. 						
Course Content:	Course						
Module 1	Basic concepts of MicrocontrollersHands-onInterfacing Task and Analysis3 Sessions					ions	
features, Conce Introduction to I	Arduino, ESP and Node MC pt of digital and analog por Embedded C and Arduino platt unications, Arduino IDE, Vario	rts, Familiarizing w form, Arduino Dataty	ith Arduino Interfactory pes and variables, Ar	ng B	oard,	API	's ,

Module 2 S	Sensory Devices	Hands-on	Interfacing Task and Analysis	3 Sessions	
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Course Code EEE1250

Course Title:

Electronics E

GATH MORE KNOWLEDGE

0 2

1

Version No

raundos Sensors: HumiNHy Sensor, Temperature Sensor, Water Detector / Sensor, PIR Sensor, Ultrasonic Sensor Connecting Switches and actuators, sensor interface with Arduino.

Introdiction to Bd Printer. 3D Printer technology and its working Principles, Applications. Introduction to online Simulators: Working with AutoCAD/Fusion 360 Simulator. This fundamental laboratory provides an opportunity to validate the concepts taught Course in the basics of electrical and electronics engineering and enhances the ability to **Description** visualize real system performance, using both hardware and simulation tools.

Module 3 Hands-on The objective of the course is to familiarize the learners with the concepts of Basics Topicyrse of Electrical and Electronics Engineering and attain Skill Development through Introduction to MicroPython, Comparison with other programming languages, Setting up the MicroPython development environment, Basics of MicroPython syntax and structure.

	Basic skill sets				
	Monuter of the	Working with	Hands-on	Interfacing Task	5 Sessions
	laboratory:	Raspberry-pi		and Analysis	
Γ	Introduction to rasph	erry ni boards nin-diagrau	n different types of	raspherry ni boards :	and its application

LED and switch control Mastuding Mobility ablest Rapples - PuTTY SSH, VNC Viewer to interface with more complicated sensors and actuators. Various Libraries and its functions. 14) An attitude of enquiry.

15) Confidence and ability to tackle new problems.

Lab: Name of the Experimetres Ability to interpret events and results.

17) Ability to work as a leader and as a member of team.

- 16. Introduction Lab 18) Assess errors and eliminate them. Level 1: Overview 19) Ordsuppebased Missore optiviter applesenterion. Level 2: Interfacing of Arduino and ESP boards with sensors and other components.
- 17. Lab 2: Smart Plant Monitoring Level 1- Push button-controlled LED.
 Level 2- Automatic Irrigation and monitoring System using Arduino
 18. Lab 3: Robotics with Arduino.

 - Level 1- Servo Motor contropility of fallow standard test procedures.

Level 2: DC Motor 25 Anor Wars essent the nerd to the serve safety precautions.

19. Lab 4: Environmental politiciomagnity des pyithout actual measurement.

Level 1 - IoT bound accessifuticon blettoning flystemerse the students shall be able to:

Level 2- IoT Based water pollution system 20. Introduction Lab for raspberry pi Level 1: Overviewand Different Raspberry the Boards, and sensors.

Course delt2: Configuring the Rusputento the and this effective a transformation of the configuring the Rusputento the and the configuring the Rusputento the configuring the configuring the Rusputento the configuring the Come ab 7: Raspherry Photoset Detection using TensorFlow and OpenCV.

- 22. Lab 8: Speech Recognition on Ratepotency Richard Voice Controlled Home Atstomation the V-I
- 23. Lab 9: Design the website sing HTM riand Cass cand host the website on Raspberry Pi.

24. Introduction Lab for 3D printing aracteristics and waveforms relevant to standard electrical and Overview of 3D printing. Design of 3D structure using the CAD. Understand the steps of fabrication of simple rectangular box using 3D printer.

25. Lab 10: Design and print of Hollow Cylindrical structure using 3D CAD and 3D printer.

- 26. Lab 11 Demonstration of Jetson nano board and its capability. (OPTIONAL)
- 27. Lab 12: Revision

Application Area:

- 28. Lab 13: RevisioExperiment No 1: Verification of KVL and KCL for a given DC circuit.
- 29. Lab 14: Min Project 1: Study and Verify KVL and KCL for the given electrical Circuit.
- 30. Lab 15: Min Project Evaluation same circuit considered in level 1,
 - perform the simulation using NI I abVIFW/Multisim/MATI

	Laby IEW/Mulfisim/MATLAB.
Copics: Types of Ard	uing boarder Thonn ARathon ARathones Petreuisen sers, RO Brinker .
Sargeted Application	Severs toat date by experiment to perform and verify the impedance, current and
	power of Series RL and RC circuits



r - r	
	Level 2: Conduct an experiment to perform and verify the impedance and current
-	nvif ReIntentarial Automation, Agriculture and Farming, Industrial Automation, Internet of
	s, Wearable Devices, Security Systems, Education and Learning. These are just a few Experiment No 3: Calculation of power and power factor of the given AC Circuit. application areas where Arduino, Raspberry Pr and sensors can be applied. The
flexibility and afforda available, allow for en	bility of 1A Comparent Reserver Ro nearly the the stide to the states of the second se
Professionally Used ¢AD, Thonny Pythor	Son and the second second second sources and the second forms and the second se
Project work/Assign	Experiment No 4: Perform the experiments on given Transformer.
1. Projects: At the er time issues.	d of the course students will be completing the project work on solving many real transformer and compute the voltage many real transformation ratio.
	Level 2: Study the effect of load on the secondary side of the transformer and
	verify the EMF equation under load conditions.
2. Book/Article revi an individual or a g	ew: At the end of each module a book reference or an article topic will be given to roup of students. They need to refer the fibrary resources and write a report on
	about the cassigned article in and sankiate for mat the sidence lay varaite Library
<u>Link</u> .	loads
3. Presentation: The	Level 2: Conduct load test on DC shunt motor and plot the performance remail bers presentation from interdisciplinary students group, where the
students will be give	n a project on they have to demonstrate the working and discuss the applications
for the same	Experiment 6: Study of PN-Junction Diode Characteristics in Forward and
	Reverse Bias Conditions.
Textbook(s):	Level 1: Carry out an experiment to plot VI Characteristics and hence find the cut-
	in voltage on forward characteristics for the Silicon P-N Junction diode. on "Programming Arduino: Getting Started with Sketches", Mc Graw Hill
	Second Edition
	n "Raspberry Pi Cookbook: Software and Hardware Problems and Solutions",
Publisher(s)	: O'Reilly Media, Inc. ISBN: 9781098130923 fourth Edition.
Kelerences	rectifier circuit and compute ripple factor and efficiency
Reference Book(s)	Level 1: Identify the components required for a rectifier circuit, rig up the circuit,
1 Neernarai Rai "	AndiskePhotectsupprEngraterst's BPBout filtshers, first edition, 2016.
	Level 2: Rig up the rectifier circuit with RC filter observe the output waveforms, uno Programming.":Nelly B.L. International Consulting Ltd. first edition,2019. determine the efficiency and upper factor.
	cForperingento 8 the renermet of ming and beginner is with the to inform the former with
	trollesses byd Edifficity th201990918BN 978-1-4842-3123-4 Level 1: Identify the components required for building a Clipper / Clamper circuit.
4. Stewart Watkiss ISBN978-1-4842-634	RegrapElectronics with Raspberry Pircui Apress Berkeley, CA. second edition, 2020.
	Level 2: Given a sinusoidal input of 10 V p-p, implement a positive / negative 3D printing , Prusa Research, 5 th edition. clipper with output clipped at 2 V.
6. <u>Volker Ziemann</u> , "	AEMandshont Coursecate SensorariblisingathaeArd withen atter Ralspher cyrRii (Senigs in
Sensors)", CRC Pres	
	Level 1: Identify the components required to implement an emitter follower
	circuit. Rig up the circuit and observe the variations in output waveform with
	Hoors, thorth, pariations in inner wave form.
6. Arduino trend	ng project Detarpsnew thew alters of Zojunnut in a pedance and Zout output impedance
	ArdEinsttenhtigel@/worlinecourses.swayam2.ac.in/aic20_sp04/preview>
	h Wqarablectet liftoldgy Kniplement RC. Coupled agnplified using a BJT and sketch the
	rfijequenchtpsp/magpi.raspberrypi.com/articles/category/tutorials/>
	memer of unings \ nups.//np.ci.ac.in/courses/100105100/



 * DOI 10.1109/ICECDS.2017.8389604 13. Supriya S, 2Dr. Aravinda " Green leaf disease detection and identification using Raspberry Pi https://www.irjet.net/archives/V9/i8/IRJET-V9I847. 14. Dr. E.N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI : http://dx.doi.org/10.13005/ojcst12.01.03 Reference Books: Copics reldvant toJubueldileverkuith Sucrear and System Verage Societ States at the state of the st		
 Volume 7 Issue 11 ISSN: 2349-6002) Targ, S. M. H. Hemanth Kumar, Ravi Pratap Singh, Nishu Sharma, Pragya Singh" IOT BASED SMART SECURITY SYSTEM USING ARDUINO" 2021 JETIR August 2021, Targvolume 8, Issue 8, unit, 10. R. Maheswar, P. Jayarajan, S. Vimalraj, G. Sivagnanam, V. Sivasankaran and I. S. Amiri, "Energy Efficient Real Time Environmental Monitoring System Using Buffer Management Protocol," 2018, pp. 1-5, doi: 10.1109/ICCCNT.2018.8494144. https://ieeexplore.ieee.org/document/8494144. Bes 11. Yaser S Shaheen,Hussam, " Arduino Mega Based Smart Traffic Control System ," December 2021 Asian Journal of Advanced Research and Reports 15(12): 43-52, 2021(15(12): 43-52, 2021):15(12): 43-52, 2021. Cour 12. Basil, Eliza Sawant, S. D. "IoT based traffic light control system using Raspberry P " DOI 10.1109/ICCCDS.2017.8389604 13. Supriya S, 2Dr. Aravinda " Green leaf disease detection and identification using Text Raspberry P in https://www.irjet.net/archives/V9/i8/IRJET-V91847. 14. Dr. E. N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI : http://dx.doi.org/10.13005/ojcst12.01.03 Reference Books: Optios reld4nnt roldbuchLiger Kight Sacra and System K Negron Soutich/IcUIG Bascfaratical and leveloprient@oisf3cchnology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson.2011 15. Samaraji Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007. 16. K. Uma Rao, A Jaya Lakshmi, "Basic Electronic Devices and Circuit Theory", Pearson Education India 7th Edition. 18. A. K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition 19. A. S. Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 19. A. S. Sedra, K. C. Smith, "Microelectronic Circuits", Wiley, 2nd Edition 19. A. S. Sedra, K. C. Smith, "Microelectronic Circuits", Wiley, 2nd Edition 19. A. S	-content:	
 DASED SMART SECONTERSTSTEM USING ARDOINO 2021 JETIK Addust 2021, Targvolume 8, Issue 8. unit, 10. R. Maheswar, P. Jayarajan, S. Vimalraj, G. Sivagnanam, V. Sivasankaran and I. S. Amiri, "Energy Efficient Real Time Environmental Monitoring System Using Buffer Management Protocol," 2018, pp. 1-5, doi: 10.1109/ICCCNT.2018.8494144. https://ieeexplore.ieee.org/document/8494144. Bes 11. Yaser S Shaheen,Hussam, "Arduino Mega Based Smart Traffic Control System ," December 2021 Asian Journal of Advanced Research and Reports 15(12): 43-52, 2021(15(12): 43-52, 2021):15(12): 43-52, 2021. Cour 12. Basil, Eliza Sawant, S.D. "IoT based traffic light control system using Raspberry P "DOI 10.1109/ICECDS.2017.8389604 Supriya S, 2Dr. Aravinda "Green leaf disease detection and identification using Text Raspberry Pi https://www.irjet.net/archives/V9/8/IRJET-V91847. Dr. E.N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI : http://dx.doi.org/10.13005/ojcst12.01.03 Reference Books: Opies reld/ant to/duel/NewerKoift* Surva and/System Keeign SoriachieUting BiscElevableal and beveloprifentCogistJechnology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson.2011 Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007. K. Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd R. A.K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition 19. A.S Sedra, K.C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 19. A.S Sedra, K.C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 19. A.S Sedra, K.C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 19. A.S Sedra, K.C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 19. Attise Secorces: https://p		
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 Text Raspberry Pi https://www.irjet.net/archives/V9/i8/IRJET-V9I847. 14. Dr. E.N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI: http://dx.doi.org/10.13005/ojcst12.01.03 Reference Books: Topics reldAnt to/dwelkilewerkigth: Surva andSysteM Bearin SocialthiekiiGH Sustainational and DeveloprifertOpialStechnology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson.2011 15. Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007. 16. K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" iK International publishing house Pvt. Ltd 17. R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition. 18. A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition 19. A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition Online Learning Resources: 20. https://presidencyuniversity.linways.com 21. https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples" 22. Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati, https://nptel.ac.in/courses/117/103/117103063/ 		Basil, Eliza Sawant, S.D. "IoT based traffic light control system using Raspberry Pi 10.1109/ICECDS.2017.8389604
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Education India 7th Edition. 18. A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition 19. A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition Online Learning Resources: 20. <u>https://presidencyuniversity.linways.com</u> 21. https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples" 22. 22. Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati, <u>https://nptel.ac.in/courses/117/103/117103063/</u> Topics relevant to "SKILL DEVELOPMENT": All the experiments which are listed are for Skill Development through Experiential Learning Techniques. This is attained through the assessment		
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Development through Experiential Learning Techniques. This is attained through the assessment	22.	Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati,
Development through Experiential Learning Techniques. This is attained through the assessment		
component mentioned in course handout.		
	component n	nentioned in course handout.

Course Code:	Course Title: Linear Algebra &	I -T- P- C	2	4	•		l
MAT2303	Vector Calculus	L-1- P- C	ు	I	U	4	l
							l



	Type of Course:BSC			
Version No.	1.0			
Course Pre- requisites	Basic Concepts of Lim Level)	its, Differentiation, Integ	gration, Matrices (PU	
Anti-requisites	NIL			
Course Description	their operations with differentiation and in problems related to interpretations in higher physics, engineering, algebra, matrix opera gradients, divergence fundamental theorems	This course explores the fundamental concepts of vectors, matrices, and their operations within the context of calculus, including vector differentiation and integration, while applying these tools to solve problems related to linear systems, transformations, and geometric interpretations in higher dimensions, often with applications in fields like physics, engineering, and computer graphics; key topics include vector algebra, matrix operations, determinants, eigenvalues, eigenvectors, gradients, divergence, curl, line integrals, surface integrals, and the fundamental theorems of vector calculus like Green's Theorem, Stokes' Theorem, and the Divergence Theorem.		
Course Objective	procedures in Matrice useful to all engineerin the ability to understa space, apply matrix op utilize concepts like gr phenomena, all while	s, Linear Algebra and ng disciplines. This cour and and manipulate ver- perations to solve system radients, divergence, and developing a strong for fic and engineering field	tional proficiency involving Vector Calculus which are se is to equip students with ectors in multidimensional ms of linear equations, and nd curl to analyze physical undation for applying these ds like physics, mechanics,	
Course Out	On successful comple	tion of the course the st	tudents shall be able to:	
Comes	linear equations and t check whether it is dia CO2 - Understand	to find eigen values, ei gonalizable.	ques to solve the system of gen vectors of a matrix to s of vector space and	
	dimensionality of it. CO3 - find the matrix bases of the relevant	•	inear transformation given	
	CO4 - Learn differen	nt notions of vector and ding the major theorems	nd scalar fields with their s (Green's, Stokes', Gauss')	
Course Content:				
Module 1	Systems of Linear Equations		7. Classes)	
operations, invertibl	Equations, Matrices and Elem e matrices, Determinants and th ems of Linear Equations.	· ·		
Module 2	Vector Space	Assignment	(9Classes)	



Linear Combinations and Linear Independence, Vectors in n Rⁿ, Linear Combinations, Linear Independence Vector Spaces, Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis, Orthogonal bases and orthogonal projections.

Module 3	Linear Transformations	(15 lectures)
		, , , , , , , , , , , , , , , , , , ,

Linear Transformations, Algebra of transformations, The Null Space and Range, Isomorphisms, Matrix Representation of Linear Transformations, Similarity Eigenvalues and Eigenvectors, Eigen values and Eigen vectors, Diagonalization.

Inner Product Spaces, The Dot Product on Rⁿ and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Application: Least Squares Approximation, Diagonalization of Symmetric Matrices, Application: Quadratic Forms.

Singular Value Decomposition: Singular values, computing singular value decomposition, and Introduction to principal component analysis.

Module 4	Vector Calculus	Assignment	(15 lectures)

Vector & Scalar Functions and Fields, Derivatives, Curve, Arc length, Curvature & Torsion, Gradient of Scalar Field, Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field, Physical interpretation, solenoidal and irrotational vector fields. Problems.

Line Integrals, Path Independence of Line Integrals, Green`s Theorem in the plane, Surface Integrals, Divergence Theorem of Gauss, Stokes`s Theorem.

Targeted Application & Tools that can be used:

- Solve systems of linear equations using various methods including Gaussian and Gauss Jordan elimination and inverse matrices.
- Perform matrix algebra, invertibility, and the transpose and understand vector algebra in Rⁿ.
- Determine relationship between coefficient matrix invertibility and solutions to a system of linear equations and the inverse matrices.
- Find eigenvalues and eigenvectors and use them in applications.
- Find the dimension of spaces such as those associated with matrices and linear transformations.
- Understand real vector spaces and subspaces and apply their properties.
- Compute inner products in a real vector space and compute angle and orthogonality in inner product spaces.
- Create orthogonal and orthonormal bases: Gram-Schmidt process and use bases and orthonormal bases to solve application problems.

• Prove basic results in linear algebra using appropriate proof-writing techniques such as linear independence of vectors; properties of subspaces; linearity, injectivity and subjectivity of functions; and properties of eigenvectors and eigenvalues.

Assignment:

Preparation of power-point slides, which include videos, animations, pictures, graphics for better erstanding the applications of Linear Algebra and Vector Calculus to engineering applications – The



Ity will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Linear bra and Vector Calculus is covered.

Text Book

2. Gilbert Strang, Linear Algebra and its applications, Wellesley-Cambridge Press,U.S.; 6th edition.

3. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

2. Introduction to Linear Algebra with Application, Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill

- 3. Elementary Linear Algebra, Applications version, Anton and Rorres, Wiley India Edition.
- 4. Advanced Engineering Mathematics, Erwin Kreysig, Wiley Publication.
- 5. Elementary Linear Algebra, Ron Larson, Cengage Learning.
- 6. Linear Algebra and its Applications, David C. Lay, Pearson Education.

E-resources/ Web links:

2. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSC095_30102024_9607

3. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_143156

4. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=CUSTOM_PACKAGE_EBSCO_29052023_270975

5. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_94555

6. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_243864

7. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_224531

- 8. NPTEL Video Lectures Matrices and Linear Algebra:
- 9. https://nptel.ac.in/courses/111106051/
- 10. NPTEL Video Lectures Differential Equations:
- 11. https://nptel.ac.in/courses/111106100/
- 12. NPTEL Vector Calculus:
- 13. https://nptel.ac.in/courses/111/105/111105122/



14. https://www.math.hkust.edu.hk/~magian/ma006_0607F.html

15. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course Code:	Course Title: Discrete Mathematics		•				
MAT2404	Type of Course: Theory - ESC	L-T- P- C	3	1	0	4	
Version No.	1.0	I					
Course Pre-requisites	MAT2302						
Anti-requisites	NIL						
Course Description	The course explores the study of ma discrete (not continuous), focusing on combinatorics, and number theory, wi fields like algorithms, software deve such as propositional logic, proof principles, and basic graph algorithms problems and structures within compu	concepts like set th th applications prim lopment, and crypt techniques, relation , providing a founda	neory, lo arily in ography ons, fui	gic, g compu /; it co nction	raph t uter so overs s, co	heory cience topic: unting	
Course Objective	The main objective of the course is to mathematical facts and how to apply the and mathematically through five in combinatorial analysis, discrete struct and modeling. A successful discrete me balance all five themes.	hem. It teaches stud nportant themes: ctures, algorithmic t	ents ho mathem hinking,	w to th atical and	ink log reas applic	gically oning ations	
Course Outcomes	On successful completion of the cours	se the students shal	l be able	e to:			
	CO1 - Explain logical sentences throu connectives.	ıgh predicates, quar	ntifiers a	nd log	jical		
	CO2 - Deploy the counting techniques to tackle combinatorial problems						
	CO3 - Comprehend the basic principle relations.	es of set theory and	differer	it type	s of		
	CO4 - Apply different types of structure	es of trees for devel	oping pi	rogran	nming	skills	
Course Content:							
Module 1	Fundamentals of Logic			(1	0 Cla	sses)	
Basic Connectives and	Truth Tables, Propositional Logic, Appli	ications of Proposit	onal Lo	gic, P	ropos	itiona	
	s and Quantifiers, Nested Quantifiers, Ru	•		•	•		
Module 2	Principle of Counting	Assignment		(1	5 Cla	sses)	
The Well Ordering Princ	iple – Mathematical Induction						
•	, Permutations and Combinations, Bino inations, Generating Permutations and (nd Ident	ities, (Gener	alizeo	
-	unting: The Principle of Inclusion and g is in its Right Place, Rook Polynomials		izations	of th	e Prir	nciple	
Module 3	Relations and Functions			(1	0 Cla	sses)	
Cartesian Products and Function Composition ar	d Relations, Functions, One-to-One, C nd Inverse Functions.	Onto Functions. Th	e Pigeo	on-hol	e Prir	nciple	
•	Relations, Computer Recognition – Zer Diagrams, Equivalence Relations and Pa		Directe	ed Gra	iphs, l	Partia	

Module 4	Recurrence Relations and Generating Functions		(10 Classes)
•	d inhomogeneous recurrences and th pire method - Perturbation method - Co	•	
Module 5	Graph Theory & Algorithms o Networks	n Assignment	(15 Classes)
Properties - Paths	sic results - Representation of a grap and connectedness - Sub graphs - C ertex and edge connectivity, Euler and	Graph Isomorphism - Ope	rations on graphs - Vertex
Tree - Definitions, BFS, DFS.	Properties, and Examples, Routed Tre	ees, Binary search tree, De	ecision tree, spanning tree:
Algorithms on Ne algorithm and Prin	tworks - Shortest path algorithm- Di n's algorithm.	ijikstra's algorithm, Minim	al spanning tree- Kruskal
Targeted Application	on & Tools that can be used:		
	tics provides the mathematical foundation gorithms, database theory, automata string systems.	•	•
Assignment:			
Assignme	nt 1: Logic Equivalences and Predic	cate calculus.	
Assignme	nt 2: Equivalence Relations and Lat	tices	
Assignme	nt 3: Recurrence Relations		
Text Book			
2. Kenneth H	. Rosen, "Discrete Mathematics and its	s Applications", McGraw-H	lill,s 8th Edition,2019.
3. Harary – G	raph Theory, Addison-Wesley Publishi	ing Company.	
References:			
2. Arthur Gill,	"Applied Algebra for Computer Science	ce", Prentice Hall.	
3. K.D. Joshi,	"Discrete Mathematics", Wiley Easter	n Ltd.	
4. Ralph. P. C Pearson Educa	Grimaldi., "Discrete and Combinatorial ation Asia.	Mathematics: An Applied	I Introduction", 4th Edition,
E-resources/ Wel	o links:		
https://pres BSCO95 301020	iuniv.knimbus.com/user#/viewDetail?s 124_54588	searchResultType=ECATA	LOGUE BASED&unique
<u>https://pres</u> EBSCO95_301020	iuniv.knimbus.com/user#/viewDetail?s 024_375	searchResultType=ECATA	LOGUE_BASED&unique_
https://www	v.math.hkust.edu.hk/~maqian/ma006_	0607F.html	
https://www	v.scu.edu.au/study-at-scu/units/math1		

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Code: PPS4006	Course Title: LOGI THINKING Type of Course: HS		L- T-P- C	0	0	2	1		
Version No.	1.0								
Course Pre- requisites	Students should have the basic concepts of Logical reasoning and Critical thinking, along with its applications in real life problems.								
Anti-requisites	Nil								
Course Description	This is a skill-based training program for the engineering students (Undergraduate). This course is designed to enable the students to enhance their skills in Logical reasoning and Critical thinking.								
Course Objective	The objective of the course is to familiarize the learners with concepts in in Logical reasoning and Critical thinking through problem solving techniques suitable for their career development.								
Course	On successful compl		e the students shall	l be ab	le to:				
Outcomes	CO1] Understand a								
	CO2] Apply the cond	cepts in problem s	olving (Bloom's tax	konom	y Lev	rel 3)			
Course Content:									
Module 1	Logical Thinking	Assignmen t				1	L6 Hours		
	and Dices, Mirror and V res, Data Interpretatio			ling, E	mbed	lded figı	ıres &		
Module 2	Critical Thinking	Assignmen t				1	14 Hours		
Topics: Analogy, Symbol conclusion, Puzzles	and Notations, Stater s	nent and assump	otion, Cause of ac	tion,	Stater	nent ar	ıd		
Targeted Applica Application area: F Tools: LMS	tion & Tools that can	be used:							
10012; LM2	facement activities and	l Competitive exar	minations.						
1 UUIS: LIVIS	Continuous Evalua	-	minations.						
Evaluation	Continuous Evalua	-	minations.						
	Continuous Evalua • Topic	tion	minations.						
	Continuous Evalua · Topic · Mid-T Text Book	tion wise evaluation erm & End Term							
	Continuous Evalua · Topic · Mid-T Text Book 1. A new approad	tion wise evaluation erm & End Term	minations.	analyt	ical b	y BS Sijv	vali		
	Continuous Evalua· Topic· Mid-T· Mid-TI.A new approad2.R S Aggarwal	tion wise evaluation erm & End Term ch to reasoning ver		analyt	ical b	y BS Sijv	vali		
	Continuous Evalua· Topic· Mid-TText Book1.A new approad2.R S Aggarwal3.	tion wise evaluation erm & End Term ch to reasoning ver		analyt	ical b	y BS Sijv	vali		
	Continuous Evalua·Topic·Mid-TText Book1.A new approad2.R S Aggarwal3.Kiran publicatiReferences	tion wise evaluation erm & End Term ch to reasoning ver ons		analyt	ical b	y BS Sijv	vali		
	Continuous Evalua· Topic· Mid-TText Book1.A new approad2.R S Aggarwal3.Kiran publicatiReferences1.www.indiabix.	tion wise evaluation 'erm & End Term ch to reasoning ver ons		analyt	ical b	y BS Sijv	vali		
	Continuous Evalua·Topic·Mid-TText Book1.A new approad2.R S Aggarwal3.Kiran publicatiReferences1.www.indiabix.2.www.testbook	tion wise evaluation erm & End Term ch to reasoning ver ons <u>com</u> . <u>com</u>	rbal, non-verbal & a	analyt	ical b	y BS Sijv	vali		
	Continuous Evalua·Topic·Mid-TText Book1.A new approad2.R S Aggarwal3.Kiran publicatiReferences1.www.indiabix.2.www.testbook	tion wise evaluation erm & End Term th to reasoning ver ons <u>com</u> <u>com/c/TheAptitue</u>	rbal, non-verbal & a						

Course Code: CSE7100	Course Title: Mini Project	L- T-P- C	0	0	0	4
Version No.	1.0					
Course Pre- requisites	Knowledge and Skills related to all the courses studied in previous semesters.					
Anti-requisites	NIL					
Course Description	Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/ Company/ Research Laboratory, or Internship Program in an Industry/Company.					
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Professional Practice and attain Employability Skills through Experiential Learning techniques.					
Course Outcomes	 On successful completion of this course the students shall be able to: 6. Identify the engineering problems related to local, regional, national or gle needs. (Understand) 7. Apply appropriate techniques or modern tools for solving the interproblem. (Apply) 8. Design the experiments as per the standards and specifications. (Analyze) 9. Interpret the events and results for meaningful conclusions. (Evaluate) 10. Appraise project findings and communicate effectively through school publications. (Create) 					tendec

Course Code: CSE7300	Course Title: Capstone Project	L- T-P- C	0	0	0	10
Version No.	1.0					
Course Pre- requisites	Knowledge and Skills related to all the courses studied in previous semesters.					
Anti-requisites	NIL					
Course Description	Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar,					

	group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/ Company/ Research Laboratory, or Internship Program in an Industry/Company.
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Professional Practice and attain Employability Skills through Experiential Learning techniques.
Course Outcomes	 On successful completion of this course the students shall be able to: 8. Identify problems based on societal /research needs. (Understand) 9. Apply Knowledge and skill to solve societal problems in a group. (Apply) 10. Develop interpersonal skills to work as member of a group or leader. (Apply) 11. Analyze the inferences from available results through theoretical / Experimental / Simulations. (Analyze) 12. Analyze the impact of solutions in societal and environmental context for sustainable development. (Analyze) 13. Improve in written and oral communication. (Create) 14. Demonstrate capabilities of self-learning in a group, which leads to lifelong learning. (Understand)

Course Code:	Course Title: Data Communications and					
CSE2252	Computer Networks Lab	L- T-P- C	0	0	2	1
	Type of Course: Lab / PCC					
Version No.	1.0			1		
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	This lab-based course provides hands-on experience in the principles and practices data communications and computer networking. It is designed to complement theoretical concepts covered in the associated lecture course. Through a series of structured experiments and practical exercises, students will gain proficiency in configuring, analyzing, and troubleshooting computer networks.					
Key topics include network topology design, IP addressing and subnetting and LAN technologies, routing and switching, TCP/IP protocol suite, and to security measures. Students will work with industry-standard tools and eq including routers, switches, protocol analyzers, and network simulation so as Cisco Packet Tracer or Wireshark.				nd ba I equi	asic ne ipment	twork t,
Course Objective	The objective of this lab course is to provide students with practical, hands-on experience in the configuration, operation, and troubleshooting of data communication systems and computer networks. Through guided experiments and real-world scenarios, students will reinforce theoretical knowledge, develop essential technical					

	skills, and gain a deeper used in modern communi	•	ng concepts, protocols	, and devices				
Course	On successful completion of the course, the students shall be able to:							
Outcomes	Design and configure basic network topologies using routers, switches, and end devices to meet specified requirements.							
	Analyze and troubleshoot network connectivity and performance issues using tools such as Wireshark and network simulators.							
	Demonstrate understandi DHCP) through practical			P, ICMP,				
	Apply IP addressing and a network resources in vari	÷ .	-	manage				
Course Content:								
Module 1,2,3,4	Physical Layer, Network Layer, Transport Laye	Lab Assignment	Problem Solving	24 Sessions				
List of Laboratory	Tasks:		I					
Lab sheet -1, M-1,	, 3 [2 Hours]							
Experiment No 1:								
Level 1: Study of t	basic network commands a	nd network configuration	commands.					
Lab sheet -2, M-1	[2 Hours]							
Experiment No 1:								
Level 1: Identify a	nd explore Network devices	s, models and cables. Intr	oduction to Cisco					
packet tracer.								
Experiment No. 2:								
Level 2 – Create v	arious network topologies	using a cisco packet trace	er.					
Lab sheet -3, M-2,	,3 [2 Hours]							
Experiment No. 1:								
Level 2 - Basic Co	onfiguration of switch/router	using Cisco packet trace	r.					
Experiment No. 2:								
Level 2 -Configure	e the privilege level passwo	rd and user authentication	n in the switch/router.					
Lab sheet – 4, M-3	3 [2 Hours]							
Experiment No. 1:								
Level 2 - Configur	e the DHCP server and wir	eless router and check th	e connectivity					
Lab sheet – 5, M-3	3 [2 Hours]							

Everyment No. 1:
Experiment No. 1: Level 2 - Configure the static routing in the Cisco packet tracer.
Experiment No. 2:
Level 2 - Configure the dynamic routing protocol in the Cisco packet tracer.
Level 2 - Configure the dynamic routing protocol in the Cisco packet tracer.
Lab sheet – 6, M-4 [2 Hours]
Experiment No. 1: Configuration of DNS Server with Recursive & amp; Integrative approach in
Cisco packet tracer.
Lab sheet – 7, M-4 [2 Hours]
Experiment No. 1:
Configure the telnet protocol in the router using the Cisco packet tracer.
Lab sheet – 8, M-4[2 Hours]
Experiment No. 1:
Level1- Introduction to NS2 and basic TCL program.
Lab sheet – 9, M-4 [2 Hours]
Experiment No. 1:
Level 1: Simulate three node Point to point network using UDP in NS2.
Experiment No. 2:
Simulate transmission of Ping message using NS2.
Lab sheet – 10, M-4[2 Hours]
Experiment No. 1:
Simulate Ethernet LAN using N-node in NS2.
Experiment No. 2:
Simulate Ethernet LAN using N-node using multiple traffic in NS2
Lab sheet –11, M-3,4 [2 Hours]
Experiment No. 1:
Level 1- Introduction to Wire Shark.
Experiment No. 2:
Level 2- Demonstration of packet analysis using wire shark.
Lab sheet –12, M-1,2,3 [2 Hours]
Experiment No. 1:
Level 2- Demonstration of switch and router configuration using real devices
Targeted Application & Tools that can be used: Cisco Packet Tracer, Wireshark, and NS2.
Case Study/Assignment: Choose and analyze a network from any organization/Assignment proposed for
this course in CO1-CO4

Problem Solving: Choose and appropriate devices and implement various

network concepts.

Programming: Simulation of any network using NS2.

Text Book(s):

Behrouz A. Forouzan, "Data Communications and Networking 5E", 5 th Edition, Tata McGraw-Hill, 2017.

Andrew S Tanenbaum, Nick Feamster & amp; David J Wetherall, "Computer Networks" Sixth Edition, Pearson Publication, 2022

Reference(s):

"Computer Networking: A Top-Down Approach", Eighth Edition, James F. Kurose, Keith W. Ross, Pearson publication, 2021.

William Stallings, Data and Computer Communication, 8th Edition, Pearson Education, 2007.

Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 4th Edition, Elsevier, 2007.

- E- Resources:
- 1. https://archive.nptel.ac.in/courses/106/105/106105183/
- 2. http://www.nptelvideos.com/course.php?id=393
- 3.https://www.youtube.com/watch?v=3DZLItfbqtQ
- 4.https://www.youtube.com/watch?v=_fIdQ4yfsfM
- 5. https://www.digimat.in/keyword/106.html
- 6. https://puniversity.informaticsglobal.com/login



Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

Course Code:	Course Title : Data Str	uctures			0					
CSE2253	Type of Course: Theory			L-T -P -C		3	0	0	3	
Version No.	1.0									
Course Pre- requisites										
Anti-requisites	NIL									
Course Description	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.									
Course Objective	The objective of the course is SKILL DEVELOPMENT of student by using EXPERIENTIAL LEARNING techniques									
Course Out Comes	On successful completion of the course the students shall be able to:CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand]CO2: Utilize linked lists for real-time scenarios. [Apply]CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply]CO4: Demonstrate different searching and sorting techniques. [Apply]									
Course Content:										
Module 1	Introduction to Data Structure and Linear Data Structure - Stacks and Queues	Assignment	Pro	gram ac	tivity		9 H	ours		

Introduction -Introduction to Data Structures, Types and concept of Arrays .

Stack -Concepts and representation, Stack operations, stack implementation using array and Applications of Stack.

Queues -Representation of queue, Queue Operations, Queue implementation using array, Types of Queue and Applications of Queue.

	Line of Dete Officiation			<u> </u>				
Module 2	Linear Data Structur	re -	Assignment	Pr	Program activity		12 Hours	
Topics: Linked L	ist - Singly Linked Li	ist, Op	eration on line	ear	list using singly linke	ed stora	ige	
structures, Circu	ular List, Applications	of Link	ed list.					
Recursion - Re	cursive Definition and	d Proce	esses.					
	Non-linear Data		• • •				40.11	
Module 3	Structures - Trees		Assignment	Pr	ogram activity		12 Hours	
Topics: Trees -	Introduction to Trees	s, Bina	ry tree :Terr	ninc	ology and Properties	, Use o	f Doubly	
Linked List, Bina	ary tree traversals :Pr	re-Ord	er traversal, I	n-O	order traversal, Post	- Orde	r traversal	
.Heaps , Expre	ession Tree ,Red Bl	lack T	ree - AVL	Tre	es ,Binary Serach	Tree		
	Non-linear Data							
Module 4	Structures -	As	signment	nent Program activity		6 Hou	6 Hours	
	Graphs and Hashing							
Taniaa (Qaanha)	-			Dra	nerties Dennesents	tion of a	Orenha	
	: Basic Concept of G y graph operations, N	•	•		• • •		•	
Hashing: Introdu	uction, Static Hashing	j, Dyna	mic Hashing					
Module 5	Searching & Sorting	Assig	nment	F	Program activity	6 Hoi	urs	
Topic: Sorting 8	& Searching - Sequer	ntial ar	nd Binary Sea	arch	Sorting -Selection	and In	sertion sor	
	ge Sort, Bubble sort							
		•						
List of Laborator	ry Tasks:							
Lab sheet -1								
Level 1: Prompobjects	t the user, read input	and pr	int messages	s.Pro	ograms using class,	methoo	ls and	
Loval 2. Progra	mming Exercises on t	fundan	nental Nata o	truc	ture - Arrave based	on Sco	nario	

Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario.

Lab sheet -2
Level 1: Programming Exercises on Stack and its operations
Level 2: Programming Exercises on Stack and its operations with condition
Lab sheet -3
Level 1: Programming on Stack application infix to postfix Conversion
Level 2: -
Lab sheet -4
Level 1: Programming on Stack application – Evaluation of postfix
Lab sheet -5
Level 1: Programming Exercises on Queues and its operations with conditions
Level 2: -
Lab sheet -6
Level 1: Programming Exercises on Linked list and its operations.
Level 2: Programming Exercises on Linked list and its operations with various positions
Lab sheet -7
Level 1: Programming Exercises on Circular Linked list and its operations.
Level 2: Programming Exercises on Circular Linked list and its operations with various positions
Lab abaat 0
Lab sheet -8
Level 1: Programming Exercises on factorial of a number
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -9
Level 1: -
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -10
Level 1: Programming Exercise on Doubly linked list and its operations
Level 2: -
Lab sheet -11
Level 1: Program to Construct Binary Search Tree and Graph
Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and post-
order(and implement BFS and DFS
Lab sheet -12
Level 1: Program to Implement the Linear Search & Binary Search

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018 .

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.

R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources :

For theory :https://onlinecourses.nptel.ac.in/noc20_cs85/preview

https://puniversity.informaticsglobal.com/login

Topics relevant to development of "Skill Development :"

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues



Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

Course Code:	Course Title : Data Stru	uctures Lab		L -T-P -C	0	0	0 2		
CSE2254	Type of Course :Lab				0	0	2	1	
Version No.	1.0			<u> </u>	1				
Course Pre- requisites									
Anti-requisites	NIL								
Course Description	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.								
Course Objective	The objective of the course EXPERIENTIAL LEARNI			MENT of stud	dent by	using			
Course Out Comes	On successful completion of the course the students shall be able to: CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand] CO2: Utilize linked lists for real-time scenarios. [Apply] CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply] CO4: Demonstrate different searching and sorting techniques. [Apply]								
Course Content:									
Module 1	Introduction to Data Structure and Linear Data Structure - Stacks and Queues	Assignment	Program	n activity		9 H	lours	i	

Introduction -Introduction to Data Structures, Types and concept of Arrays .

Stack -Concepts and representation, Stack operations, stack implementation using array and Applications of Stack.

Queues -Representation of queue, Queue Operations, Queue implementation using array, Types of Queue and Applications of Queue.

	Linear Data Structur	ro						
Module 2	Linked List	ie -	Assignment	Pr	Program activity		12 Hours	
<u> </u>				the set the set of the first state of the state of the set				
•	ist - Singly Linked Li			ear	list using singly linke	ed stora	ige	
structures, Circu	ular List, Applications	of Link	ed list.					
Recursion - Re	cursive Definition and	d Proce	esses.					
Non-linear Data						10 1 10 100		
Module 3	Structures - Trees		Assignment	P	ogram activity		12 Hours	
Topics: Trees -	Introduction to Trees	s, Bina	ry tree :Terr	ninc	ology and Properties	, Use o	f Doubly	
Linked List, Bina	ary tree traversals :Pr	re-Ord	er traversal, I	n-O	order traversal, Post	- Orde	r traversal	
.Heaps , Expre	ession Tree ,Red Bl	lack T	ree - AVL	Tre	es ,Binary Serach	Tree		
	Non-linear Data							
Module 4	Structures -	Ass	signment	nment Program activity		6 Hou	Hours	
	Graphs and							
	Hashing							
	Basic Concept of G	•	-		• • •		-	
ADT, Elementar	y graph operations, N	/linimur	n Cost spanr	ning	trees, Shortest path	and Tr	ansitive	
	uction Static Hashing		mia Uaching					
Hashing. Introdu	uction, Static Hashing	, Dyna				1		
	Searching &							
Module 5	Sorting	Assig	nment	F	Program activity	6 Ho	urs	
Topic: Sorting 8	Searching - Sequer	ntial ar	nd Binary Sea	arch	, Sorting -Selection	and In	sertion sor	
Quick sort, Merc	ge Sort, Bubble sort				C C			
List of Laborator	ry Tasks:							
Lab sheet -1								
Level 1: Prompobjects	t the user, read input	and pr	int messages	s.Pro	ograms using class,	methoo	ls and	
Level 2. Progra	mming Exercises on t	fundan	nental Nata e	truc	ture - Arrave based	on Sco	nario	

Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario.

Lab about 0
Lab sheet -2
Level 1: Programming Exercises on Stack and its operations
Level 2: Programming Exercises on Stack and its operations with condition
Lab sheet -3
Level 1: Programming on Stack application infix to postfix Conversion
Level 2: -
Lab sheet -4
Level 1: Programming on Stack application – Evaluation of postfix
Lab sheet -5
Level 1: Programming Exercises on Queues and its operations with conditions
Level 2: -
Lab sheet -6
Level 1: Programming Exercises on Linked list and its operations.
Level 2: Programming Exercises on Linked list and its operations with various positions
Lab sheet -7
Level 1: Programming Exercises on Circular Linked list and its operations.
Level 2: Programming Exercises on Circular Linked list and its operations with various positions
Lab sheet -8
Level 1: Programming Exercises on factorial of a number
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -9
Level 1: -
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -10
Level 1: Programming Exercise on Doubly linked list and its operations
Level 2: -
Lab sheet -11
Level 1: Program to Construct Binary Search Tree and Graph
Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and post-
order(and implement BFS and DFS
Lab sheet -12
Level 1: Program to Implement the Linear Search & Binary Search

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018 .

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

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Web resources :

For theory :https://onlinecourses.nptel.ac.in/noc20_cs85/preview

https://puniversity.informaticsglobal.com/login

Topics relevant to development of "Skill Development :"

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues



ict, 1956	YEARS DF ACODEMIC WISDOM

Course Code: CSE2255	Course Title: Object Or Using Java	-	ing L-T- P- C	3 0	0 3		
0012200	Type of Course: Theory	y - PCC					
Version No.	2.0						
Course Pre- requisites	Nil						
Anti-requisites	Nil						
Course Description	This course introduces the core concepts of object-oriented programming. This course has theory and lab component which emphasizes on understanding the implementation and application of object-oriented programming paradigm. It helps the student to build real time secure applications by applying these concepts and also for effective problem solving. The students interpret and understand the need for object oriented programming to build applications.						
Course Objective	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques						
	On successful completion of the course the students shall be able to:						
	CO1: Describe the bas	ic programming c	oncepts. [Un	derstand]			
	CO2: Apply the concep problems. [Application	· · · ·	cts and meth	ods to solve	e		
Course Out Comes	CO3: Apply the concep	ot of arrays and str	ings. [Appy]				
	CO4: Implement inheri applications. [Apply]	tance and polymo	rphism buildi	ing secure			
	CO5: Apply the concepts of interface and error handling mechanism. [Apply]						
Course Content:							
Module 1	Basic Concepts of Programming and Java	Assignment	Problem Solving	9 Session	S		
program structur types, Identifiers	ion to Principles of Prog e, Download Eclipse ID , Variables, Constants ir out functions, Control St	E to run Java prog n java, Operators,	grams, Samp Assignments	ble program s and Expre	, Data		



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Module 2	Classes, objects, methods and Constructors	Assignment	Problem Solving	10 Sessions				
Topics: Classes, Objects and Methods: Introduction to object Oriented Principles, defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.								
Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.								
Module 3	Arrays, String and String buffer	Assignment	Problem Solving	8 Sessions				
• •	efining an Array, Initiali String: Creation & Ope	• •	•	•				
Module 4	Inheritance and Polymorphism	Assignment	Problem Solving	10 Sessions				
Polymorphism: N functions and with	Topics: Inheritance: Defining a subclass, Types of Inheritance, super keyword. Dynamic Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.							
Module 5	Input & Output Operation in Java	Assignment	Problem Solving	8 Sessions				
Understanding St Files, Buffer and	ration in Java(java.io P treams, working with Fi Buffer Management, R er and Observable Inter	le Object, File I/O ead/Write Operation	Basics, Read	ling and Writing to				
Text Book								
T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education, 11th Edition,2019.								
References								
R1. Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Tenth Edition, Pearson 2015.								
R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.4th Edition, 2000.								
Page 18 of 477								



R3. E. Balagurusamy, "Programming with Java", Tata McGraw Hill Education, 6th Edition, 2019.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenjl97t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_9III9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword

static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.





YEARS

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Course Code: CSE2256	Course Title: Object Orier Using Java Lab Type of Course: Lab - PC	0 0	L-T- P- C) ()	2	1		
Version No.	2.0						1		
Course Pre- requisites	Nil								
Anti-requisites	Nil								
Course Description	This course introduces th This course has theory ar understanding the implem programming paradigm. applications by applying t solving. The students inte programming to build app	nd lab component nentation and appl It helps the studer hese concepts and rpret and understa	which empha ication of obj nt to build rea d also for effe	asizes o ject-orio al time s ective p	on ented secur proble	e em	-		
Course Objective	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques								
	On successful completior	of the course the	students sha	all be a	ble to):			
	CO1: Demonstrate basic programming concepts. [Apply]								
Course Out	CO2: Apply the concept c problems. [Application]	f classes, objects	and methods	s to solv	ve				
Comes	CO3: Apply the concept c	of arrays and string	gs. [Appy]						
	CO4: Implement inheritance and polymorphism building secure applications [Apply]								
	CO5: Apply the concepts	of interface and e	rror handling	mecha	inism	. [Ap	ply]		
Course Content:									
Module 1	Basic Concepts of Programming and Java	Accianmont	Problem Solving	12 Se	essior	IS			



Download Eclipse IDE to run Java programs, Sample programs on Data types, Identifiers, Variables, Constants in java, Operators, Assignments and Expression, Basic Input/ Output functions, Control Statements: Branching and Looping.

Module 2	Classes, objects, methods and Constructors	Assignment	Problem Solving	14 Sessions
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Problem solving using Classes, Objects and Methods: defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.

Use Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.

Module 3	Arrays, String and String _A buffer	ssignment	Problem Solving	10 Sessions
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Using Arrays and Strings : Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Array of objects. String: Creation & Operation. String builder class, methods in String Buffer.

Module 4 Assignment	roblem 12 Sessions plving
---------------------	------------------------------

Inheritance: Defining a subclass, Types of Inheritance, super keyword. Dynamic Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.

Module 5	Input & Output Operation in Java	Assignment	Problem Solving	12 Sessions

Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.

P1: Programming Exercises on Basic Concepts.

LEVEL 1: Discuss about datatypes and variables.

LEVEL 2: Demonstrate a simple java program

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P2: Programming Exercises on Basic Concepts.

LEVEL 1: Discuss about datatypes and variables.

LEVEL 2: Demonstrate a simple java program

P3: Programming Exercises on operators, expressions based on a given scenario.

LEVEL 1: Explain operators, expressions.

LEVEL 2: Demonstrate operators

P4: Programming Exercises Command Line Arguments based on a given scenario.

LEVEL 1: Explain command line arguments

LEVEL 2: Demonstrate command line arguments

P5: Programming Exercises on basic Input/ Output functions and Control Statements: Branching

LEVEL 1: Explain Input/ Output functions

LEVEL 2:Demonstrate Control Statements: Branching

P6: Programming Exercises on Control Statements: Looping

LEVEL 1: Explain variour loops.

LEVEL 2:Demonstrate Control Statements: Looping

P7: Programming Exercises on Creating Objects, classes on a given scenario.

LEVEL 1: Illustrate class, object and methods.

LEVEL 2: Execute java program using class and objects

P8: Programming Exercises on Adding methods and Constructors to the class based on a given scenario.

LEVEL 1: Illustrate methods and constructors

LEVEL 2: Execute java program using methods and constructors

P9: Programming Exercises on methods based on a given scenario.

LEVEL 1: Illustrate method overloading

LEVEL 2: Apply method overloading for the given scenario.





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P10: Programming Exercises on methods based on a given scenario.

- LEVEL 1: Illustrate constructors overloading
- LEVEL 2: Apply constructor overloading for the given scenario
- P11: Programming Exercises on methods for static members bassed on a given scenario.
- LEVEL 1: Benefits of usage static members
- LEVEL 2: Usage of Static Members for the given scenario
- P12: Programming Exercises on static methods based on a given scenario.
- LEVEL 1: Benefits of usage static methods
- LEVEL 2: Usage of Static Methods for the given scenario.
- P13: Programming Exercises on nested Classes based on a given scenario.
- LEVEL 1: Benefits of usage nested classes
- LEVEL 2: Apply the concept of usage of nested classes for the given scenario
- P14: Programming Exercises on Arrays and its built-in functions based on a given scenario.
- LEVEL 1: Illustrate one dimensional arrays and its functions.
- LEVEL 2: Demonstrate programs with single-dimensional arrays and operations.
- P15: Programming Exercises on Arrays and its built-in functions based on a given scenario.
- LEVEL 1: Illustrate multi dimensional arrays and its functions.
- LEVEL 2: Demonstrate programs with multi-dimensional arrays and operations.
- P16: Programming Exercises on String Class and its built-in functions based on a given scenario.
- LEVEL 1: Explain about String class and String methods.
- LEVEL 2: Execute simple java applications for String and StringBuffer operations
- P17: Programming Exercises on String Buffer Class and its built-in functions based on a given scenario.
- LEVEL 1: Explain about StringBuffer class and String methods.
- LEVEL 2: Execute simple java applications for String and StringBuffer operations



P18: Programming Exercises on String Builders and its built-in functions based on a given scenario.

LEVEL 1: Explain about String Builders.

LEVEL 2: Execute java applications for String Builders

P19: Programming Exercises on single, multi level Inheritance and super keyword based on given scenario.

LEVEL 1: Explain single and multi level inheritance.

LEVEL 2: Demonstrate simple applications for the different types of inheritance

P20: Programming Exercises hierarchical Inheritance and super keyword based on given scenario.

LEVEL 1: Explain hierarchical inheritance.

LEVEL 2: Demonstrate simple applications for hierarchical inheritance

P21: Programming Exercises on Overriding.

LEVEL 1: Differentiate method overloading and method overriding.

LEVEL 2: Demonstrate simple program with dynamic method dispatch.

P22: Programming Exercises on Final based on given scenario.

LEVEL 1: Implement programs using concept of final.

LEVEL 2: Use final keyword for the given problem

P23: Programming Exercises on Abstract keyword based on given scenario.

LEVEL 1: Implement programs using concept of Abstract.

LEVEL 2: Use abstract keyword for the given problem

P24: Programming Exercises on Interface based on a given scenario.

LEVEL 1: Differentiate abstract class about interface

LEVEL 2: Implement interfaces in the given problem

P25: Programming Exercises on Exception Handling based on a given scenario.

LEVEL 1: Explain exception handling

LEVEL 2: Solve the given problem using exception handling mechanism.

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P26: Programming Exercises on Character Stream Classes based on a given scenario.

LEVEL 1: Explain Character Stream Classes

LEVEL 2: Solve the given problem using Character Stream Class.

P27: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P28: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P29: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P30: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

Targeted Application & Tools that can be used : JDK /Eclipse IDE/Visual Studio Code / net Beans IDE.

Text Book

T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education, 11th Edition,2019.

References



R1. Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Tenth Edition, Pearson 2015.

R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.4th Edition, 2000.

R3. E. Balagurusamy, "Programming with Java", Tata McGraw Hill Education, 6th Edition, 2019.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenjl97t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_9III9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword

static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.





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Course Code: CSE2271	Course Title: Softwa Development	are Design a	nd	L-T- P- C	3-0-0-3		
Version No.	1.0			I			
Course Pre- requisites	NIL						
Anti-requisites	NIL						
Course Description	The objective of this course is to provide the fundamentals conception Software Engineering process and principles.						
	The course covers software requirement engineering processes, syst analysis, design, implementation and testing aspects of software syst development.						
	The course covers software quality, configuration management an maintenance.						
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Software Engineering and attain Skill Development through Participative Learning techniques.						
Course Out Comes	On successful comple	tion of this co	ourse the	e students	shall be able to:		
	1] Describe the Software Engineering principles, ethics and process models(Knowledge)						
		2] Identify the requirements, analysis and appropriate design models for a given application (Comprehension)					
	3] Understand the Agile Principles(Knowledge)						
	4] Apply an appropriate planning, scheduling, evaluation and maintenance principles involved in software(Application)						
Module 1	Introduction to Software Engineering and Process Models	Quiz			10 Hours		
	(Knowledge level)						



Introduction: Need for Software Engineering, Professional Software Development, Software Engineering Ethics, Software Engineering Practice-Essence of Practice, General Principles Software Development Life Cycle

Models: Waterfall Model – Classical Waterfall Model, Iterative Waterfall Model, Evolutionary model-Spiral, Prototype.

Module 2	Software Requirements, Analysis and Design (Comprehension level)	Assignment	Development of SRS documents for a given scenario	12 Hours
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Requirements Engineering: Eliciting requirements, Functional and non- Functional requirements, Software Requirements Specification (SRS), Requirement Analysis and validation. Requirements modelling- Introduction to Use Cases, Activity diagram and Swim lane diagram. CASE support in Software Life Cycle, Characteristics of CASE Tools, Architecture of a CASE Environment.

Design: Design concepts, Architectural design, Component based design, User interface design.

Module 3	Agile Principles & Devops	Quiz	10 Hours
	(Knowledge level)		

Agile: Scrum Roles and activities, Sprint Agile software development methods - Scaling, User Stories, Agile estimation techniques, Product backlogs, Stake holder roles, Dynamic System Development Method.

Devops: Introduction, definition, history, tools.

Software Testing and Maintenance	Apply the testing concepts using	13 Hours
(Application Level)	Programing	

Software Testing-verification and validation, Test Strategies - White Box Testing, Black box Testing. Automation Tools for Testing.

Software Quality Assurance-Elements of software quality assurance, SQA Tasks, Goals and Metrics, Software configuration management- SCM process, SCM Tools (GitHub).



Maintenance- Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models.

Targeted Application & Tools that can be used: Selenium, GitHub, CASE Tools

Text Book

 Roger S. Pressman, "Software Engineering – A Practitioner's Approach", VII Edition, McGraw-2012] B2. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management", VI Edition, Graw-Hill, 201

References

- Rajib Mall, "Fundamentals of Software Engineering", VI Edition, PHI learning private limited, 2015.
- 8. Ian Sommerville, "Software Engineering", IX Edition, Pearson Education Asia, 2011.
- 9. Agile Software Development Principles, Patterns and Practices.1st Edition, Wiley, 2002

Topics Relevant to "Skill Development: Balck box Testing, White box Testing, Automated Testing for Skill development through Participative Learning Techniques. This is attained through assessment mentioned in the course handout

Course Code: CSE2258	Course Title: Web Technologies	L-T- P- C	2	0	0	2
Version No.	1.0					1
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	This course highlights the compreh languages that are used for creatin The associated laboratory provides concepts and enhance critical thinl	g web-based app an opportunity	lication to impl	is. ement	-	





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Course Objective	concepts of	The objective of the course is to familiarize the learners with the concepts of <mark>Web Technology</mark> and attain <mark>Skill Development</mark> through <mark>Experiential Learning</mark> techniques.						
Course	On successfu	On successful completion of this course the students shall be able to:						
Outcomes	CO1: Implem (Apply)	CO1: Implement web-based application using client-side scripting languages. (Apply)						
	CO2: Apply v (Apply)	arious constructs to e	enhance the appearance of a	a website.				
	CO3: Apply s database. (Apply)							
Course Content:								
Module 1	Introduction to XHTML	Quizzes and Assignments	Quizzes on various features of XHTML, simple applications	20 Sessions				
Basics: V	Veb, WWW, Web l	prowsers, Web server	11					
	2		XHTML: Basic Syntax, St					
			ges, Hypertext Links, Lists,					
	Syntactic Differen TML for Responsi		nd XHTML, Demonstratior	of applications				
Module 2	Advanced CSS	Quizzes and assignments	Comprehension based Quizzes and assignments; Application of CSS in designing webpages	20 Sessions				
Advance	d CSS: Layout, No	ormal Flow, Positionir	ng Elements, Floating Eleme	ents,				
Construc Framewo	-	Layouts, Approaches	to CSS Layout, Responsive	Design, CSS				
XML: Basics, Der	monstration of ap	plications using XML	with XSLT.					

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Module 3	PHP – Application Level	Quizzes and assignments	Application of PHP in web designing	20 Sessions
PHP: Introdu and \$ POST,	ction to server-side	e Development with	h PHP, Arrays, Superglobal A	Arrays, \$GE
-	av. \$ Files Arrav.	Reading/Writing I	Files, PHP Classes and Obj	ects. Obiect
		ο, ο	base APIs, Managing a MySQ	
Accessing MyS	QL in PHP, Applicat	tions.		
Project work	<u> </u>			
•	are given after co 1 the stipulated d	-	nodule which the student r	leed to
Textbook(s):				
2] Robert. W. 2016.	Sebesta, " <i>Programr</i>	ning the World Wide	e Web", Pearson Education, 9	th Edition,
	l, Harvey Deitel, At	bey Deital,"Interne	et & World Wide Web How t	o Program'
Fifth Editior	n, Pearson Educati	on, 2021.		
	or Professionals, ebo 1 Jan. 20, 2022)	ook available at http	os://books.goalkicker.com/0	CSSBook/
4]Deitel, Deit Pearson	el, Goldberg," <i>Intern</i>	et & World Wide We	eb How to Program", Fifth Ed	ition,
Education, 20				
Reference Bo	ok(s):			
R1. Randy Education India		Hoar,"Fundamer	ntals of Web Developmer	t", Pearsoi
1st. Editi	on.2016.			
R2. Jeffrey C Education, 1st	. Jackson,"Web Te	echnologies: A Co	mputer Science Perspectiv	e", Pearsoi
Edition,20	16.			
Additional we	b-based resource	S		
W1. W3scho				
	ois.com			



W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

- 7. Web, WWW, Web browsers, Web servers, Internet.
- 8. CSS, PHP.
- 9. Designing the website for healthcare.

The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2259	Course Title: Web Technologies Lab			L-T- P- C	0	0	2	1	
Version No.		1.0							
Course Pre- requisites									
Anti-requisites		NIL							







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Course Description		This course highlights the comprehensive introduction to scripting languages that are used for creating web-based applications. The associated laboratory provides an opportunity to					
		implement the concepts and enhance critical thinking and analytical skills.					
Course		The objective of the course is to familiarize the learners					
Objective		with the concepts of <mark>Web</mark> Technology and attain Skill					
		Development through <mark>Experiential Learning</mark> techniques.					
Course Outcomes		On successful completion of this course the students shall be able to:					
		CO1: Implement web-based application using client-side scripting languages. (Apply)					
		CO2 : Apply various constructs to enhance the appearance of a website. (Apply)					
		CO3: Apply server-side scripting languages to develop a web page linked to a database.(Apply)					
Course Content:							
Module 1	Introductory Introductory Introductory Internet	teatures of XHTMI					
Stand	ard XHTML	XHTML Document Structure, Basic Text Markup such as headings,					
parag	raphs, lists, ta	ples, forms, and semantic tags.					







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Module 2 CSS Styling			Quizzes and assignments	Quizz Appli	rehension based es and assignments; cation of CSS in ning webpages		10 Sessions		
	Apply CSS3 to style HTML elements, including layout techniques, color schemes,								
	typograph	ny, and responsiv	e design princ	ciples.					
XML:	XML: Basics, Demonstration of applications using XML with XSLT.								
Modu	Module 3 PHP – Applicatio Level				s and Application of PHP in nents web designing		12 Sessio		
		on to server-side	e Developmen	t with	PHP, Arrays, Superglo	obal Ar	rays, \$GE'	T and	
	\$ POST,								
	\$_SERVER Array, \$_Files Array, Reading/Writing Files, PHP Classes and Objects, Object Oriented								
U	Design, Working with Databases, SQL, Database APIs, Managing a MySQL Database. Accessing MySQL in PHP, Applications.								





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List of Laboratory Tasks:

Experiment No. 1: Demonstration of XHTML features

Level 1: Demonstration of various XHTML Tags (Level 1) Level 2: Design and develop static web pages for an online Book store (Level 2).

Experiment No. 2: Application of CSS in web designing

Level 1: Design a document using XHTML and CSS to create a catalog of items for online electronic shopping.

Level 2: Create and save XML document for students' information and display the same using cascaded style sheet.

Experiment No. 3: Application of PHP in web designing.

Level 1: Write a PHP program to read the personal information of a person such as first name, last name, age, permanent address, and pin code entered by the user into a table created in MySQL. Read the same information from the database and display it on the front end.

Level 2: Using PHP develop a web page that accepts book information such as ISBN number, title, authors, edition, and publisher and store information submitted through the web page in MySQL database.

Experiment No. 4: Building a website.

Build a website for organizing an International Conference. The conference website must be able to collect the author's details and upload a file.

Targeted Application & Tools that can be used: Xampp web server to be used to demonstrate PHP.

Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.



Textbook(s):

2] Robert. W. Sebesta, "*Programming the World Wide Web*", Pearson Education, 9th Edition, 2016.2]Paul Deitel, Harvey Deitel, Abbey Deital, "Internet & World Wide Web How to Program", Fifth

Edition, Pearson Education, 2021.

3]CSS Notes for Professionals, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

4]Deitel, Deitel, Goldberg,"Internet & World Wide Web How to Program", Fifth Edition, Pearson

Education, 2021.

Reference Book(s):

R1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", Pearson Education India,

1st. Edition.2016.

R2. Jeffrey C. Jackson,"Web Technologies: A Computer Science Perspective", Pearson Education, 1st

Edition,2016.

Additional web-based resources

W1. W3schools.com

W2. Developer.mozilla.org/en-US/docs/Learn

W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

10. Web, WWW, Web browsers, Web servers, Internet.

11. CSS, PHP.

12. Designing the website for healthcare.

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The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2260	Course Title: Database M Type of Course: Theory		stems	L-T-P-C	3	0	0	3
Version No.	1.0							
Course Pre- requisite s	Foundational understanding of data types, data structures, basic programming knowledge, familiarity with operating systems and file management. Basic knowledge of set theory, logic, and discrete mathematics to understand relational algebra and query formulation.							
Anti- requisites	NIL							
Course Descripti on	systems, including data m a solid foundation on the n It develops skills in SQL students to construct and concept of object oriented technologies like NoSQL . data storage structures an	This course introduces the foundational principles of database management systems, including data models, schemas, and architectures. This course provides a solid foundation on the relational model of data and the use of relational algebra. It develops skills in SQL for data definition, manipulation, and control, enabling students to construct and execute complex queries. The course also introduces the concept of object oriented and object relational databases and modern database technologies like NoSQL . The also course allows the students to gain insights into data storage structures and indexing strategies for optimizing query performance.						
Course Objective		The objective of the course is to familiarize the learners with the concepts of DatabaseManagement Systems and attain Employability through Problem						
Course Out Comes	 On successful completion of the course the students shall be able to: 17. Describe the fundamental elements of relational database management systems. [Understand] 18. Examine databases using SQL query processing and Optimization. [Apply] 19. Design simple database systems applying the normalization constraints and demonstrate the database transaction processing, recovery, and security. [Apply] 20. Interpret the concept of advanced databases and its applications. [Apply] 							
Course Conte	nt:							
Module 1	Introduction to Database Modelling and Relational Algebra Assignment Problem Solving 10 Sessions (Understand)							



Topics:

Introduction to Database: Schema, Instance, 3-shema architecture, physical and logical data independence, Data isolation problem in traditional file system, advantages of database over traditional file systems. Entity Relationship (ER) Model, ER Model to Relational Model, Examples on ER model.

Relational Algebra with selection, projection, rename, set operations, Cartesian product, joins (inner and outer joins), and division operator. Examples on Relational Algebra Operations.

Module 2	Fundamentals of SQL andQuery Optimization (Apply)	Assignment	Programming	11 Sessions
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Topics:

SQL Database Querying, DDL, DML, Constraints, Operators, Set Operators, Aggregate Functions, Joins, Views, Procedures, Functions and Triggers.

Database programming issues and techniques: Embedded SQL, Dynamic SQL; SQL / PSM and NoSQL.

Query Optimization: Purpose, transformation of relational expressions, estimating cost and statistics of expression, choosing evaluation plans, linear and bushy plans, dynamic programming algorithms.

Module 3 Relational Database Module 3 Management(Apply)		Problem Solving	12 Sessions
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Topics:

Relational database design: Problems in schema design, redundancy and anomalies, Normal Forms based on Primary Keys-(1NF,2NF, 3NF), Boyce-Codd Normal Form, Multi valued Dependency (Fourth Normal Form), JoinDependencies (Fifth Normal Form), lossy and lossless decompositions, Database De-normalization.

Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; 2PL, Serializability and Recoverability; Lock Management; The write-ahead log protocol; Check pointing; Recovering from a System Crash; Media Recovery; Other approaches and interaction with concurrency control.

Module 4 Advanced DBMS Topics Assignment Case Study 12 Sessions (Apply)	Module 4	-	Assignment	Case Study	12 Sessions
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Topics:

Advanced topics: Object oriented database management systems, Deductive database management systems, Spatial database management systems, Temporal database management systems, Constraint database management systems.

New database applications and architectures such as Data warehousing, Multimedia, Mobility, NoSQL, NativeXML databases (NXD), Document-oriented databases, Statistical databases.





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Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications. Tools/Simulator used: MySQL DB for student practice.

Also demonstration of ORACLE DB on object-relational database creation and JDBC connection.

- 5. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 6. Programming: Implementation of any given scenario using MySQL.

Text Books:

- T1. Elmasri R and Navathe S B, "Fundamentals of Database System", Pearson Publication, 7th Edition, 2018.
- T2. RamaKrishna & Gehrke, "Database Management Systems" 3rd Edition, 2018, McGraw-Hill Education.
- T3. W. Lemahieu, S. vanden Broucke and B. Baesens, "Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data", Cambridge University Press, 2018.

References

R1 Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill ,7th Edition, 2019.

R2 M. Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems", O'Reilly, 2017.

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database design using ER- Relational mapping, Implementation of given database scenario using MYSQLDB.

Topics relevant to development of Employability: Develop, test and implement computer databases, creatingsophisticated, interactive and secure database applications Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Nil



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Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

RESIDENCY UNIVE

Course Code: CSE2261	Course Title: Database Management Systems Lab Type of Course: 1) Laboratory - PCC	L-T-P-C	0	0	2	1
Version No.	1.0					
Course Pre- requisite s	Foundational understanding of data types, basic progra operating systems and file management.	imming kno	wle	dge	¢,	
Anti- requisites	NIL					
Course Descripti on	The Database Management Systems (DBMS) Laboratory is designed to provide students with hands-on experience in database design, implementation, and management using SQL and database management tools such as MySQL. The lab complements theoretical concepts learned in database courses by allowing students to practice database creation, querying, and optimization techniques. The DBMS Lab enables students to develop industry-relevant skills in database management, preparing them for careers in software development, data engineering, and database administration .					
Course Objective	The objective of the course is to familiarize the le. DatabaseManagement Systems and attain Employabil Methodologies.					
Course Out Comes	 On successful completion of the course the students sh 21. Demonstrate the database concepts, practice, and 22. Design and implement database schemas w techniques to optimize structure. [Apply]] 23. Develop and implement stored procedures, trigge and efficiency. [Apply] 24. To Design and build database applications for real 	SQL querie hile applyi rs, and vie	es. [ng ws	no for	auto	matior
Course Conte	ent:					
List of Laborat Create Employ	ory Tasks: yee, Student, Banking and Library databases and populat	e them with	n ree	quir	ed d	ata.

Do the following experiments of different lab sheets on those databases.

Labsheet-1 [3 Practical Sessions]

Experiment No 1: [1 Session]

1. To study and implement the different language of Structured Query Language. Level 1: Perform operations using Data Definition Language and Data Manipulation Language commands including different variants of SELECT on Student DB.

Level 2: Identify the given requirements; valid attributes and data types and Perform DDL and DML operations on a given scenario. [Banking Databases]

Experiment No. 2: [2 Sessions]

2. To study and implement the concept of integrity constraints in SQL.

Level 1: Create tables on Banking database using PRIMARY KEY, NOT NULL, UNIQUE, FOREIGN KEY and demonstrate the working of relational, logical, pattern matching, BETWEEN, IS NULL, IN and NOT IN Special Operators on Student Database.

Level 2: Enforce different types of data and referential integrity constraints. Then try queries with special operators based on the student database. [Banking Database].

Labsheet-2 [3 Practical Sessions] Experiment No. 3: [1 Session]

3. Implement complex queries in SQL.

Level 1: Implement the conjugate of GROUP BY, ORDER BY and aggregate functions on Banking Database. Level 2: Implement MySQL DB queries on library database using appropriate clauses and aggregate functions. Also order the data either in ascending and descending order using corresponding clause. [Library databases].

Experiment No. 4: [2 Session]

4. To study and implement different types of Set and Join Operations [2 Slots] Level 1: Demonstrate different types of Set Operations (UNION, UNION ALL, INTERSECT, MINUS) and Join Operations (INNER JOINS, OUTER JOINS, CROSS JOIN, NATURAL JOIN) on two or more tables of Airline Database. Level 2: Use Set and Join operations to retrieve the data from two or more relations(tables) as per the given scenario. [Airline Database]

Labsheet-3 [2 Practical Sessions] Experiment No. 5: [2 sessions]

5. To study and implement Views, and Procedures in MySQL DB.

Level 1: Implement MySQL Views, and Procedures in ORACLE DB on Employee database. Level 2: Analyze the requirement and construct views, and Procedures on Mini Project Domain. [Banking Database]

Labsheet-4 [2 Practical Sessions] Experiment No. 6: [2 Sessions]

6. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Analyze the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-5 [2 Practical Sessions] Experiment No. 7: [2 Sessions]

7. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Determine the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-6 [4 Practical Sessions] Experiment No. 8: [2 Sessions]

8. To implement the concept of forms and reports.

Level 1: Implement the concept of forms and reports.

Level 2: Examine the schema relationship.

Experiment No. 9: [2 Sessions]

9. Create the database using the given schema. (Flight Management)

Level 1: Implement a relational database based on the provided schema for the Flight Management system, including the creation of tables, relationships, and constraints.

Level 2: Demonstrate schema relationships by defining primary and foreign keys to ensure data integrity within the Flight Management database.

Labsheet-7 [4 Practical Sessions]

Experiment No. 10: [2 Sessions]

10. Create the database using the given schema. (Company database)

Level 1: Implement the database schema by defining tables, relationships, and constraints according to the given Company Database schema.

Level 2: Demonstrate the schema's relationships and data integrity by creating and linking tables as per the specified requirements.

Experiment No. 11: [2 Sessions]

11. Create the database using the given schema. (Student Library)

Level 1: Implement forms and reports based on the provided Student Library database schema, ensuring effective data entry and reporting mechanisms.

Level 2: Demonstrate the schema relationships within the Student Library database, demonstrating how these relationships influence the creation and functionality of forms and reports.

Labsheet-8 [1 Sessions]

12. Design a mini project based on the databases such as Inventory Management System, University Management System, Hospital Management System, etc.

Level 1: Implement the real time database.

Level 2: Analyze the working of database in real time.

Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications. Tools/Simulator used: MySQL DB for student practice.

Also demonstration of ORACLE DB on object-relational database creation and JDBC connection.

Percentage of changes in this version: 50% of changes from earlier version. New topics are highlighted initalic.

- 7. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 8. Programming: Implementation of any given scenario using MySQL.

Text Books:

- T1. Elmasri R and Navathe S B, "Fundamentals of Database System", Pearson Publication, 7th Edition, 2018.
- T2. RamaKrishna & Gehrke, "Database Management Systems" 3rd Edition, 2018, McGraw-Hill Education.
- T3. W. Lemahieu, S. vanden Broucke and B. Baesens, "Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data", Cambridge University Press, 2018.

References

- R1 Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill ,7th Edition, 2019.
- R2 M. Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems", O'Reilly, 2017.

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database designusing ER- Relational mapping, Implementation of given database scenario using MYSQLDB.

Topics relevant to development of Employability: Develop, test and implement computer databases, creatingsophisticated, interactive and secure database applications Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Nil

Course Code: CSE2262	Course Title: Analysis of Algorithms Type of Course: Theory PCC	L- T-P- C	3	1	0	4	
Version No.	1.0						
Course Pre- requisites							
Anti- requisites	Nil						
Course Description	This course introduces techniques for the design and analysis of efficient algorithms and methods of applications. This course discusses the classic approaches for algorithm design such as Divide and Conquer, Dynamic Programming, Greedy method. This course also describes other basic strategies searching solution space. The core concepts of analyzing algorithms and classifying them into various complexity classes is covered in the end.						
Course Objective	The objective of the course is to familiarize the learners Algorithms and attain Skill Development through Pro						

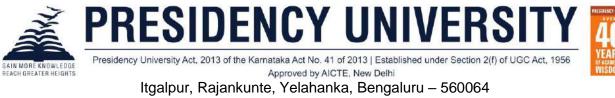
Course Out	On successful completic	on of the course the stu	dents shall be able to:						
Comes	1. Compute efficiency of a	given algorithm.[Apply]							
	2. Apply divide and conqu	er technique for searchin	g and sorting Problems.[Apply]						
	3. Apply the Dynamic Pro	gramming technique for	a given problem. [Apply]						
	4. Apply greedy technique	e for solving a Problem.[A	Apply]						
	5. Demonstrate Back track	ting technique and limitation	tions of Algorithms.[Apply]						
Course Content:									
Module 1	Introduction	Assignment	Simulation/Data Analysis	10 Sessions					
	Introduction, Asymptotic Notations and its properties, Best case, worst case and average case- Sequential search, Sorting; Mathematical analysis for Recursive and Non-recursive algorithms: Substitution method and Master's Theorem.								
Module 2	Divide-and-conquer	Assignment	Simulation/Data Analysis	08 Sessions					
Introduction. Inse	rtion Sort; Merge sort, Quicl	k sort, Binary search.							
Module 3	Dynamic programming	Term paper/Assignment	Simulation/Data Analysis	10 Sessions					
	n examples, Principles of Me thms. Chain Matrix Multipli	· · ·	Problem, Bellman-Ford algorit	hm, Floyd-					
Module 4	Greedy technique	Term paper/Assignment	Simulation/Data Analysis	09 Sessions					
	tional Knansack Problem N	finimal Spanning Tree: P	rim's Algorithm and Kruskal's	Algorithm,					
-	ortest Path: Dijkstra's Algori								
-			Simulation/Data Analysis	08 Sessions					
Single-source Sho Module 5	ortest Path: Dijkstra's Algori Complexity Classes	thm Term paper/Assignment	Simulation/Data Analysis an Satisfiability Problem (SAT	Sessions					
Single-source Sho Module 5 Complexity Cla	ortest Path: Dijkstra's Algori Complexity Classes	thm Term paper/Assignment NP Complete - Boolea	an Satisfiability Problem (SAT	Sessions					
Single-source Sho Module 5 Complexity Cla	Complexity Classes	thm Term paper/Assignment NP Complete - Boolea	an Satisfiability Problem (SAT	Sessions					
Single-source Sho Module 5 Complexity Cla Branch and Bou Text Book	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens	an Satisfiability Problem (SAT	Sessions).					
Single-source Sho Module 5 Complexity Cla Branch and Bou Text Book	Complexity Classes Sesses- P,NP- NP Hard and and: Knapsack problem; B	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens	an Satisfiability Problem (SAT	Sessions).					
Single-source Sho Module 5 Complexity Cla Branch and Bou Text Book 5. A Education	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018.	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i>	an Satisfiability Problem (SAT	Sessions). dition, Pearson					
Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018.	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri	an Satisfiability Problem (SAT s problem. nalysis of Algorithms", 3rd ed	Sessions). dition, Pearson					
Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T Algorithm	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018. Thomas H.Cormen, Charles F	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri	an Satisfiability Problem (SAT s problem. nalysis of Algorithms", 3rd ed	Sessions). dition, Pearson					
Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T Algorithm References	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018. Thomas H.Cormen, Charles F	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri 2022.	an Satisfiability Problem (SAT s problem. <i>nalysis of Algorithms</i> ", 3rd ea	Sessions). dition, Pearson					
Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T Algorithm References 9. J	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018. Thomas H.Cormen, Charles E <i>ns</i> ", 4th edition, MIT Press, 2	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri 2022. Algorithm Design", Addis	an Satisfiability Problem (SAT s problem. <i>nalysis of Algorithms</i> ", 3rd ea	Sessions). dition, Pearson <i>uction to</i>					
Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T Algorithm References 9. J 10. T	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018. Thomas H.Cormen, Charles E <i>ns</i> ", 4th edition, MIT Press, 2	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri 2022. Algorithm Design", Addis <i>ns Illuminated</i> " (books 1	an Satisfiability Problem (SAT s problem. <i>nalysis of Algorithms</i> ", 3rd ed west and Clifford Stein, <i>"Introd</i> son-Wesley, 2005.	Sessions). dition, Pearson <i>uction to</i>					
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Single-source Sha Module 5 Complexity Cla Branch and Bou Text Book 5. A Education 6. T Algorithm References 9. J 10. T Implement 11. A	Complexity Classes Isses- P,NP- NP Hard and Ind: Knapsack problem; B Anany Levitin, <i>"Introductio</i> n, 2018. Thomas H.Cormen, Charles E <i>ns</i> ", 4th edition, MIT Press, 2 . Kleinberg and E. Tardos, "2 Tim Roughgarden, <i>"Algorithm</i> ntation", Soundlikeyourself I	thm Term paper/Assignment NP Complete - Boolea acktracking, - N-Queens <i>n to the Design and A</i> E.Leiserson, Ronald L. Ri 2022. <i>Algorithm Design</i> ", Addis <i>ms Illuminated</i> " (books 1 Publishing, 2017-2019. an, " <i>The Design and And</i>	an Satisfiability Problem (SAT s problem. <i>nalysis of Algorithms</i> ", 3rd ed west and Clifford Stein, <i>"Introd</i> son-Wesley, 2005. through 3), "Operating System <i>alysis of Algorithms</i> ", Addison-V	Sessions). dition, Pearson uction to s Design and					

Web-Resources

- 9. NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs47/preview
- 10. Coursera: Analysis of Algorithms by Princeton University
- 11. <u>Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).</u>
- 12. Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of Aarhus

<u>University</u>

Topics relevant to "SKILL DEVELOPMENT": knapsack, prim's, kruskal's algorithm, quick sort, binary search for **Skill Development** through **Problem Solving methodologies**. This is attained through assessment component mentioned in course handout.



•		T	<u> </u>	-	1	1	
Course Code:	Course Title: Analysis of Algorithms Lab Type of Course: Lab - PCC						
		L- T-P-	C () (C	2	1	
CSE2263							
Version No.	1					<u> </u>	
Course Pre-	Nil						
requisites							
Anti- requisites	NIL						
Course Description	This course introduces techniques for the design and analysis of efficie applications. This course discusses the classic approaches for algorithm Conquer, Dynamic Programming, Greedy method. This course also d searching solution space. The core concepts of analyzing algorithms and complexity classes is covered in the end.	m desigr escribes	n suc othe	ch rt	as Div pasic s	vide and trategies	
Course Objective	The objective of the course is to familiarize the learners with t Algorithms and attain Skill Development through Experiential Lea						
	On successful completion of the course the students shall be a	able to:					
	1. Compute efficiency of a given algorithm. [Applying]						
Course Out	2. Apply divide and conquer technique for searching and sorting Problem	s.[Apply	ing]				
Comes	3. Apply the Dynamic Programming technique for a given problem. [Applying]						
	4. Apply greedy technique for solving a Problem.[Applying]						
	5. Demonstrate Back tracking technique and limitations of Algorithms.[A	pplying]					
Course Content							
Module 1	Introduction				Se	3 ssions	
•	Inning time of an algorithm, Compare running time of algorithms, Impole sort, selection sort	blement	sort	ing	j algoi	ithms	
Module 2	Divide-and-conquer				Se	3 ssions	
Compare sea Merge Sort,	arching algorithms: Linear Search, Binary Search; Compare Sorting QuickSort.	algorithi	ns: l	Ins	ertion	Sort,	
Module 3	Dynamic programming				Se	3 ssions	
Introduction	and memorization: Factorial; Coin Change Problem ; Floyd-Warshal	's Algori	thm				
Module 4	Greedy technique					3 ssions	
Fractional Kr	hapsack Problem; Minimal Spanning Tree Algorithms-Prim's Algorith	m, Krusl	kal's	al	gorith	m	

Module 5	Complexity Classes	3 Sessions
Branch and I	Bound: Knapsack problem; Backtracking, - N-Queens problem.	
	List of Laboratory Tasks:	
	1. Measuring running time of an algorithm	
	Objective: To experimentally determine the running time of basic algoring input size n=10, 100, 1000, etc. by taking difference of starting time and time.	
	2. Compare running time of algorithms	
	Objective: To execute two algorithms to solve the same problem, and to comparatively evaluate the better algorithm for large values of N.	D
	3. Implement sorting algorithms such as bubble sort, selection sort	
	Objective: To implement comparison based sorting strategies.	
	4. Compare searching algorithms	
	Objective: To implement two searching strategies and compare their pe	erformance
	5. Compare Sorting algorithms	
	Objective: To implement searching strategies that follow top down desi approach (Insertion sort, merge sort).	ign
	6. Quick Sort	
	Objective: To demonstrate Quick sort and its variants, and their impact running time.	on
	7. Dynamic Programming	
	Objective: To demonstrate Dynamic Programming approach with the he Factorial algorithm.	elp of
	8. Coin Change Problem	
	Objective: To implement an efficient algorithm for the Coin Change pro	blem.
	9. Floyd-Warshall's Algorithm	
	Objective: To demonstrate how dynamic programming is used with the Floyd-Warshall's algorithm.	help of
	10. Fractional Knapsack Problem	
	Objective: To demonstrate how greedy method can be used to solve th Fractional Knapsack Problem.	e
	11. Minimal Spanning Tree Algorithm	
	Objective: To implement greedy strategy to solve the Minimal Spanning problem using Prim's Algorithm.	g Tree
	12. Kruskal's Minimal Spanning Tree Algorithm	
	Objective: To implement greedy strategies to solve the Minimal Spanni problem using Kruskal's Algorithm.	ng Tree

13. Knapsack Problem
Objective: To implement Knapsack problem using branch and bound technique.
14. N-Queen's Problem
Objective: To demonstrate backtracking method with the help of N-Queen's problem.
15. Case Study
Objective: To demonstrate how various techniques can be used to solve the same problem with the help of Knapsack problem.
Targeted Application & Tools that can be used
3. PyTorch/Jupyter Notebook – For Python programming
Text Book
T1 Anany Levitin, <i>"Introduction to the Design and Analysis of Algorithms"</i> , 3rd edition, Pearson Education, 2018.
T2 Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, <i>"Introduction to Algorithms</i> ", 4th edition, MIT Press, 2022.
References
R1. J. Kleinberg and E. Tardos, "Algorithm Design", Addison-Wesley, 2005.
R2. Tim Roughgarden, "Algorithms Illuminated" (books 1 through 3), "Operating Systems Design and Implementation", Soundlikeyourself Publishing, 2017-2019.
R3. AV Aho, J Hopcroft, JD Ullman, "The Design and Analysis of Algorithms", Addison-Wesley, 1974.
R4. Donald E. Knuth, "The Art of Computer Programming", Volumes 1 and 3 Pearson.
Web Based Resources and E-books:
W1. NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs47/preview
W2. Coursera: Analysis of Algorithms by Princeton University
W3. Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).
W4. Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of Aarhus
University
Topics relevant to "EMPLOYABILITY SKILLS": The lab experiments and assessments enable the student to acquire Skill Development through Experiential Learning techniques

Course Code: CSE2264	Course Title: Essentials of Al Type of Course: Program Core Course - Theory	L-T-P- C	3	0	0	3	
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Version No.	1.0							
Course Pre- requisites	NIL							
Anti- requisites	NIL	IIL						
Course Description	course, the student followed by knowled learn about uncerta such as Naïve Baye Topics: Uninformed Constraint satisfacti	first learns the variou dge-based logic repr inty in AI, as well as as Classifier and Hido search, Heuristic se	arch, Local search, Adverter Resolution, Probability	roblem-solving, the student will uch challenges ersarial search,				
Course Objectives	•	the course is EN	/IPLOYBILITY of stud	ent by using				
Course Out Comes	5. Explai Al [Understan 6. Impler [Apply] 7. Prove [Apply]	 On successful completion of this course the students shall be able to: 5. Explain different methods of searching, proving, and analysis in AI [Understand] 6. Implement various graphical and adversarial search algorithms. [Apply] 7. Prove, by resolution, different situations using First Order Logic [Apply] 						
Course Conten			0 11					
Module 1	Search Methods for Problem- Solving	Problem-Solving Tests	NPTEL Assignments	No. of Sessions: 13				
Search; Gener Uninformed S Search, Genera Deepening Dep Algorithms. He	ral Formulation of S earch Algorithms – alized Uniform Cost Se pth-First Search, Time	Search Problems; I Breadth First Searc arch (a.k.a Dijkstra's e and Space Comp rithms – Heuristics	ypes of AI and Learning Data Structures used ch, Depth First Search, Single-Source Shortest lexity Analysis of Uninf and Admissibility, Gre	in Searching. Uniform Cost Path), Iterative formed Search eedy Best-First				
Module 2	Advanced Search Methods	Problem-Solving Tests	NPTEL Assignments	No. of Sessions: 12				
Search – Mini Constraint Sat	imax Search, Alpha-E isfaction Problems D	Beta Pruning, Ideal efinitions and Exar	rithms, Gradient Descer Ordering. Constraint nples – Map Colourin uristics; Arc Consister	Satisfaction – g, N Queens,				
Module 3	Knowledge-Based Logic Representation	Automated Theorem Proving using FOL Resolution	NPTEL Assignments	No. of Sessions: 10				
Inference Rules		sjunctive Normal Fo	positional Logic. Logica rms. First Order Logic s. Inference Rules. Co	= - Syntax and				

Module 4	Uncertainty in Al	Representing problems as HMM	NPTEL Assignments	No. of Sessions: 06
Classifier. Usin Definition of HN solutions – Fo Natural Langua Artificial Neuror Targeted Appl 5. Implement 6. Implement	g Naïve Bayes Class M. Sequence Labelin rward Probability and ge Processing (Eg. P ns, Activation Function ication & Tools that intation of a shortest-pa- ntation of a sequence	sifier for Supervised g and Markov Assum Viterbi Algorithm. art-of-Speech Taggir is, Multilayer Percept can be used: ath finder using differ labeler using Viterbi	ent search algorithms. Algorithm.	arkov Models – in HMM and their ence Labeling in Deep Learning –
course			Assignment propose	
Edition. 7. La 2021. 8. E	Pearson Education. 2 avika Goel. <i>Artificial In</i>	022. <i>telligence: Concepts</i> ht and Shivashankar	elligence: A Modern Ap and Applications. 1 st E B Nair. <i>Artificial Intelli</i>	dition. Wiley.
5. Munesh (Publishers. 6. George <i>Solving</i> . 6 th Weblinks 6. N Link: <u>http</u> 7. S Link: <u>http</u> 8. D Solving". Link: <u>http</u> 9. D and Reas	Chandra Trivedi. A Cla 2018. Luger. Artificial Intell Edition. Pearson Educ PTEL Courses: Maus <u>s://nptel.ac.in/courses</u> hyamanta M. Hazarika <u>s://nptel.ac.in/courses</u> eepak Khemani (IIT M <u>s://nptel.ac.in/courses</u>	assical Approach to A igence: Structures a cation. 2021. am (IIT Delhi), "An In /106102220. a (IIT Guwahati), "Fur /112103280. Useful f ladras), "Artificial Inte /106106226. Useful f ladras), "Artificial Inte	Iligence: Search Meth for Module 1 and 2 Iligence: Knowledge F	¹ Edition. Khanna omplex Problem Intelligence" Intelligence". ods for Problem-





Approved by AICTE, New Delhi



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Course	Course Title: Essentials of AI Lab					_				
Code:	Type of Course: Program Core Course	L-T-P-C	0	0	2	1				
CSE2265	- Lab									
Version No.	1.0	1.0								
Course Pre- requisites	NIL									
Anti- requisites	NIL									
Course Description	This course introduces the student to the basics of artificial intelligence. In this course, the student first learns the various search methods for problem-solving, followed by knowledge-based logic representations. After that, the student will learn about uncertainty in AI, as well as approaches to solve such challenges such as Naïve Bayes Classifier and Hidden Markov Models. Topics: Uninformed search, Heuristic search, Local search, Adversarial search, Constraint satisfaction, logic, First Order Resolution, Probability, Naïve Bayes Classifier, and Hidden Markov Model (HMM).									
Course Objectives	The objective of the course is EMPLC EXPERIENTIAL LEARNING techniques.	OYBILITY o	of st	udent	by	using				
Course Out Comes	On successful completion of this course the students shall be able to: 5. Explain different methods of searching, proving, and analysis in AI [Understand] 6. Implement various graphical and adversarial search algorithms. [Apply] 7. Prove, by resolution, different situations using First Order Logic [Apply]									
	8. Solve sequence labeling pro	oblems usir	ng HI	MM [A		-				
Course Cont					No.	of				
Sessions: 15										
Experiment N	No. 1: File Handling									

Level 1: Read text files using Python Level 2: Parse text files using Python

Experiment No. 2: Implementation of Graph Representations

Level 1: Implement graph representations by taking input from the console Level 2: Implement graph representations by taking input from files.

Experiment No. 3 & 4: Implementation of Uninformed Search Algorithms Level 1: Implement uninformed search algorithms – BFS and DFS – on unweighted graphs. Level 2: Implement uninformed search algorithms – Uniform Cost Search and Dijkstra's SSSP – on weighted graphs

Experiment No. 5: Implementation of Heuristic Search Algorithms

Level 1: Calculate the upper-bounds of admissible heuristics using Dijkstra's SSSP.





Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi

Level 2: Implement Greedy Best-First Search and A* Search Algorithms.

Experiment No. 6 & 7: Implementation of Adversarial Search Level 1: Implement a Game Tree Level 2: Perform Alpha-Beta Pruning and Ideal Ordering

Experiment No. 8 & 9: Implementation of a CSP Solver

Level 1: Implement a CSP solver to solve a cryptarithmetic problem Level 2: Implement a CSP solver for map colouring

Experiment No. 10: Using Python Packages for CSP

Level 1: Implement a CSP solver for Sudoku Level 2: Implement a CSP solver for Addoku

Experiment No. 11: Implement a Family Tree Parser

Level 1: Perform logic programming using logpy. Level 2: Implement a family tree parser

Experiment No. 12 & 13: Implement a Decision Maker

Level 1: Implement a Minesweeper solver Level 2: Implement a Battleship solver

Experiment No. 14 & 15: Hidden Markov Model

Level 1: Implement a generic HMM

Level 2: Build a PoS Tagger using a HMM with the Brown Corpus and the Universal Dependencies Tagset.

Targeted Application & Tools that can be used:

- 7. Google Colab
- 8. Python IDEs like PyCharm

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

The course is a lab-based course with all the assessments centrally evaluated. Every experiment consists of **two sessions**. The first session involves exploring a solution to the problem. The second session involves solving a particular problem.

Textbook(s):

- 3. Stuart Russel and Peter Norvig. *Artificial Intelligence: A Modern Approach.* 4th Edition. Pearson Education. 2022.
- 4. Prateek Joshi and Alberto Artasanchez. *Artificial Intelligence with Python*. 2nd Edition. Packt. 2020.

References:

- 3. Deepak Khemani. A First Course in Artificial Intelligence. 1st Edition. 6th Reprint, 2018.
- 4. Munesh Chandra Trivedi. *A Classical Approach to Artificial Intelligence*. 2nd Edition. Khanna Publishers. 2018.





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GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS		y AICTE, New Delhi				10020000	WISDOM
Course Code: CSE2266	Course Title: Theory of Con		L- T-P- C	3	0	0	3
Version No.	2.0		I		I		1
Course Pre- requisites	nil						
Anti- requisites	NIL						
Course Description	The course deals with in correspondence between lang them. Topics include: Forn Deterministic and Nondetern state and push-down autom relations with algorithms.	guage classes a nal definitions ministic syster	nd the autor of gramm ns, Gramma	mata ars ar ar	tha and nbig	t reco acce guity,	gnize ptors, finite
Course Objective	The objective of the course i of Theory of Computatio Development through Proble	n as mentio	ned above	and			-
Course Outcomes	On successful completion of Describe various components Automata for the given Lan Regular grammar and Contex Push down Automata. (App Language. (Application)	s of Automata. guage. (Applic t free grammar	(Knowledge cation) 3. D : (Comprehe	e) 2. Distin ensic	Illus Iguis on) 4	strate sh bet . Con	Finite tween .struct
Course Content:							
Module 1	Introduction to automata theory	Assignment	Problems Strings and Language operations	d		6 cl	asses
Topics:							
Languages & c	Automata Theory, Application operations on languages, Repres achines (FSM): Deterministic F tic FSMs	sentation of au	tomata, Lan	guag	ge re	cogni	zers,
Module 2	Finite Automata	Assignment	Assignmen Problems DFA, NFA	on		13 Sess	sions



Topics:

Basic concepts of Finite automata, DFA- definitions of DFA, Deterministic Accepters Transition Graphs and Languages

and DFA's, Regular Languages, NFA- Definition of a Nondeterministic Accepter, Languages and NFA's Why Non- determinism? Equivalence of Deterministic and Nondeterministic Finite Accepters, Reduction of the Number of States in Finite Automata.

	Regular Expressions &	Assignment	Problems on RE,	12
Module 3	Context Free Grammar		CFG, PT, PL and	Sessions
			Ambiguity	

Topics:Formal Definition of a Regular Expression, Languages Associated with Regular Expressions, Languages, Regular Languages (RL) and Non-regular Languages: Closure properties of RLs, to show some languages are not RLs, Closure Properties of Regular Context Free Grammars-Examples of Context-Free Languages, Leftmost and Rightmost Derivations, Derivation Trees, Relation Between Sentential Forms and Derivation Trees, Ambiguity in Grammars and Languages: Ambiguous Grammars, Removing Ambiguity, Chomsky Normal Form, Gribiche Normal Form.

Module 4	Push down	Assignment	Problems on	08 Sessions
	Automata		pushdown	
			Automaton	

Topics:

Definition of a Pushdown Automaton, Language Accepted by a Pushdown Automaton, Acceptance by Final State, Acceptance by Empty Stack, From Empty Stack to Final State, From Final State to Empty Stack Equivalence of PDA's and CFG's: From Grammars to Pushdown Automata.

Module 5	Turing Machine	Assignment	Problems on	07 Sessions
			Turning Machine	

Topics:

Definition of a Turing Machine, Turing Machines as Language Accepters, Example Languages to construct Turing

machine, Turing Machines as Transducers, Halting Programming Techniques for Turing Machines

Targeted Application & Tools that can be used:

Targeted Application:

1. Text Processing





2. Compilers

- 3. Text Editors
- 4. Robotics Applications
- 5. Artificial Intelligence

Tools:

1. JFLAP (Java Formal Language and Automata Package) Software simulation tool. It's interactive educational

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software written in Java to experiment topics in automata theory.

2. Turing machine Online simulators.

Text Book(s):

1. Peter Linz, "An introduction to Formal Languages and Automata", Jones and Bartlett Publications 6th Ed, 2018.

Reference(s):

1. Aho, Ullman and Hopcroft, "Theory of Computation", Pearson India 3rd Edition 2008.

2. Michael Sipser, "Theory of Computation", Cengage India 3rd Ed, 2014.

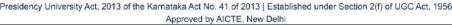
E-Resources

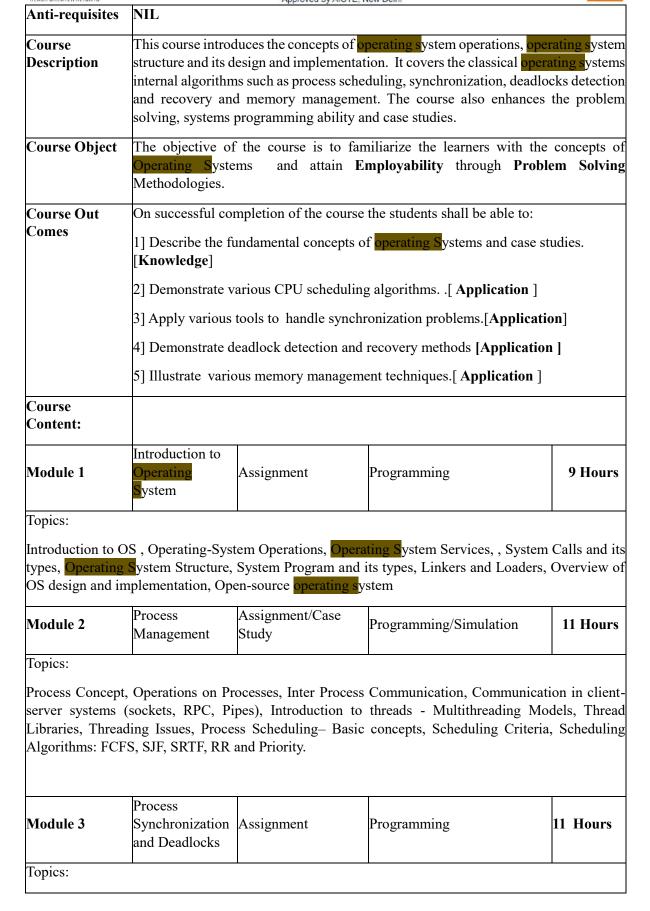
 $NPTEL\ course - https://onlinecourses.nptel.ac.in/noc21_cs83/preview$

Course Code:	Course Title: Operating Systems	L-T- P- C	3	0	0	3
CSE2269						
Version No.	1.0					
Course Pre- requisites	Nil					



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The Critical-Section Problem- Peterson's Solution, Synchronization hardware, Semaphores, Classic Problems of Synchronization with Semaphore Solution- Producer-Consumer Problem, Reader-Writer problems, Dining Philosopher's Problem, . Introduction to Deadlocks, Necessary conditions for deadlock, Resource allocation Graph, Methods for handling deadlock: Deadlock Prevention and Implementation, Deadlock Avoidance and Implementation, Deadlock detection & Recovery from Deadlock.

Module 4	emory anagement	Assignment	Programming/Simulation	10 Hours
----------	--------------------	------------	------------------------	----------

Topics:

Introduction to Memory Management, Basic hardware-Base and Limit Registers, Memory Management Unit(MMU), Dynamic loading and linking, Swapping, Contiguous and Non-Contiguous Memory Allocation, Segmentation, Paging - Structure of the Page Table – Virtual Memory and Demand Paging – Page Faults and Page Replacement Algorithms, Copy-on-write, Allocation of Frames, Thrashing

Introduction to File system management: File System Interface (access methods, directory structures), File system implementation.

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems where in there are resources and entities that use and manage the resources.

Software Tools:

Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install and work on multiple guest Operating Systems on top of a host OS.

Intel Processor identification utility: This software is used to explain about multi-core processors. It helps to identify the specifications of your Intel processor, like no of cores, Chipset information, technologies supported by the processor etc.

Project work/Assignment

Demonstrate process concepts in LINUX OS.

Simulation of CPU scheduling algorithms.

Develop program to demonstrate use of Semaphores in threads.

Develop program to demonstrate use of deadlock avoidance algorithms.

Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019



References

Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.

William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.

Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020

Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau, "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html





Course Code:	Course Title: <mark>Operating S</mark> ystems Lab		0	0	2	1
CSE2270		L-T- P- C				
Version No.	1.0					
Course Pre- requisites	Nil					
Anti-requisites	NIL					
Course Description	This laboratory course provides hands-on operating systems through practical assign covers foundational aspects such as system inter-process communication, synchronizat and file systems. Students will implement and scheduling algorithms, fostering deeper design. The lab also introduces modern OS basics of open-source OS environments.	ments, simulation calls, process an tion, deadlocks, r and simulate real r understanding o	is, and d thr nem -tim of Of	nd o read lory le C S al	case s l man man OS con cchite	tudies. 1 agement agement nponent cture and
Course Object	The objective of the course is to familiar Operating Systems and attain Employ Methodologies.					-
Course Out	On successful completion of the course the s	studente chall he c	1.1.			
Comes	 Demonstrate system-level programming u [Apply] Simulate process scheduling and multithr 	using system calls reading techniques	s and s. [A	1 OS App	ly]	
Comes	1] Demonstrate system-level programming u [Apply]	using system calls reading techniques ration problems us	s and s. [A sing	1 OS App sen	ly] napho	res and

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems where in there are resources and entities that use and manage the resources.

Software Tools:

Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install and work on multiple guest Operating Systems on top of a host OS.

Intel Processor identification utility: This software is used to explain about multi-core processors. It helps to identify the specifications of your Intel processor, like no of cores, Chipset information, technologies supported by the processor etc.

List of Laboratory Tasks: Lab sheet -1







Approved by AICTE, New Delhi L1: Write a program to demonstrate the use of fork() and exec() system calls in process creation. L2: A system has limited memory and high-priority real-time processes. Design a scheduling algorithm that ensures responsiveness while preventing starvation. Lab sheet -2 L1: Implement First-Come-First-Serve (FCFS) process scheduling using C or Python. L2: You are designing a server that handles thousands of client connections. Compare multithreading and multiprocessing for this task and implement a basic server model. Lab sheet -3 L1: Implement Round Robin Scheduling with a fixed time quantum. L2: In a banking system, concurrent access to accounts leads to data corruption. Design a synchronization solution to avoid race conditions. Lab sheet -4 L1: Write a program to create threads using Pthreads or Python's threading module. L2: You're tasked with building a file access tracker in an OS. Implement a system to log file access patterns and identify frequent accesses. Lab sheet -5 L1: Demonstrate inter-process communication (IPC) using pipes. L2: A simulation tool needs to emulate process suspension and resumption. Design and implement such a mechanism using signals or condition variables. Lab sheet -6 L1: Simulate the Producer-Consumer problem using semaphores. L2: You're developing a system where sensor devices (producers) generate temperature readings, and data processors (consumers) store and process these readings. To prevent race conditions and ensure buffer safety, implement a synchronization mechanism using semaphores. Lab sheet -7 L1: Implement Dining Philosophers Problem using threads and synchronization. L2: In a multi-threaded cafeteria simulation, five philosophers sit around a circular table, each alternating between thinking and eating. To eat, a philosopher must hold two forks (represented by shared resources). Your task







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is to avoid deadlock and ensure no philosopher starves using thread
synchronization techniques.
Lab sheet -8
L1: Write a program to simulate First Fit, Best Fit, and Worst Fit memory
allocation strategies. L2: A system with limited memory blocks needs to allocate memory to
processes arriving with various size requests. Your task is to implement three
classic memory allocation strategies—First Fit, Best Fit, and Worst Fit—to
allocate memory to each process efficiently. Simulate and compare how
memory gets allocated in each strateg
Lab sheet -9
L1: Demonstrate paging using a simple page table simulation.
L2: A program has a logical address space divided into pages. The system's memory is divided into equal-sized frames. When a program executes, its
pages are loaded into available frames in main memory. Simulate the address
translation process using a page table and demonstrate how a logical address
is converted to a physical address.
Lab sheet -10
L1: Write a program to simulate page replacement algorithms like FIFO and
LRU.
L2: In a virtual memory system, a process accesses pages in a specific order. The memory can only hold a limited number of pages (frames). When a page is
needed and the memory is full, a page replacement algorithm is used to decide
which page to evict. Simulate and compare FIFO and LRU algorithms for a
given page reference string.
Lab sheet -11
14. Simulata fila directoru atructura (cingle laval/two laval)
L1: Simulate file directory structure (single level/two level). L2: A university campus computer lab has limited memory space available for
each student login session. When students open files or run programs,
memory pages are loaded into available memory frames. Due to the limited
number of frames, some pages must be replaced when new ones are needed.
The lab system uses page replacement algorithms to decide which pages to
evict when memory is full.
Lab sheet -12
L1: Write a shell script to demonstrate file handling commands in Linux.
L2: Design a command-line mini shell that can run background and
foreground processes and handle basic built-in commands like cd, pwd, exit.
Project work/Assignment
Demonstrate process concepts in LINUX OS.
Simulation of CPU scheduling algorithms.





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Develop program to demonstrate use of Semaphores in threads.

Develop program to demonstrate use of deadlock avoidance algorithms.

Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019

References

Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.

William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.

Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020

Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau , "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html

Course Code: MAT2301	Course Title: Calculus and Differential Equations Type of Course: BSC	L-T-P-C	3	1	0	4
Version No.	1.0	1		1	1	1
Course Pre- requisites Anti-requisites	NIL					
Course Description	Calculus and differential equations are mathematics, statistics and operations resear able to build upon the foundations of calculus repertoire of theory and practice in these are differential equations in the description and will also be considered. This unit will extend knowledge and use of techniques in different focuses on the concepts of Calculus and Diff specific engineering problems. The course i type in nature.	rch. In this court established to g eas. The applicat modelling of r the problem-sol ial and integral c erential Equatio	rse, st reatly tion o eal-w ving calcul ns wi	uden v enha f calo orld skills us. T th ref	ts can ance t culus probl , rang he co čerenc	n be their and ems ge of urse to
Course Objective	The goal of the course Calculus and Differ students with a concrete foundation of differ	-				



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	and higher-order ordinary differential equa knowledge of these mathematical tools.	tions enabling then	n to acquire the
Course Out Comes	 On successful completion of the course the s 9. Apply the knowledge of calculus curves and its applications in determinin 10. Apply the principles of integral calc 11. Learn the notion of partial different multivariate functions and solve problem Jacobian. 12. Solve first-order linear/nonlinear analytically using standard methods. 	to solve problems ag the bentness of a ulus to evaluate inte- iation to calculate r as related to compos	related to polar curve. egrals. ate of change of ite functions and
Course Content:			
Module 1	Differential Calculus		(10 Classes)
Limit, continuity a	ions, curvature and radius of curvature. nd partial derivatives, directional derivatives, na, minima and saddle points; Method of Lag		
Module 2	Integral Calculus	Assignment	(10 Classes)
	pplications of definite integrals to evalua	ite surface areas a	and volumes of
	's theorem, Mean value theorems, Taylor minate forms and L'Hospital's rule; Maxima a Multivariable Calculus		
remainders; Indeter Module 3 Multiple Integration Change of variables (constant and varia Simple application	minate forms and L'Hospital's rule; Maxima a	and minima. ler of integration in o volumes, Center of r orthogonal curvilin arallelepipeds; Scala	theorems with (10 lectures) double integrals, mass and Gravity lear coordinates, ar line integrals,
remainders; Indeter Module 3 Multiple Integration Change of variables (constant and varia Simple applications vector line integrals	minate forms and L'Hospital's rule; Maxima a Multivariable Calculus n: Double integrals (Cartesian), change of ord s (Cartesian to polar), Applications: areas and value able densities); Triple integrals (Cartesian), s involving cubes, sphere and rectangular parts	and minima. ler of integration in o volumes, Center of r orthogonal curvilin arallelepipeds; Scala	theorems with (10 lectures) double integrals, mass and Gravity lear coordinates, ar line integrals,
remainders; Indeter Module 3 Multiple Integration Change of variables (constant and varia Simple applications vector line integrals Stokes. Module 4 Definition, types of linear and Bernoull for p, equations solf Linear differential	minate forms and L'Hospital's rule; Maxima a Multivariable Calculus n: Double integrals (Cartesian), change of ord s (Cartesian to polar), Applications: areas and value able densities); Triple integrals (Cartesian), s involving cubes, sphere and rectangular parts s, scalar surface integrals, vector surface integrals	and minima. ler of integration in over volumes, Center of r orthogonal curvilin arallelepipeds; Scala grals, Theorems of G Assignment le Separable, Homo of of first degree: eq raut's type. with constant coef	theorems with (10 lectures) double integrals, nass and Gravity lear coordinates, ar line integrals, Green, Gauss and (15 lectures) ogeneous, Exact, luations solvable ficients - Non-



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8. Select any one simple differential equation pertaining to the respective branch of engineering, identify the dependent and independent variable – Obtain the solution and compare the solution sets by varying the values of the dependent variable.

Text Book

5. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition

6. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

25. Victor Henner, Tatyana Belozerova, Mickhail Khenner, Ordinary and Partial Differential Equations, CRC Press, Edition, 2013.

26. Walter Ledermann, Multiple integrals, Springer, 1st edition

27. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

28. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

E-resources/ Web links:

18. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> E BASED&unique id=EBSCO95 30102024 103205

19. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> E BASED&unique_id=EBSCO95_30102024_106839

20. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> E_BASED&unique_id=EBSCO95_30102024_61605

21. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E BASED&unique id=EBSCO95 30102024 134719</u>

22. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html

23. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Course	Course Title: Engineering Graphics	L- T-P-				
Code:	Type of Course: School Core & Theory	L- 1-F-	2	0	0	2
MEC1006	Only	C				
Version No.	1.2					
Course Pre-	NIL					
requisites						
Anti-requisites	NIL					
Course Description	The course is designed with the objective engineering graphics. It is introductory in natu with the techniques used to create engine emphasizes on projection of points, lines, pla- projections.	ure and ac eering di	cquaii awin	nts th gs. T	estud he cc	ents ourse
	The objective of the course is to familiarize the				-	ots
Course	of "Engineering Graphics" and attain SKILL DE	VELOPM	ENT t	hroug	gh	
Objective	Problem solving methodologies.					







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		ate competency of E	course the students shall be able ngineering Graphics as per BIS	
	6. Comprehe		ojection for drawing projections	s of Points,
			hic projections of Solids by visu	ualizing
Course		ferent positions.		C
Outcomes	1	ctorial drawings us eobjects in three di	ing the principles of isometric p mensions.	rojections
Course Conten	<u>t:</u>			
Module 1	Introduction to Drawing	Assignment	Standard technical drawing	02 Sessions
	0		relevant BIS conventions and st	
Lettering, Linec	onventions, dim	ensioning, Selectio	on of drawing sheet size and sca	le.
	Orthographic projections of Points,			
Module 2	Straight Linesand Plane Surfaces	Assignment	Projection methods Analysis	10 Sessions
		1 /	methods of projection, Planes of p l third angle projections. Projectio	
inall 4 quadrants		opteu. Filst aligie alic	i till u aligie projections. Projectio	II OI POIIItS
lengths, true and Plane surfaces (F	l apparent Inclina First angle project le – in different p	ations to reference p tion): Regular plane s	/first angle projection only): True a lanes. (No application problems). surfaces – triangle, square, rectang oth the planes using change of pos	Projection o gle, pentagor
Module 3	Orthographi c Projections of Solids	Assignment	Multi-view drawing Analysis	1) Session
	tions (Problems		vramids, cone, hexahedron and t and First angle projection).	etrahedron
Module 4	Isometric Projections of Solids (Using isometric scale	Assignment	Spatial Visualization	8 Session
Topics:	only)			
Introduction, I			tions of right regular prisms nd hemispheres, hexahedron	-
combination of objects.	² 2 solids, conve	ersion of orthograp	bhic view to isometric projectic	on of simple
-			[8 Hours: Applic	ation Level

[8 Hours: Application Level]



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Text Book: 1 N D Bhat

1.N. D. Bhatt, "Engineering Drawing: Plane and Solid Geometry," Charotar Publishing House Pvt. Ltd.

References:

4. K.R. Gopalakrishna, "Engineering Graphics", Subhash Publishers, Bangalore.

5. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, "Engineering Graphics with AutoCAD," Prentice Hall.

6. D. A. Jolhe, "Engineering Drawing with Introduction to AutoCAD," Tata McGraw Hill.

Web resources:

https://nptel.ac.in/courses/112103019

Topics relevant to "SKILL DEVELOPMENT": Projection in first and third angle for **SKILL DEVELOPMENT** through **Problem Solving methodologies**. This is attained through the assessment component mentioned in the course handout.

ENG2501	Advanced Englis	h	L- T- P- C	2	0	0	2	
Version No.	2.0							
Course Pre-	ENG1900 - English for Technical Communication							
requisites								
Anti-requisites	NIL							
Course	This course is designed to equip students to enhance their communication abilities in Listening, Speaking, Reading, and Writing. The curriculum							
Description		e 1 e e	•					
	-	al communication principl	-			-		
	• 、	g impromptu speaking), s	U 11					
	0	tification of logical falla	· 1				-	
		s of prompt engineering 1	-					
	-	al age. Upon course com						
	Ŭ	nunicate effectively and c	- ·					
	professional enviro	•						
Course Out	On successful com	ppletion of the course the s	students shall be	abla	to			
Come		ipietion of the course the s	students shall be	aure	10.			
Come	9. Recognize	the elements of interperso	onal and cross-cu	ltura	ıl			
		n to address communication	0		•			
		te the ability to deliver str	-	romj	ptu			
		g effective speaking techni	-					
		extual and visual materials		adin	g			
	-	valuate arguments, logic, a	-					
	12. Produce pe	ersuasive and analytical es	says using effect	ive				
	argumentation	techniques and structured	writing strategie	es.				
Course Content:								
	Foundations of	Case Studies/ Role	Cross-Cultural				12	
Module 1	Effective	case Studies/ Role	Cross-Cultural Competency			Class		
	Communication	piay	Competency					



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Topics:								
•	Fundamentals of Inter	personal Communic	cation					
•	Verbal, Non-verbal, an	d Paraverbal comm	unication.					
•	Cultural dimensions th	Cultural dimensions theory (Hofstede's Cultural Dimensions).						
•	Active Listening Techniques							
•	Common Errors in Communication							
Activities:								
•	Instagram/YouTube Vo	ocabulary Activity						
•	e	• •	Experiment/Mixed Messages	5				
Challe	enge/Role Reversal Con							
Module 2	Mastering Speech Delivery	JAM	Public Speaking Confidence	12 Classes				
Topics:								
•	Introduction to Promp	t Engineering						
•	Speech Preparation an							
•	Techniques for Effecti	ve Impromptu Spea	king					
•	Practice Speech Deliv	ery						
Activities:								
•	Speech Writing							
•	Impromptu Speech							
	Critical		'					
	Reading and		Critical Thinking	12				
Module 3	Logical	Worksheet	and Analysis	Classes				
	Analysis		U .					
Topics:								
•	Critical Reading Strat	egies: Contextualiz	zing, Figurative Language, E	valuating				
Logic			Ianipulation, Analysing Visua					
•			Slope, False Dilemma, Post H					
			vagon, No True Scotsman, Red	d Herring,				
	al to Authority, Sunk Co	st, Appeal to 1gnora	ince					
Activities:								
•	Critical Reading Work	sheet/Identifying B	ias in News Articles	1				
	Writing		Clear and	9				
Module 4	Effective	Assignment	Coherent Writing	Classes				
	Arguments							
Topics:								
•	Understanding Critical	e						
•	Building Arguments (I	-	s)					
•	Techniques for Persua	sion						
Activities	:							
•	Causes or Effects/Ann	eal Mash-Un/Debat	tes on Controversial Topics					
•	Opinion Writing		es on controversiar ropies					
•								
			iz, Chatgpt, Gemini, Youtube	,				
Instagram, Q	uillbot, Grammarly, Pad	let						



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References

- 11. Adler, R. B., Rodman, G., & DuPré, A. (2019). Understanding human communication (14th ed.). Oxford University Press.
- 12. Moore, B. N., & Parker, R. (2020). Critical thinking (13th ed.). McGraw-Hill Education.
- 13. Hamilton, C. (2020). Communicating for success (2nd ed.). Routledge.
- Ting-Toomey, S., & Dorjee, T. (2018). Intercultural competence: A model for teaching and assessing cross-cultural communication. *Journal of Intercultural Communication*, 47(2), 213–229. https://doi.org/10.1016/j.jicc.2018.03.004
- 15. https://www.ted.com/

Topics Relevant to "employability": Teamwork and Collaboration, Critical Thinking and Problem-Solving

Topics Relevant to "Human Values and Professional Ethics": Critical reasoning, Inclusivity and Fairness

Course Code: ECE2022	Course Title: Digital Design Type of Course: ESC		L- T-P- C	2	0	0	2
Version No.	1.0						
Course Pre- requisites	[1] Elements of Electronics/Electrical Engineering, 2] Basic concepts of number representation, Boolean Algebra						
Anti-requisites	NIL						
Course Description	The purpose of this course is to enable the students to appreciate the fundamentals of digital logic circuits and Boolean algebra focusing on both combinational and sequential logic circuits. The course emphasizes on minimization techniques for making canonical and low-cost digital circuit implementations. This course deals with analysis and design of digital electronic circuits. The course also creates a foundation for future courses which includes Computer Architecture, Microprocessors, Microcontrollers, and Embedded Systems etc.						
6	through laboratory tasks. The associate to verify the theoretical knowledge.						•
Course Objective	The objective of the course is to fam Digital Design and attain the SKILL LEARNING.						•
Course Outcomes	 On successful completion of this course the students shall be able to: ix. Describe the concepts of number systems, Boolean algebra and logic gates. x. Apply minimization techniques to simplify Boolean expressions. xi. Demonstrate the Combinational circuits for a given logic xii. Demonstrate the Sequential and programmable logic circuits 						
Course Content:							
Module 1	c_{vctomc} - c_{vctomc} - c_{vctomc} - c_{vctomc} - c_{vctomc}	cation gnment	Data Analysi	s tas	sk	06 cl	asses



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Topics:

Review of Number systems and logic gates, Number base conversions, Overview of Boolean functions and simplifications, two, three, four variable K-Maps- Don't care conditions- Both SOP and POS- Universal Gates (NAND & NOR) Implementations. Introduction to HDL.

Module 2	Boolean function simplification	Application Assignment	Data Analysis task	08 Classes
Topics:				

Introduction to Combinational circuits, Analysis, Design procedure, Binary Adder and Subtractor, Magnitude comparator, Parity generator and checker, Multiplexers-Demultiplexers, Decoders, Encoders and Priority Encoders, HDL Models of combinational circuits.

Module 3 Combinational Logic circuits:	Application Assignment	Programming Task & Data Analysis task	08 Classes
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Topics:

Introduction to sequential circuits, Storage elements: latches and flip flops, Characteristic tables and equations, excitation table, Analysis of clocked sequential circuits, Mealy & Moore Models of finite state machines - Registers & Counters. HDL Models of Sequential circuits.

Targeted Application & Tools that can be used:

Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, Home Automation, Communication in systems in industries Professionally Used Software: HDL/VHDL/Verilog HDL/ OOPS

Text Book(s):

5. Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education, 6th edition

6. Thomas L. Floyd "DIGITAL LOGIC DESIGN", Pearson Education, fourth edition.

Reference(s):

Reference Book(s):

R1. Jain, R. P., "Modern Digital Electronics", McGraw Hill Education (India), 4th Edition

R2. Roth, Charles H., Jr and Kinney Larry L., "*Fundamentals of logic Design"*, Cengage Learning, 7th

Edition

Online Resources (e-books, notes, ppts, video lectures etc.): <u>Book Free Download</u>

<u>(studymaterialz.in)</u>

15. eBook1: Mano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education.

16. {[PDF] Digital Design By M. Morris Mano, Michael D Ciletti Book Free Download

}

17. eBook2:Floyd "DIGITAL LOGIC DESIGN" fourth edition- ePub, eBook- [PDF] DIGITAL LOGIC DESIGN FOURTH EDITION FLOYD | abri.engenderhealth.org.

18. NPTEL Course- <u>NPTEL :: Electrical Engineering - NOC:Digital Electronic Circuits</u> 19. Digital Logic Design PPT <u>Slide 1 (iare.ac.in)</u>

20. Lab Tutorial: <u>Multisim Tutorial for Digital Circuits - Bing video</u> <u>CircuitVerse - Digital Circuit Simulator online</u>

FAIN MORE KNOWLEDGE REACH GREATER HEIGHTS Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi	
Learn Logisim Beginners Tutorial Easy Explanation! - Bing video	
Digital Design 5: LOGISIM Tutorial & Demo 21. https://presiuniv.knimbus.com/user#/home E-content:	
 Z. Xin-Li and W. Hong-Ying, "The Application of Digital Electronics in Network Communication," 2016 Eighth International Conference on Measuring Technology a Mechatronics Automation (ICMTMA), 2016, pp. 684-687, doi: 10.1109/ICMTMA.2016.16 An encoding technique for design and optimization of combinational logic circ DipayanBhadra;Tanvir Ahmed Tarique;Sultan Uddin Ahmed;N Shahjahan;KazuyukiMurase2010 13th International Conference on Computer a Information Technology (ICCIT) A. Matrosova and V. Provkin, "Applying Incompletely Specified Boolean Functions for Pat Circuit Generation," 2021 IEEE East-West Design & Test Symposium (EWDTS), 2021, pp. 4, doi: 10.1109/EWDTS52692.2021.9581029. A. Matrosova, V. Provkin and E. Nikolaeva, "Masking Internal Node Faults and Trojan Circu in Logical Circuits," 2019 IEEE East-West Design & Test Symposium (EWDTS), 2019, pp. 4, doi: 10.1109/EWDTS.2019.8884434. 	nd 8. uit 1d. nd cch 1-
Topics relevant to "SKILL DEVELOPMENT": Adders, Multiplexers, Decoders / Encoders; Fl Flops, Counters and Registers for Skill Development through Experiential Learning techniqu This is attained through assessment component mentioned in course handout.	

Course Code: PHY2504	Course Title: Optoelectronics and Quantum Physics Lab Type of Course: BSC	L-T- P-C	0	0	2	1
Version No.	1.0			I		
Course Pre- requisites	NIL					
Anti- requisites	NIL					
	The laboratory provides an opportunity to validate the the ability to use the concepts for technological applications.	-	-			
Course Description	aim to develop following skills: An attitude of enqu tackle new problems, ability to interpret even measure physical phenomena, select suitable materials, locate faults in systems.	uiry, confi ts and re	idenc esults	e an s, ob	d ab serv	ility to ve and
	 aim to develop following skills: An attitude of enquitackle new problems, ability to interpret even measure physical phenomena, select suitable materials, locate faults in systems. On successful completion of the course the students CO1: To understand electrical and optical properties CO2: Interpret the results of various experiments 	airy, confi ts and re equipme s shall be a of materia	idenc esults ent, in able to als	e an s, ob nstru D:	d ab oserv umer	ility to ve and nt and
Description Course Out	aim to develop following skills: An attitude of enquitackle new problems, ability to interpret even measure physical phenomena, select suitable materials, locate faults in systems. On successful completion of the course the students CO1: To understand electrical and optical properties	ts and re equipme s shall be a of materia to verify t ers with the	able to able to able conce	e an s, ob nstru D: D: D: D: D: D: D: D: D: D: D: D: D:	d ab oserv umer	ility to ve and nt and used in



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Level 1: Calculation of accuracy and precision of a given data

Level 2: propagation of errors in addition, subtraction, multiplication and division.

Experiment N0 2: To determine the wavelength of semiconductor diode Laser and to estimate the particle size of lycopodium powder using diffraction.

Level 1: Determination of Wavelength of Laser

Level 2: Finding the particle size of lycopodium powder.

Experiment No. 3: To determine the proportionality of Hall Voltage, magnetic flux density and the polarity of Charge carrier.

Level 1: To determine the proportionality of Hall Voltage and magnetic flux density

Level 2: To determine the polarity of Charge carrier.

Experiment No. 4: To study the I-V characteristics of a given zener diode in forward and reverse bias conditions.

Level 1: To study I –V characteristics of the given Zener diode in reverse bias and to determine break down voltage.

Level 2: To study I –V characteristics of the given Zener diode in forward bias and to determine knee voltage and forward resistance.

Experiment No. 5: To study input and output characteristics of a given Transistor.

Level 1: To determine the input resistance of a given transistor.

Level 2: To determine current transfer characteristics and transistor parameters of a given transistor.

Experiment No. 6: Determination of Fermi energy and Fermi temperature of a given metal and bimetallic wire.

Level 1: Determination of Fermi energy and Fermi temperature of given metal wire.

Level 2: Determination of Fermi energy and Fermi temperature of given bimetallic wire.

Experiment No. 7: To study the I-V characteristics and I-R characteristics of a solar cell as a function of the irradiance.

Level 1: To study the I-V characteristics

Level 2: I-R characteristics of a solar cell as a function of the irradiance.

Experiment No. 8: Calculate the numerical aperture and study the losses that occur in optical fiber cable. .

Level 1: Calculate the numerical aperture.

Level 2: study the losses that occur in optical fiber cable.

Experiment No. 9: Plotting I-V characteristics in forward and reverse bias for LEDs and Determination of knee voltage.

Level 1: Plotting I-V characteristics in forward and reverse bias for LEDs

Level 2: Determination of knee voltage.

Experiment No. 10: Determination of Stefan's constant and verification of Stefan-Boltzmann Law. Level 1: Determination of Stefan's constant

Level 2: Verification of Stefan-Boltzmann Law.





Experiment No. 11: Determination of dielectric constant of given materials.

Level 1: Determination of Stefan's constant

Level 2: compare the obtain results with other materials

Experiment No. 12: determine the wavelength of monochromatic light, such as sodium light, using Newton's rings.

Level 1: Determination of wavelength

Level 2: determine the radius of curvature of the Plano-convex lens.

Targeted Application & Tools that can be used:

7. Areas of application are optoelectronics industry, Solar panel technologies, quantum computing software, electronic devices using transistors and diodes, memory devices, endoscopy, SQUIDS in MRI, Advanced material characterizations using SEM and STM.

8. Origin, excel and Mat lab soft wares for programming and data analysis.

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

Assessment Type

- Midterm exam
- Assignment (review of digital/ e-resource from PU link given in references section mandatory to submit screen shot accessing digital resource.)
- Quiz
- End Term Exam
- Self-Learning

1. Prepare a comprehensive report on non-conventional energy resources in Karnataka and their pros and cons.

2. Write a report on importance of quantum entanglement in supercomputers.

		1	1	-	1	1
Course Code:	Course Title: Probability and Statistics	L-T- P- C	3	1	0	4
MAT2402	Type of Course: BSC		3		U	4
Version No.	1.0					
Course Pre- requisites						
Anti- requisites	NIL					
Course Description	The course introduces the concepts of proba covering how to collect, organize, interpret, a mathematical models to understand randomn across various fields like science, engineering	and draw inferess and uncer	rences tainty,	from with a	data (pplica	using itions
Course Objective	The objective of the course is to equip studen probability theory and statistical methods, enal data, and make informed decisions based or various situations, often applied across differen business.	oling them to ca the likelihood	ollect, a	analyz ents o	e, inte ccurri	erpret ng in
Course Out Comes	 On successful completion of the course the str 9. Be able to compute conditional probabilitie and check for independence of events. 10.Be able to set up and work with discrete & particular, to understand the Bernoulli, bind distributions, uniform, normal, and expone 	es directly and continuous ra omial, geometi	using E ndom v ric, Pois	Bayes' /ariabl		





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	11.Identifying different types of data rela logarithmic).12.Be able to use specific significance to		•
	sample), and chi-squared test	2313, moluting 2-1031, 1-	
Course Conte	nt:		
Module 1	Basic Probability		(6 Classes)
•	an Event, multiplication rule, combinations, al Probability, Bayes's Theorem and Proble	•	n Law, Multiplication
Module 2	Random Variables and Bivariate Distributions	Assignment	(15 Classes)
Expectations, of distribution, Co	bles (discrete and continuous), Probabilition discrete probability distributions - Binomial pontinuous uniform distribution - exponention variate distributions and their properties, dis es' rule.	distribution, Poisson di al distribution, normal	stribution, geometric distribution, gamma
Module 3	Curve Fitting & Statistical Methods		(13 Classes)
Karl Pearson's	ax ^b) Measures of Central tendency, Mome s coefficient of correlation and rank corre		t repetition, Multiple
	Joint Probability Distribution and Sampling Theory	elation (with & Without	
Correlation - P Module 4	s coefficient of correlation and rank corre roblems. Regression analysis - lines of reg Joint Probability Distribution and	elation (with & Withou pression, Multiple regree Assignment	ssion - Problems. (15 Classes)
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r	s coefficient of correlation and rank corre roblems. Regression analysis - lines of reg Joint Probability Distribution and Sampling Theory	elation (with & Without pression, Multiple regres Assignment ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te	 covariance. I errors, Testing of proportions, est for single mean,
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r goodness of fit	s coefficient of correlation and rank corre- roblems. Regression analysis - lines of reg Joint Probability Distribution and Sampling Theory y distribution for two discrete random varia- bling, sampling distributions, Standard E est of significance - Large sample test for significance of means, and difference of significance of si	elation (with & Without pression, Multiple regres Assignment ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te	 covariance. I errors, Testing of proportions, est for single mean,
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r goodness of fit Targeted Appl The contents o	s coefficient of correlation and rank corre- roblems. Regression analysis - lines of reg Joint Probability Distribution and Sampling Theory by distribution for two discrete random variated oling, sampling distributions, Standard E est of significance - Large sample test for se difference of means, and difference of se means and correlation coefficients, test for and independence of attributes.	Assignment Assignment Ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te or ratio of variances -	(15 Classes) (15 Classes) covariance. Il errors, Testing of rence of proportions est for single mean Chi-square test for
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r goodness of fit Targeted Appl The contents o formulations, F	Joint Probability Distribution and Sampling Theory Ty distribution for two discrete random variated of significance - Large sample test for significance - Large sample test for significance of means, and difference of significance of and independence of attributes.	Assignment Assignment Ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te or ratio of variances -	(15 Classes) (15 Classes) covariance. Il errors, Testing or rence of proportions est for single mean Chi-square test fo
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, of difference of r goodness of fit Targeted Appl The contents o formulations, F Tools Used: R	 a coefficient of correlation and rank correlations. Regression analysis - lines of regression and system Design. 	Assignment Assignment Ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te or ratio of variances -	ssion - Problems. (15 Classes) covariance. Il errors, Testing o rence of proportions est for single mean Chi-square test fo
Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r goodness of fit Targeted Appl The contents o formulations, F Tools Used: R Assignment: 3. Select a identify the dep	 a coefficient of correlation and rank correlations. Regression analysis - lines of regression and system Design. 	Assignment Assignment Ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te or ratio of variances -	(15 Classes) (15 Classes) covariance. Il errors, Testing of rence of proportions est for single mean Chi-square test fo courses for problem anch of engineering
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Correlation - P Module 4 Joint Probabilit Random samp Hypothesis, Te single mean, o difference of r goodness of fit Targeted Appl The contents o formulations, P Tools Used: R Assignment: 3. Select a identify the dep by varying the Text Book 5. Ronald .E. Statistics for	a coefficient of correlation and rank correlations. Regression analysis - lines of regression and system values of the dependent variable.	Assignment Assignment Ables, expectation and of rror, Type I & Type I single proportion, differ tandard deviations, Te or ratio of variances - of the core engineering of the core engineering the solution and comp Myers, and Keying E. cation, Delhi-9th editior	ssion - Problems. (15 Classes) covariance. Il errors, Testing of ence of proportions est for single mean. Chi-square test for courses for problem anch of engineering pare the solution sets Ye, "Probability and a, 2012.





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- 7. Miller and Freund, Probability and Statistics for Engineers, Pearson Education Ltd.
- 8. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition.
- 9. Douglas C. Montgomery & George Runger, Applied Statistics and Probability for Engineers, , Wiley Publications

E-resources/ Web links:

- 17. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_10427</u>
- 18. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&uni</u> <u>que_id=EBSCO95_30102024_100198</u>
- 19. https://nptel.ac.in/courses/109104124
- 20. https://nptel.ac.in/courses/111106051
- 21. https://nptel.ac.in/courses/111102137
- 22. https://www.math.hkust.edu.hk/~magian/ma006_0607F.html
- 23. https://www.scu.edu.au/study-at-scu/units/math1005/2022/
- 24. Presidency University's Knimbus library URL is: presiuniv.knimbus.com

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course	Course Title: Foundations of Integrated	і тр				-
Code:	Engineering	L- T-P- C	2	0	0	2
CIV1200	Type of Course: ESC	C				
Version No.	1.0	·				
Course Pre- requisites	NIL					
Anti- requisites	NIL					
Course Description	This interdisciplinary course introduces first-year eng principles and practices across key engineering d problem-solving, sustainability, and ethical innovat mechanical, electrical, and IT systems intersect with AI, and geomatics to address global challenges. The deeper understanding of smart infrastructure, pu systems, and securing IT solutions. Topics include monitoring, GIS-enabled urban planning, renew cybersecurity fundamentals. The course cultivat engineering's role in sustainable development, safe preparing students to contribute meaningfully to technology-driven world.	iomains, er ion. Stude n emerging rough case rototyping bioinforma vable ene es a holis ety, and eth	mpha tech studi mech tics fo rgy i tic u nical o	sizing xplore nologi es, le anica or env ntegr nders decisi	real- e how ies lik arners l/elec vironn ation, standii on-ma	world civil, e loT, s gain tronic nental and ng of aking,
Course Objective	The objective of the course is skill development of Learning techniques.	of student	by us	ing P	Partici	oative

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GAIN MORE KNOWLEI REACH GREATER HEIG	DGE	cy University Act, 2013 of the Karna A		41 of 2013 Established AICTE, New Delhi	under Section 2(f) of UGC Act, 19	56 TEAKS of Academic WISDOM
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Outconverse: CHE25	1] 5 01 inter	Materials Recall Key princip disciplinary endineeri	les of Theory	Agile, DevOp ⊿_{⊽t}₿SC	s, L-T-P-C and bioinforma	tics used in
Versio	n No.	1.0	0		able meterials in de	-:
Course	-	xplain the role of GIS structure and disaste				signing smart
requisi						oir rool world
Anti-		Describe core com dations.	Jonenis	of mechanic	al systems and the	eir real-world
requisi		Describe the function	opolity	of IoT anobio	d waarabla dawiaa	ambaddad
Course	4					
Descri	ption	and applications of		•		
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Content:					d interpret solution	•
		challenges conneg			play, energy, smart	
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Innovation thr	0	interface with their	indust	rial application	ns.	
Emerging Fiel Sustainability			desi	gned to c	ater to Enviror	nment and
Sustainability	a Salety.	Sustainability				
Moduceourse		The objective of th	e cour	se is 'SKILL D	DEVELOPMENT' of	f the student
Smart Infrastr	Geoma	by using Participat	ive lea	rning techniqu	les.	
Geospatial da						
Sustainable C	Constructi	On a la ser statues a			- the students she	
		On successful con				
Greenwinova		-zero energy building 6. Relate the kn	owledg	e of chemistr	y to computational	approaches
Module 3	Action	nical Englineeringate 7. Recognize and	incenz	ret solutions f	or the challenges of	
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Module 4	Engine	ering	_ Quiz	Vi	sualization	
Smart Device	s & Syste	ms: Embedded syste	ems, W	earable techno	logy, Edge computin	ig and
Energy Innov	ations: E\	/ charging infrastruct	ire. wire	eless power tra	insfer. Smart grid inte	earation with
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GAIN MORE KNUWLEDGE REACH GREATER HEIGHTS		CTE, New Delhi		WISDOM
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nan <mark>agement, Rob</mark>	otics prototyping, renewable energy	<u>y systems, Wearat</u>	ble health tech, sma	rt grids,
	mory Systems : Introduction,			
lools: Unansinaters,	capacito, Tinkerogel, Atracisser Qer	18, Angenisto Raspose	stryoppi materials - (organic,
Fext Book: Chips.	nd hybrid materials, and app	lications, manura	cturing of semico	nauctor
11. William Oal Oxford UNVER	kes & Les Leone, "Engineering Yo	ur Future: An Introc materials, mater	luction to Engineeri ials for display -P	ng", rinciple,
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2nd Edition, 202	se & Keith Ross, Computer Netwo Smart Sensors and	Acipin Antom Dom	AmalantizzPearson	Q9,
Edition, 2020	Smart Sensors and	HSORGIATION PURA	d analysis	asses
References	Devices			
	nomaterials- Introduction, clas			
^{IIC} quantum co	nfinement. Size dependent pro	perties, Synthesis	, Properties of CN	T and
Graphene a	nd their application as Materia	in for data analys	sis and packaging	a-RFID
Unavade	s 1st Edition 2020			
17 Charles J. J. 5th Edition, 202	(ibert, "Sustainable Construction: ptroduction, types, Principle	Green Building Des and applications-	ign and Delivery", V electrochemical	Viley, sensor:
	end statistication and a line of the statistication of the statist			lew
Utopia", W.W. 19. David Buch	Norton & Company, 1st Edition, 20 19 topics: Fullerene, biomolect a, Renewable Energy Systems:)20 Asmartensing, St Asmartenergy, Sy	rain sensors stems Approach",	
	tt, "Makestainable Materials, ⊤ and Development	r i		
	Brooks, Christopher Grow, & Philip			
	vaste: Introduction, E waste Ha	zards, E- waste m	nanagement, Reco	overy of
veb <mark>-resources</mark> :	etal- Cu by Hydrometallurgy.			
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	art Cities : Introducing Digital Inno ee Ghemistry m/Introductionreto		A10031nohmara	insthin
	vatioanEnteropioToberghadableerspr			
	rates PHBVC synthesis and app			
12. Add	itive Manufacturing: Opportunities	, Challenges, Implic	ations	
Self-learnin	ig topics: t. circularie conordy e c	ase studies ebk&A	N=1134464&site=et	nost-live
Module 5	Energy Science	Quiz/Seminar	Data Collection and analysis	09 Classe
Tonice: Ba	ttery technology:Fundamenta	ls of electrochom	,	
-	nical storage devices: battery (L		•	
	- LiO ₂) and supercapacitors-Int			
	etric capacitor.		-, .,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Photovolta	ics: Solar cells - Construction	n and working pr	inciple; types- Ind	organic,
Organic and	I quantum dot sensitized (QDS	SC's).		
i				
Self -learni	ng topics: Battery technology	for e-mobility, Gre	en hydrogen	





Application areas are Data storage and analysis, logistics, Biomedicine, Energy, Environment and sustainability

Tools: Molview, chemdraw, excel etc

Project work/Assignment:

Assessment Type

- Midterm exam
- Assignment (review of digital/ e-resource from PU link given in references section - mandatory to submit screenshot accessing the digital resource.)
- Quiz/Student Seminar
- End Term Exam
- Self-learning

Text Book

- 3. Wiley, "Engineering Chemistry", Wiley.
- 4. G.A. Ozin and A.C. Arsenault, Nanochemistry: A chemical approach to nanomaterials, Royal Society of Chemistry, 2009

Reference Books

- 16. Functional and smart materials, Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2020, CRC Press,
- 17. ISBN: 978-036-727-510-5.
- 18. E-waste recycling and management: present scenarios and environmental issues, Khan, Anish, and
- 19. Abdullah M. Asiri. 2019, Springer, Vol. 33. ISBN: 978-3-030-14186-8.
- 20. Essentials of computational chemistry: theories and models, Christopher J Cramer, 2013, John Wiley &
- 21. Sons. ISBN: 978-0-470-09182-1.
- 22. Energy storage and conversion devices: Supercapacitors, batteries and hydroelectric cells, Anurag Gaur,
- 23. L. Sharma, Anil Arya. 2021, CRC press, 1st edition, ISBN: 978-1-003-14176-1.
- 24. Fundamentals of analytical chemistry: An introduction, Douglas A. Skooget etal., 2004 Thomson Asia pte
- 25. Ltd., 8th, ISBN: 978-0-495-55828-6
- 26. Functional and smart materials, Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2020, CRC Press,
- 27. ISBN: 978-036-727-510-5.
- 28. Electrical and electronic devices, circuits and materials: Technological challenges and solutions. Tripathi,
- 29. L., Alvi, P. A., & Subramaniam, U, 2021, John Wiley & Sons, ISBN: 978-0367564261.
- 30. F. Jensen, Introduction to Computational Chemistry, 3rd edition, Wiley, 2017.

E resources

- 9. <u>https://presiuniv.knimbus.com/user#/searchresult?searchId=computational%20che</u> <u>mistry&_t=1738054970142</u>
- 10. https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU E_BASED&unique_id=EBSCO95_30102024_48504
- 11. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_147967</u>
- 12. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_130301</u>
- 13. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_87297</u>
- 14. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU</u> <u>E_BASED&unique_id=EBSCO95_30102024_67006</u>

HK4	PRESIDENCY UNIVERSITY	40
GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi	VEARS OF ACRIMINIC WISDOM
15. <u>https:/</u>	/presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECAT	ALOGU
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E_BASED&unique_id=EBSCO95_30102024_137261
16. https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGU
E_BASED&unique_id=EBSCO95_30102024_86712

Skill Sets

All topics in theory component are relevant to Environment and Sustainability.

Course	Course Title: Program Solvin	ng Using C					
Code:	Type of Course: Theory	ig Using C		L- T-P-C	2 0	0	2
CSE2200	- PCC				2 0	U	2
Version No.	1.0						
Course Pre-	NIL						
requisites							
•	NIL						
Anti-requisites							
Course Description	The course is designed to pro will be able to develop logi applications in C. ACAlso by easily switch over to any other language in future	cs which w learning the	ill help then	n to create	progra	ams	and
Course Object	The objective of the course is t Problem SolvingUsing C and Methodologies.				-		
Course Outcomes	 On successful completion of 7. Write algorithms and to dr 8. Demonstrate knowledge a programming constructs 9. Develop and implement ap 10. Decompose a problem into 11. Solve applications in C us 12. Design applications using 	aw flowchan and develop oplications u o functions a ing structure	rts for solving simple appli sing arrays and develop n and develop n and Union	g problems cations in o nd strings nodular reus	C sable c		
Course Content:		-					
Module 1	Introduction to C Language	Quiz	Problem Solving	6 Sessi	ons		
Preprocessor Direct types – Operators a Branching - Decisio	gramming – Algorithms – Pseu tives (#define, #include, #undet and Expressions – Managing In on Making and Looping.	F) - Overviewput and Out	w of C – Con put Operation	stants, Vari	ables a on Ma	and I	Data
Module 2	Introduction to Arrays and Strings	Quiz	Problem Solving	6 Sessi	ons		
Programs – Sorting Arrays – Initializati Introduction – Decl	on – One Dimensional Array – I g (Bubble Sort, Selection Sort) on of Two Dimensional Array aring and Initializing String g Strings from Terminal – Writi) – Searchin s. Example I	g (Linear Se Programs – M	arch) - Tw Iatrix opera	o Dim ations.	ensio Stri	onal ngs:
Module 3	Functions and Pointers	Quiz	Problem Solving	6 Sessi	-		
declaration, definiti	ction – Need for User-defined f on and function call–Categorie Variables – Initialization of Va – Parameter	s of Function	Elements of U ns – Recursio	n. Pointers	: Intro	duct	ion





Passing: Pass by Value, Pass by Reference.

Module 4	Structures and Union	Quiz	Problem Solving	6 Sessions
Topics:				
Structures: Int	roduction – Defining a Stru	ucture – Declarin	g Structure Variable -	- Accessing Structur
Members – Arr	ray of Structures – Arrays	within Structures	– Union: Introductio	on – Defining and
Declaring Unio	on – Difference Between			-
Union and Stru	cture.			
Module 5	File handling	Case Study	Problem Solving	6 Sessions
Topics:				1
-	and Onening a File Class	·		
Flies: Delining	and Obening a File $-$ Clos	sing a File – Inpu	it / Output Operations	on File – Random
Access Files	and Opening a File – Clos	sing a File – Inpu	it / Output Operations	on File – Random
Access Files	and Opening a File – Clos	sing a File – Inpu	it / Output Operations	on File – Random
Access Files Text Book(s):	1 0	0 1		
Access Files Text Book(s): 1. E. Balag	guruswamy, "Programmi	0 1		
Access Files Text Book(s): 1. E. Balag Education, ISI	uruswamy, "Programmi BN: 978-93-5316- 513-0.	0 1		
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo	uruswamy, "Programmi BN: 978-93-5316- 513-0. k(s):	ng in ANSI C",	8th Edition, 2019, N	
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka	guruswamy, "Programmi BN: 978-93-5316- 513-0. Jk(s): anetkar, Let us C, 17th Edi	ng in ANSI C",	8th Edition, 2019, N cations, 2020.	AcGraw Hill
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka 17. ReemaThare	Juruswamy, "Programmi BN: 978-93-5316- 513-0. Ok(s): anetkar, Let us C, 17th Edi ja, "Programming in C", C	ng in ANSI C", ition, BPB Public	8th Edition, 2019, N cations, 2020. y Press, Second Editio	IcGraw Hill on, 2016.
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka 17. ReemaThare 18. Kernighan, H	guruswamy, "Programmi BN: 978-93-5316- 513-0. k(s): anetkar, Let us C, 17th Edi ja, "Programming in C", C 3.W and Ritchie,D.M, "Th	ng in ANSI C", ition, BPB Public	8th Edition, 2019, N cations, 2020. y Press, Second Editio	IcGraw Hill on, 2016.
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka 17. ReemaThare 18. Kernighan, F Education, 2	guruswamy, "Programmi BN: 978-93-5316- 513-0. ok(s): anetkar, Let us C, 17th Edi ja, "Programming in C", C 3.W and Ritchie,D.M, "Th 015	ng in ANSI C", ition, BPB Public Oxford Universit e C Programmin	8th Edition, 2019, N cations, 2020. y Press, Second Edition g language", Second	AcGraw Hill on, 2016. Edition, Pearson
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka 17. ReemaThare 18. Kernighan, H Education, 2 19. Schildt Herb	Suruswamy, "Programmi BN: 978-93-5316- 513-0. bk(s): anetkar, Let us C, 17th Edi ja, "Programming in C", C 3.W and Ritchie,D.M, "Th 015 ert, "C: The Complete Ref	ng in ANSI C", ition, BPB Public Oxford University e C Programmin čerence", Tata M	8th Edition, 2019, N cations, 2020. y Press, Second Edition g language", Second	IcGraw Hill on, 2016. Edition, Pearson h, 4th Edition, 2014.
Access Files Text Book(s): 1. E. Balag Education, ISI Reference Boo 16. Yashwant Ka 17. ReemaThare 18. Kernighan, H Education, 2 19. Schildt Herb 20. Stephen G. K	guruswamy, "Programmi BN: 978-93-5316- 513-0. ok(s): anetkar, Let us C, 17th Edi ja, "Programming in C", C 3.W and Ritchie,D.M, "Th 015	ng in ANSI C", ition, BPB Public Oxford University e C Programmin čerence", Tata M	8th Edition, 2019, N cations, 2020. y Press, Second Edition g language", Second	IcGraw Hill on, 2016. Edition, Pearson h, 4th Edition, 2014.

- 1. 2. https://nptel.ac.in/courses/106/105/106105171/
- https://archive.nptel.ac.in/courses/106/104/106104128/

Course Code: EEE1200	Course Title: Basics of Electrical and Electronics Engineering. Type of Course: Theory - ESC	L-T-P-C	3	0	0	3			
Version No.	2.0								
Course Pre-requisites	NIL								
Anti-requisites	NIL								
Course Description	This is a fundamental Course which is designed to know the use of basics of electrical and electronics engineering principles occurs in various fields of Engineering. The course emphasises on the characteristics and applications of electrical and electronic devices. The course also emphasizes on the working, analysis and design of electrical circuits using both active & passive components. Additionally, this course creates a foundation for the future courses such as Electrical machines, power system, power electronics Linear Integrated Circuits, Analog Communication and Digital Communication etc.								
Course Objective	The objective of the course is to familiarize the learners with the concepts of Basics of Electrical and Electronics Engineering and attain Skill Development through Participative Learning techniques.								
Course Outcomes	On successful completion of this course the students shall be able to:								





GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	na a constructiva de la constructiva de la constructiva de la constructiva de la construcción de la construcción El	a Act No. 41 of 2013 Established under Se oved by AICTE, New Delhi	ction 2(f) of UGC Act, 1956	YEARS DF ACADEMIC WISDOM
	and other parame Discuss various f of semiconductor	of Electrical Engineering ters in the circuits. Fundamental parameters a devices and their applica perations of different biasi	ppearing in the c tions.	haracteristics
	Discuss the perf electrical Machin	formance characteristics es.	and application	s of various
Course Content:				
Module 1	Introduction to Electrical Circuits	Assignment/ Quiz	Numerical solving Task	10 Sessions
Series and paralle	-	ork, Types of elements, No stive networks, Star–to-1 mples.		-
	• •	e circuits - Series RL, RC r factor, Numerical exam		uits, Concept
Introduction to the connection, Nume		elation between line and	phase values in	Star & Delta
Module 2	Semiconductor and Diode applications	Assignment/ Quiz	Memory Recall based Quizzes	10 Sessions
practical behaviou	r, Modelling the Diod	emiconductor, Types of S e Forward Characteristic its applications like volta	, and Diode app	
Module 3	Transistors and its Applications	Assignment/ Quiz	Memory Recall- based Quizzes	10 Sessions
and their current gamplifier. JFET (Cooff voltage, Comp	ains. Operating point, E Construction, principal varison of BJT and FE	hents, BJT Configurations Biasing, Fixed Bias, and lo of Operation and Volt –A I. MOSFET (Constructio ancement and Depletion r	ad line analysis. mpere characteri n, principal of C	Single Stage stics). Pinch-
Module 4	Fundamentals of Electrical Machines	Assignment/ Quiz	Numerical solving Task	10 Sessions
Numerical exampl	es. DC Motor: principl	sformers: principle of o e of operation, Back EM of Induction Motors and	F, torque equatio	-



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Self-Learning Topics:

- Clipping and clamping circuits, Stabilization Techniques, Voltage divider bias and its stability factor, Multistage amplifier, Darlington pair.
- Special Machines: Introduction to special electrical machines and its applications.

Targeted Application & Tools that can be used:

- Targeted Applications: Application Area includes all electrical and electronic circuits (power supply unit, regulator unit, embedded devices, hardware electronics etc.). The students will be able to join a profession which involves basics to high level of electronic circuit design.
- Professionally Used Software: Multisim/ P Spice
- Besides these software tools hardware equipment such as Multimeters, Function Generators, Power Supplies, Oscilloscopes etc., can be used to perform component/circuit testing and analysis..

Project Work/ Assignment:

1. Article review: At the end, of course an article topic will be given to an individual or a group of students. They need to refer the library resources and write a report on their understanding about the assigned article in appropriate format.

2. Presentation: There will be a group presentation, where the students will be given a topic. They will have to explain/demonstrate the working and discuss the applications for the same.

3. Case Study: - At the end of the course students will be given a 'real-world' application based circuits like Power Amplifier, Signal/Function Generator etc. as a case study. Students will be submitting a report which will include Circuit Diagrams, Design, Working Mechanism and Results etc. in appropriate format

Text Book(s):

- Kothari D. P. & Nagrath I. J., "Basic Electrical and Electronics Engineering", Tata McGraw-Hill
- Education
- Theraja B.L. and Theraja A.K., "A Textbook of Electrical Technology: Basic Electrical Engineering" in S.I. System of Units, 23rd ed., New Delhi: S. Chand, 2002.
- A.P.Malvino, Electronic Principles,7thEdition, Tata McGraw Hill,2007
- J. Millman, C. C. Halkias and C. D. Parikh, "Millman's Integrated Electronics", McGraw Hill Education, 2nd Edition.

• Basics of Electrical & Electronics Laboratory Manual.

Reference Book (s):

- John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and Electronic Technology", 10th Edition (Indian Edition published by Dorling Kindersley), Pearson,2011
- Samarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, Prentice Hall India, 2007.
- K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing house Pvt. Ltd
- R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India 7th Edition.
- A K. Maini, V. Agrawal, "Electronic Devices & Circuits", Wiley, 2nd Edition
- A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition
- Online Resources (e-books, notes, ppts, video lectures etc.):



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- https://presidencyuniversity.linways.com
- https://www.digimat.in/nptel/courses/video/108105112/L01 "Fundamentals of Electrical Engineering-Basic Concepts, Examples"
- Seminar Topic: https://nptel.ac.in/courses/108/105/108105153/ "Electrical Measurements"
- Video lectures on "Electronic Devices" by Prof. Dr. A. N. Chandorkar, IIT Bombay http://www.satishkashyap.com/2013/03/video-lectures-on-electron-devices-by.html
- Video lectures on "Analog Electronics" by Prof. S.C. Dutta Roy, IIT Delhi https://nptel.ac.in/courses/108/102/108102095/
- Video lectures on "Diodes", by Prof. Chitralekha Mahanta, IIT Guwahati,
- https://nptel.ac.in/courses/117/103/117103063/
- E-content:
- "Introduction to Electrical Machines https://nptel.ac.in/courses/108/102/108102146/"
- M. -Y. Kao, H. Kam and C. Hu, "Deep-Learning-Assisted Physics-Driven MOSFET Current Voltage Modeling," in IEEE Electron Device Letters, vol. 43, no. 6, pp. 974-977, June 2022, doi: 10.1109/LED.2022.3168243
- https://ieeexplore-ieee-org-resiuniv.knimbus.com/document/9758727
- F. Bonet, O. Aviñó-Salvadó, M. Vellvehi, X. Jordà, P. Godignon and X. Perpiñà, "Carrier
- Concentration Analysis in 1.2 kV SiC Schottky Diodes Under Current Crowding," in IEEE Letters, Electron Device vol. 43, no. pp. 938-941, June 2022, doi: 6, 10.1109/LED.2022.3171112. https://ieeexplore-ieeeorgpresiuniv.knimbus.com/document/9764749
- M. Chanda, S. Jain, S. De and C. K. Sarkar, "Implementation of Subthreshold Adiabatic Logic for Ultralow-Power Application," in IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. .23, no. 12, pp. 2782-2790, Dec. 2015.
- https://ieeexplore.ieee.org/document/7018053
- R. Raut and O. Ghasemi, "A power efficient wide band trans-impedance amplifier in submicron
- CMOS integrated circuit technology," 2008 Joint 6th International IEEE Northeast Workshop on Circuits and Systems and TAISA Conference, 2008, pp. 113-116, doi: 0.1109/NEWCAS.2008.4606334. https://ieeexplore.ieee.org/document/4606334

Topics relevant to "SKILL DEVELOPMENT": Performing suitable experiments to compute the electric circuit parameters, performance operation of machines, and operation of semiconductor devices for Skill Development through Participative Learning techniques. This is attained through assessment component mentioned in course plan.

Course	Course Title: Program Solving Using C Lab					
Code:	Type of Course: Lab -	L- T-P-C	0	0	4	2
CSE2201	PCC					
Version No.	1.0					
Course Pre-	NIL					
requisites						
Anti-requisites	NIL					
Course	The course is designed to provide complete knowled	ge of C lang	guag	ge. S	Stud	ents
Description	will be able to develop logics which will help the applications in C. ACAlso by learning the basic progr easily switch over to any other language in future.		-	<u> </u>		



Course Object



Approved by AICTE, New Delhi The objective of the course is to familiarize the learners with the concepts of Broblem Solving Ligna C and attain Employability through Broblem Solving

	Problem Solving Using C and attain Employability through Problem Solving Methodologies.
Course Outcomes	On successful completion of this course the students shall be able to:
	13. Write algorithms and to draw flowcharts for solving problems
	14. Demonstrate knowledge and develop simple applications in C
	programming constructs
	15. Develop and implement applications using arrays and strings
	16. Decompose a problem into functions and develop modular reusable code
	17. Solve applications in C using structures and Union
	18. Design applications using Sequential and Random Access File
	Processing.
Course Content:	

List of Practicals:

Lab Sheet 1: 10 Sessions

Program 1: Sum of Two Numbers

Program 2: Find the Greatest of Three Numbers

Program 3: Check Even or Odd using Conditional Operator

Program 4: Print Multiplication Table using Loop

Program 5: Count Digits in a Number using While Loop

Program 6: Demonstration of Preprocessor Directives

Program 7: Simple Calculator using Switch Case

Lab Sheet 2: 10 Sessions

Program 1: Check Whether a Number is Positive, Negative or Zero

Program 2: Find the Sum of First N Natural Numbers

Program 3: Check Whether a Number is Prime or Not

Program 4: Find Factorial of a Number

Program 5: Reverse a Number

Program 6: Simple Number Guessing Game

Lab Sheet 3: 10 Sessions

Program 1: Linear Search in a One-Dimensional Array

Program 2: Bubble Sort on an Integer Array

Program 3: Matrix Addition (2D Arrays)

Program 4: Count Vowels in a String

Program 6: Selection Sort on an Array

Lab Sheet 4: 10 Sessions

Program 1: Sum of Two Numbers Using User-Defined Function
Program 2: Factorial Using Recursion
Program 3: Swap Two Numbers Using Call by Value (No Swap)
Program 4: Swap Two Numbers Using Call by Reference (With Swap)
Program 5: Pointer Basics - Access and Modify Variable via Pointer
Program 6: Accessing Array Elements Using Pointers

Lab Sheet 5: 10 Sessions Program 1: Basic Structure Usage







Program 2: Input and Display Array of Structures Program 3: Array Inside Structure (Student Marks) Program 4: Structure with Nested Structures (Date of Birth) Program 5: Union Example and Member Access

Lab Sheet 6: 10 Sessions

Program 1: Write to a File (Text Mode)

Program 2: Read from a File (Text Mode)

Program 3: Append Data to a File

Program 4: Count Characters, Words and Lines in a File

Program 5: Write and Read Structure to/from a Binary File

Program 6: Random Access in File (Update a Record)

Text Book(s):

1. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316- 513-0.

Reference Book(s):

- 21. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
- 22. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
- 23. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015
- 24. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.
- 25. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Web Links and Video Lectures:

- 5. <u>https://nptel.ac.in/courses/106/105/106105171/</u>
- 6. <u>https://archive.nptel.ac.in/courses/106/104/106104128/</u>

Course Code: PPS1026	Course Title: Industry Readiness Program – II (Audited Course) Type of Course: Practical Only Course	L- T - P- C	0	0	2	0
Version No.	1.0					
Course Pre- requisites						
Anti- requisites	NIL					
Course Description	This course is designed to enable stud building and use empathy in leader preparing themselves effectively t methodologies.	ship. The co	urse w	vill ben	efit le	arners in
Course Objective	The objective of the course is to concepts of "Industry Readiness SKILL DEVELOPMENT thro techniques.		Profe	ssiona	ls" an	





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Course Code: Course Title: Design Workshop Course Product Course Product I 0 2 Course Product NIL I 0 2 Course Product 10 This fundamental laboratory provides an opportunity to validate the concepts taught in the basics of electrical and electronics engineering and enhances the ability to visualize real system performance, using both hardware and simulation tools. Course Product NIL In the basics of electrical and electronics ingineering and enhances the ability to visualize real system performance, using both hardware and simulation tools. Course Product NIL The objective of the course is to familiarize the learners with the concepts of Basics or electrical and Electronics tangineering and attain Skill Development through the objective of the course is the fundamentals of Ardinion and Raspberry P1 baoratory: course Product and Basics Photoe Course is Employability Skills of student by using PARTICLEAR WINGOR Photoe Photoe Course is Employability Skills of student by using PARTICLEAR WINGOR Photoe Photoe Course is Employability Skills of student by using PARTICLEAR WINGOR Photoe Photoe Course is Employability Skills of student by using PARTICLEAR WINGOR Photoe Photoe Photoe Course and developing practical application Andreage Photoe Photo	GAIN MORE KNOWLEDGE	Presi				Act, 1956	YEARS
Course Pre- Cisition Course L-T-P-C 1 0 2 Anti-requisites NIL In the basics of electrical and electronics engineering and enhances the ability to visualize real system performance, using both nardware and simulation tools. Null. In the basics of electrical and electronics engineering and enhances the ability to visualize real system performance, using both nardware and simulation tools. Afterree NIL The objective of the course is to familiarize the learners with the concepts of Basics of Electrical and Electronics Engineering and attain Skill Development through performance using and their application in various real time projects involving sensors. Posseptiating System Possical Control is a distribution of the course is the ability to visualize the using of sensors. Students will learn the fundamentals of Arduino and Raspberry Pi boards, read spenser by and interface sensors with Arduino and Raspberry Pi boards, read applicative of the course is Employability Skills of student by using programming and gain handset bible roid working at devices This course is suitable for beginners who are interstead on exploring the world of electronics and developing practice applicative of the course is Employability Skills of student by using PARTICIPATIVE LEARNING techniques. Course On successfylegegigiding af thematic therational materials. On successfylegegigiding af thematic therational materials. On successfylegegigiding af thematic therational materials. Demography Reputer LEARNING techniques. On successfylegegigiding af thematic theratoreal material		Cou			11		TISOUM
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Induces Hands-on LeveMic Copython Hands-on opics: power of Series RL and RC circuits htroduction to MicroPython, Comparison with other programming languages, Setting up the MicroPython			Experiment No 2: A	Analyse AC series circu	uts – KL, RC and RLC Interfacing Task	· 1 Sect-	ne
opics: power of Series RL and RC circuits atroduction to MicroPython, Comparison with other programming languages, Setting up the MicroPython	Module 3		LeveMictonsthon	Hands-on experiment to perform	anadderifaltheisimneda	nce curr	us ent and
ntroduction to MicroPython, Comparison with other programming languages, Setting up the MicroPython	Tonics:				mar - emy monipodd	, eun	ent unu
		Micro	1		<u>o languages</u> Setting ur	<u>the Mic</u>	<u>roPython</u>
			, 1	1 0		· ···· · ······	
	actorphient en	, 11011		- juion syntax and suu			







GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	Approved by AICTE, New Delhi VISDOM
Module 4	Lev Workinglwithn experiment to perform alluterfactingly diskped an search furrent of RIRaspherry puits. and Analysis
Introduction to raspbe	erry pi boards, pin-diagram, different types of raspberry pi boards and its application,
LED and switch cont	erry pi boards, pin-diagram, different types of raspberry pi boards and its application, Experiment No 3: Calculation of power and power factor of the given AC Circuit. ol. Mastering Modules, Setup Raspberry - PuTTY SSH, VNC Viewer to interface with
	sors and actuatorist Variages Libearies and star substar substar for given
1	resistive load.
Lab: Name of the Exp	eriments: Conduct an experiment to measure the power and power factor for given
1	inductive load.
31. Introduction	Lab 1:
Level 1: Ove	verseringenting basearform the experimenta angiven Transformer.
	facing of Ardwing hand ESP equation with sensors and other components voltage
32. Lab 2: Sma	t Plant Monitoring transformation rate.
Level 1- Push	button-controlled LED.
Level 2- Auto	nhatice Initiation and enforcit of ingal yestetimeuse ogneted wiside of the transformer and
	tives with the telvine quation under load conditions.
	o Motor control using Arduino
Level 2: DC	Figure Confirment No.5: Load test on DC shunt motor
	onevental collection distance for recorded.
Level 1 - IoT	based air Pollution Monitoring System.
	Based water pollution system
	Lab the respectively offel test on DC shunt motor and plot the performance
	rychawaoteDifferent Raspberry Pi Boards, and sensors.
Level 2: Con	Figuring the Raspherry Pi and Interfacing with sensors and other components
36 Lah 7. Rasn	figuring the Raspberry Pi and Interfacing with sensors and other components. Experiment of Study of PN-Junction Diode Characteristics in Forward and erry Pi based Object Detection using TensorFlow and OpenCV. In Recognition on Raspberry Pi for Voice Controlled Home Automation. In the website using if the error plat VI Characteristics and hence find the cut-
37 Lab 8. Speed	Reverse Bias Conditions by Pi for Voice Controlled Home Automation
38 Lab 9. Desig	Lievel L: Carry out an experiment to plat XL Characteristics and hence find the cut-
39 Introduction	in No Hags Dr pforwarg. characteristics for the Silicon P-N Junction diode.
Overview of	BD printing. Designt of ID periverent toshot NI Chada Uniteristican & Arestediode and
	simple fundation of the second states of the second states of the second
	grand bindeof Hollow Cylindrical structure using 3D CAD and 3D printer.
	nstration of Honow Cymanical strate and 5D of D and 5D printer.
	sion tificer circuit and compute ripple factor and efficiency
	sipavel 1: Identify the components required for a rectifier circuit, rig up the circuit,
	Bife sketch the output waveforms without filter.
45. Lab 15: Mini	Present 2: Rely apple value of the rectifier circuit with RC filter, observe the output waveforms,
	determine the efficiency and ripple factor.
	uno boards , thomy Pythol, Pythole and clamping signify for different reference voltages and to verify the responses.
Targeted Application	h & Foble Identify the comp onents required for building a Clipper / Clamper circuit.
	Rig up the circuit according to the circuit diagram given and sketch the output
Application Area:	waveform.
	Level 2: Given a sinusoidal input of 10 V p-p, implement a positive / negative
Home Automation, E	nelipperewith Mapitocings Agriculture and Farming, Industrial Automation, Internet of
	sEWserablenDevices Security Systems pertunation of chitarning These in a justin few
	application areas where Arduino, Raspberry Pi and sensors can be applied. The
	bility of fA Identifyathe Raspberryt Piecounbinedimplethenwaterangerofostansers
-	dissipos Rigilipethincircating indosative projectations in output waveform with
	respect to the variations in input waveform.
Professionally Used	Software: DStudents the values of SALABUE Spectrare's Addin of BetaindpEdarker
	, By the interference of \mathbb{Z}_m is presented and \mathbb{Z}_{0m} of \mathbb{Z}_m is presented and \mathbb{Z}_{0m} of \mathbb{Z}_{0m} of \mathbb{Z}_{0m}
	Experiment 10: To Implement RC Coupled amplifier using a BJT and sketch the ment: ment: frequency response.
Project work/Assign	irequency response.
	d of the codest studients with betsompleting the pleaser work on survive grantify features in the circuit and sketch the frequency response.



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Level 2: From the frequency response curve determine the value of the mid band gain and the bandwidth. Book/Article review: At the end of each module a book reference or an article topic will be given to anTindividual polia agious construction and the second state of the second se their understanding about the assigned article in appropriate format. <u>Presidency University Librar</u> Targeted Applications: Application Area includes all electrical and electronic circuits (power supply unit, regulator unit, embedded devices, hardware electronics etc.). The students will be able to join a profession which involves basics to high level of electronic circuit design. Presentation: There will be a presentation from interdisciplinary students group, where the students will be given a project on they have to demonstrate the working and discuss the applications for Besides of the se software tools hardware equipment such as Multimeters, Function Generators, Power Supplies, Oscilloscopes etc., can be used to perform component/circuit testing and analysis. extbook(s): \overline{C} 5. Monk Simon "Programming Arduino: Getting Started with Sketches", Mc Graw Hill **Publications Second Edition** Monk Simon "Raspberry Pi Cookbook: Software and Hardware Problems and Solutions", Publisher(s): O'Reilly Media, Inc. ISBN: 9781098130923 fourth Edition. Reference²Book(s), Kothari D. P. & Nagrath I. J., "Basic Electrical and Electronics Engineering", Tata McGraw-Hill Neerparaj Rai "Arduino Projects for Engineers" BPB publishers, first edition, 2016. **Reference Books:** Ryan Turner "Arduino Programming " Nelly B.L. International Consulting Ltd. first edition, 2019. John Hiley, Keith Brown and Ian McKenzie Smith, "HUGHES Electrical and 25. CharleseBell, Micro, Rython forthe Internet of Things of Besiner's Guidento Ricogramming with Python on Missocomtrollers" by" Edition 1, 2017, ISBN 978-1-4842-3123-4 4. Stewart Watkiss "Learn Electronics with Raspberry Pi" Apress Berkeley, CA . second edition,2020. ISBN978-1-4842-64848-8 27. K Uma Rao, A Jaya Lakshmi, "Basic Electrical engineering" IK International publishing . Jo Prusa, et al. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson 6. Volker Education Ind Hand Et and Course in Sensors Using the Arduino and Raspberry Pi (Series in Sensors)" 29RC PASK. Manditi WnA 2011 wal, "Electronic Devices & Circuits", Wiley, 2nd Edition A.S Sedra, K. C. Smith, "Microelectronic Circuits", Oxford University Press, 6th Edition 30. **Online Learning Resources:** Online Resources (eppopks notes pots riden lectures etc.): 11. Arduino trending Projecti ginhttps://www.bttps://projectioshoshosduing.og/~Fundamentals of 12. Introduction to Arduino S https://onlinecourses.swayam2.ac.in/aic20_sp04/preview> 13. Cases tudies on Weatable tocherology http://www.http://ww http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://www.http://wwww.http://wwww.http://www.ht 15. Introduction to internet of things< <u>https://nptel.ac.in/courses/106105166></u> Topics relevant to "SKILL DEVELOPMENT": All the experiments which are listed are for Skill Cattle Health Monitoring System Using Arduino and IOT (April 2021| IJIRT | Devel15. comp Volume 7 Issue 11 | ISSN: 2349-6002) M H Hemanth Kumar, Ravi Pratap Singh, Nishu Sharma, Pragya Singh" IOT 16. BASED SMART SECURITY SYSTEM USING ARDUINO" 2021 JETIR August 2021, Volume 8, Issue 8. 17. R. Maheswar, P. Jayarajan, S. Vimalraj, G. Sivagnanam, V. Sivasankaran and I. S. Amiri, "Energy Efficient Real Time Environmental Monitoring System Using Buffer Management Protocol," 2018, pp. 1-5, doi: 10.1109/ICCCNT.2018.8494144. https://ieeexplore.ieee.org/document/8494144. 18. Yaser S Shaheen, Hussam., " Arduino Mega Based Smart Traffic Control System ," December 2021 Asian Journal of Advanced Research and Reports 15(12): 43-52,

2021(15(12): 43-52, 2021):15(12): 43-52, 2021.







19. Basil, Eliza Sawant, S.D. "IoT based traffic light control system using Raspberry Pi " DOI 10.1109/ICECDS.2017.8389604

20. Supriya S, 2Dr. Aravinda " Green leaf disease detection and identification using Raspberry Pi https://www.irjet.net/archives/V9/i8/IRJET-V9I847.

21. Dr. E.N. Ganesh., "Health Monitoring System using Raspberry Pi and IOT" DOI : http://dx.doi.org/10.13005/ojcst12.01.03

Topics relevant to development of "SKILL": System design for achieving Sustainable Development Goals.

Course Code: MAT2303	Vector C	Title: Linear Algebra & Calculus Course:BSC	L-T- P- C	3	1	0	4
Version No.		1.0					1
Course Pre- requisites		Basic Concepts of Limits, Diffe Level)	erentiation, Inte	gration,	Matric	es (PU	
Anti-requisites		NIL					
Course Description		This course explores the fundamental concepts of vectors, matrices, and their operations within the context of calculus, including vector differentiation and integration, while applying these tools to solve problems related to linear systems, transformations, and geometric interpretations in higher dimensions, often with applications in fields like physics, engineering, and computer graphics; key topics include vector algebra, matrix operations, determinants, eigenvalues, eigenvectors gradients, divergence, curl, line integrals, surface integrals, and the fundamental theorems of vector calculus like Green's Theorem, Stokes Theorem, and the Divergence Theorem.					vector solve metric ds like vector ectors, nd the
Course Objective	The course is intended to develop computational proficiency procedures in Matrices, Linear Algebra and Vector Calculus useful to all engineering disciplines. This course is to equip stud the ability to understand and manipulate vectors in multidir space, apply matrix operations to solve systems of linear equa utilize concepts like gradients, divergence, and curl to analyze phenomena, all while developing a strong foundation for apply tools in various scientific and engineering fields like physics, m and computer graphics.					us which studen tidimen quation lyze ph oplying	ch are ts with sional s, and ysical these
Course Out Comes		On successful completion of the	ne course the s	students	shall b	e able	to:
		CO1 - Use matrix methods and linear equations and to find e check whether it is diagonaliza	igen values, e	•		-	
		CO2 - Understand the a dimensionality of it.	bstract notior	is of v	vector	space	e and
		CO3 - find the matrix repres bases of the relevant vector sp		linear tr	ansfori	mation	given



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	CO4 - Learn different notions of properties. Understanding the major and some applications of these theo	theorems (Green	
Course Content:			
Module 1	Systems of Linear Equations	8.	Classes)

Systems of Linear Equations, Matrices and Elementary Row Operations, Echelon forms, Matrix operations, invertible matrices, Determinants and their properties, Cramer's Rule, LU-decomposition, Applications of Systems of Linear Equations.

Module 2	Vector Space	Assignment	(9Classes)

Linear Combinations and Linear Independence, Vectors in n Rⁿ, Linear Combinations, Linear Independence Vector Spaces, Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis, Orthogonal bases and orthogonal projections.

Module 3	Linear Transformations	(15 lectures)

Linear Transformations, Algebra of transformations, The Null Space and Range, Isomorphisms, Matrix Representation of Linear Transformations, Similarity Eigenvalues and Eigenvectors, Eigen values and Eigen vectors, Diagonalization.

Inner Product Spaces, The Dot Product on Rⁿ and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Application: Least Squares Approximation, Diagonalization of Symmetric Matrices, Application: Quadratic Forms.

Singular Value Decomposition: Singular values, computing singular value decomposition, and Introduction to principal component analysis.

Module 4	Vector Calculus	Assignment	(15 lectures)

Vector & Scalar Functions and Fields, Derivatives, Curve, Arc length, Curvature & Torsion, Gradient of Scalar Field, Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field, Physical interpretation, solenoidal and irrotational vector fields. Problems.

Line Integrals, Path Independence of Line Integrals, Green`s Theorem in the plane, Surface Integrals, Divergence Theorem of Gauss, Stokes`s Theorem.

Targeted Application & Tools that can be used:

• Solve systems of linear equations using various methods including Gaussian and Gauss Jordan elimination and inverse matrices.

- Perform matrix algebra, invertibility, and the transpose and understand vector algebra in Rⁿ.
- Determine relationship between coefficient matrix invertibility and solutions to a system of linear equations and the inverse matrices.
- Find eigenvalues and eigenvectors and use them in applications.
- Find the dimension of spaces such as those associated with matrices and linear transformations.
- Understand real vector spaces and subspaces and apply their properties.

• Compute inner products in a real vector space and compute angle and orthogonality in inner product spaces.



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• Create orthogonal and orthonormal bases: Gram-Schmidt process and use bases and orthonormal bases to solve application problems.

• Prove basic results in linear algebra using appropriate proof-writing techniques such as linear independence of vectors; properties of subspaces; linearity, injectivity and subjectivity of functions; and properties of eigenvectors and eigenvalues.

Assignment:

Preparation of power-point slides, which include videos, animations, pictures, graphics for better erstanding the applications of Linear Algebra and Vector Calculus to engineering applications – The Ity will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Linear ebra and Vector Calculus is covered.

Text Book

3. Gilbert Strang, Linear Algebra and its applications, Wellesley-Cambridge Press,U.S.; 6th edition.

4. B. S. Grewal (2017), Higher Engineering Mathematics by, 44th Edition, Khanna Publishers.

References:

- 3. Introduction to Linear Algebra with Application, Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill
- 4. Elementary Linear Algebra, Applications version, Anton and Rorres, Wiley India Edition.
- 5. Advanced Engineering Mathematics, Erwin Kreysig, Wiley Publication.
- 6. Elementary Linear Algebra, Ron Larson, Cengage Learning.
- 7. Linear Algebra and its Applications, David C. Lay, Pearson Education.

E-resources/ Web links:

3. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSC095_30102024_9607

4. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_143156

5. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=CUSTOM_PACKAGE_EBSCO_29052023_270975

6. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_94555

7. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSCO95_30102024_243864

8. <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&</u> unique_id=EBSC095_30102024_224531

9. NPTEL Video Lectures Matrices and Linear Algebra:



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- 10. https://nptel.ac.in/courses/111106051/
- 11. NPTEL Video Lectures Differential Equations:
- 12. https://nptel.ac.in/courses/111106100/
- 13. NPTEL Vector Calculus:
- 14. https://nptel.ac.in/courses/111/105/111105122/
- 15. https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html
- 16. https://www.scu.edu.au/study-at-scu/units/math1005/2022/

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of Vector calculus and Linear Algebra with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem Solving. This is attained through the assessment component mentioned in the course handout.

Course Code:	Course Title: Discrete Mathematics		•			
MAT2404	Type of Course: Theory - ESC	L-T- P- C	3	1	0	4
Version No.	1.0	I				
Course Pre-requisites	MAT2302					
Anti-requisites	NIL					
Course Description	The course explores the study of ma discrete (not continuous), focusing on combinatorics, and number theory, wi fields like algorithms, software deve such as propositional logic, proof principles, and basic graph algorithms problems and structures within compu	concepts like set th th applications prim lopment, and crypt techniques, relation , providing a founda	neory, lo arily in ography ons, fui	gic, g compu /; it co nction	raph t uter so overs s, co	heory cience topic: unting
Course Objective	The main objective of the course is to mathematical facts and how to apply the and mathematically through five in combinatorial analysis, discrete struct and modeling. A successful discrete me balance all five themes.	hem. It teaches stud nportant themes: ctures, algorithmic t	ents ho mathem hinking,	w to th atical and	ink log reas applic	gically oning ations
Course Outcomes	On successful completion of the cours	se the students shal	l be able	e to:		
	CO1 - Explain logical sentences throu connectives.	ıgh predicates, quar	ntifiers a	nd log	jical	
	CO2 - Deploy the counting techniques	s to tackle combinat	orial pro	blems	6	
	CO3 - Comprehend the basic principle relations.	es of set theory and	differer	it type	s of	
	CO4 - Apply different types of structure	es of trees for devel	oping pi	rogran	nming	skills
Course Content:						
Module 1	Fundamentals of Logic			(1	0 Cla	sses)
Basic Connectives and	Truth Tables, Propositional Logic, Appli	ications of Proposit	onal Lo	gic, P	ropos	itiona
	s and Quantifiers, Nested Quantifiers, Ru	•		•	•	
Module 2	Principle of Counting	Assignment		(1	5 Cla	sses)
The Well Ordering Princ	iple – Mathematical Induction					
•	, Permutations and Combinations, Bino inations, Generating Permutations and (nd Ident	ities, (Gener	alizeo
-	unting: The Principle of Inclusion and g is in its Right Place, Rook Polynomials		izations	of th	e Prir	nciple
Module 3	Relations and Functions			(1	0 Cla	sses)
Cartesian Products and Function Composition ar	d Relations, Functions, One-to-One, C nd Inverse Functions.	Onto Functions. Th	e Pigeo	on-hol	e Prir	nciple
•	Relations, Computer Recognition – Zer Diagrams, Equivalence Relations and Pa		Directe	ed Gra	iphs, l	Partia

Homogeneous and inhomogeneous recurrences and their solutions - solving recurrences using generating functions - Repertoire method - Cruvolutions - simple manipulations and tricks. Module 5 Graph Theory & Algorithms on Assignment (15 Classes) Definitions and basic results - Representation of a graph by a matrix and adjacency list - Trees - Cycles Properties - Paths and connectedness - Sub graphs - Graph Isomorphism - Operations on graphs - Verte and edge cuts - Vertex and edge connectivity, Euler and Hamilton Paths, Shortest-Paths. Tree - Definitions, Properties, and Examples, Routed Trees, Binary search tree, Decision tree, spanning tree BFS, DFS. Algorithms on Networks - Shortest path algorithm- Dijikstra's algorithm, Minimal spanning tree- Kruska algorithm and Prim's algorithm. Targeted Application & Tools that can be used: Discrete mathematics provides the mathematical foundations for many computer science courses including data structures, algorithm, database theory, automata theory, formal languages, compiler theory, compute security, and operating systems. Assignment: Assignment 1: Logic Equivalences and Predicate calculus. Assignment 2: Equivalence Relations and Lattices Assignment 3: Recurrence Relations Text Book 3. Kenneth H. Rosen, "Discrete Mathematics", Wiley Eastern Ltd. 4. Harary – Graph Theory, Addison-Wesley Publishing Company. References: 3. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. 4. K.	Module 4	Recurrence Relations and Generating Functions		(10 Classes)
Networks Netwo	•	•	•	
Properties - Paths and connectedness - Sub graphs - Graph Isomorphism - Operations on graphs - Verter and edge cuts - Vertex and edge connectivity, Euler and Hamilton Paths, Shortest-Paths. Tree - Definitions, Properties, and Examples, Routed Trees, Binary search tree, Decision tree, spanning tree BFS, DFS. Algorithms on Networks - Shortest path algorithm- Dijikstra's algorithm, Minimal spanning tree- Kruska algorithm and Prim's algorithm. Targeted Application & Tools that can be used: Discrete mathematics provides the mathematical foundations for many computer science courses including data structures, algorithms, database theory, automata theory, formal languages, compiler theory, compute security, and operating systems. Assignment: Assignment 1: Logic Equivalences and Predicate calculus. Assignment 2: Equivalence Relations and Lattices Assignment 3: Recurrence Relations Text Book 3. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition,2019. 4. Harary – Graph Theory, Addison-Wesley Publishing Company. References: 3. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. 4. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd. 5. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition Pearson Education Asia. E-resources/Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique. EBSCO95_30102024_54588 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique. EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~magian/ma006_0607F.html	Module 5		Assignment	(15 Classes)
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Conserve mathematics provides the mathematical foundations for many computer science courses including data structures, algorithms, database theory, automata theory, formal languages, compiler theory, compute security, and operating systems. Assignment: Assignment 1: Logic Equivalences and Predicate calculus. Assignment 2: Equivalence Relations and Lattices Assignment 3: Recurrence Relations Text Book Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition,2019. Harary – Graph Theory, Addison-Wesley Publishing Company. References: Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd. References: Rathematics, "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition Pearson Education Asia. E-resources/ Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_EBSCO95_30102024_375			ra's algorithm, Minimal s	panning tree- Kruska
data structures, algorithms, database theory, automata theory, formal languages, compiler theory, compute security, and operating systems. Assignment: Assignment 1: Logic Equivalences and Predicate calculus. Assignment 2: Equivalence Relations and Lattices Assignment 3: Recurrence Relations Text Book 3. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition,2019. 4. Harary – Graph Theory, Addison-Wesley Publishing Company. References: 3. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. 4. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd. 5. Ralph. P. Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition Pearson Education Asia. E-resources/ Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~magian/ma006_0607F.html	argeted Application &	Tools that can be used:		
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Assignment 2: Equivalence Relations and Lattices Assignment 3: Recurrence Relations Text Book 3. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw-Hill,s 8th Edition,2019. 4. Harary – Graph Theory, Addison-Wesley Publishing Company. References: 3. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. 4. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd. 5. Ralph. P. Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition Pearson Education Asia. E-resources/ Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_ EBSCO95_30102024_54588 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique_ EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~magian/ma006_0607F.html	Assignment:			
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References: 3. Arthur Gill, "Applied Algebra for Computer Science", Prentice Hall. 4. K.D. Joshi, "Discrete Mathematics", Wiley Eastern Ltd. 5. Ralph. P. Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition Pearson Education Asia. E-resources/ Web links: https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique EBSCO95_30102024_54588 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html	3. Kenneth H. Ro	sen, "Discrete Mathematics and its Ap	olications", McGraw-Hill,s	8th Edition,2019.
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Pearson Education Asia. E-resources/ Web links: <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique</u> EBSCO95_30102024_54588 <u>https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique</u> EBSCO95_30102024_375 <u>https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html</u>	4. K.D. Joshi, "Dis	screte Mathematics", Wiley Eastern Lte	d.	
https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique EBSCO95_30102024_54588 https://presiuniv.knimbus.com/user#/viewDetail?searchResultType=ECATALOGUE_BASED&unique EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html	-		thematics: An Applied Intr	oduction", 4th Edition,
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EBSCO95_30102024_375 https://www.math.hkust.edu.hk/~maqian/ma006_0607F.html			chResultType=ECATALOG	<u> BASED&unique</u>
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https://www.scu.edu.au/study-at-scu/units/math1005/2022/	https://www.ma	ath.hkust.edu.hk/~maqian/ma006_060	7F.html	
	https://www.scu	u.edu.au/study-at-scu/units/math1005/	2022/	

Topics relevant to SKILL DEVELOPMENT: The course focuses on the concepts of calculus and differential equation with reference to specific engineering problems. The course is of both conceptual and analytical type in nature through Problem solving. This is attained through the assessment component mentioned in course handout.

Code: PPS4006	Course Title: LOGI THINKING Type of Course: HS			T-P- C	0	0	2	1				
Version No.	1.0											
Course Pre- requisites		Students should have the basic concepts of Logical reasoning and Critical thinking, along with its applications in real life problems.										
Anti-requisites	Nil	Nil										
Course Description		This is a skill-based training program for the engineering students (Undergraduate). This course is designed to enable the students to enhance their skills in Logical reasoning and Critical thinking.										
Course Objective	The objective of the reasoning and Critic career development	cal thinking throu	ugh proble	m solving	techr	iques						
Course	On successful compl		se the stud	ents shall	be ab	le to:						
Outcomes	CO1] Understand a											
	CO2] Apply the cond	cepts in problem s	solving (Bl	oom's tax	onom	y Lev	rel 3)					
Course Content:												
Module 1	Logical Thinking	Assignmen t					-	16 Hours				
	and Dices, Mirror and V res, Data Interpretation			g and Fold	ing, E	mbed	lded figu	ires &				
Module 2	Critical Thinking	Assignmen t					-	14 Hours				
Topics: Analogy, Symbol conclusion, Puzzles	and Notations, Stater s	nent and assum	iption, Cai	use of act	tion,	Stater	nent ar	ıd				
Targeted Applica												
	Placement activities and		aminations									
Application area: P		l Competitive exa	aminations									
Application area: P	Placement activities and Continuous Evalua	l Competitive exa	aminations									
Application area: F Tools: LMS	Placement activities and Continuous Evalua Topic	l Competitive exa tion										
Application area: F Tools: LMS	Placement activities and Continuous Evalua Topic Mid-T Text Book	l Competitive exa <mark>tion</mark> wise evaluation 'erm & End Term										
Application area: F Tools: LMS	Placement activities and Continuous Evalua · Topic · Mid-T Text Book 1. A new approac	l Competitive exa <mark>tion</mark> wise evaluation			analyt	ical b	y BS Sijv	vali				
Application area: F Tools: LMS	Placement activities and Continuous Evalua Topic Mid-T Text Book 1. A new approac 2. R S Aggarwal	l Competitive exa <mark>tion</mark> wise evaluation erm & End Term ch to reasoning ve			analyt	ical b	y BS Sijv	vali				
Application area: F Tools: LMS	Placement activities and Continuous Evalua · Topic · Mid-T Text Book 1. A new approad 2. R S Aggarwal 3. Kiran publicati	l Competitive exa <mark>tion</mark> wise evaluation erm & End Term ch to reasoning ve			analyt	ical b	y BS Sijv	vali				
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Application area: F Tools: LMS	Placement activities and Continuous Evalua · Topic · Mid-T Text Book 1. A new approac 2. R S Aggarwal 3. Kiran publicati References 1. www.indiabix.	l Competitive exa tion wise evaluation erm & End Term ch to reasoning ve ons			analyt	ical b	y BS Sijv	vali				
Application area: F Tools: LMS	Placement activities and Continuous Evalua Topic Mid-T Text Book 1. A new approac 2. R S Aggarwal 3. Kiran publicati References 1. www.indiabix.o 2. www.testbook	l Competitive exa tion wise evaluation erm & End Term ch to reasoning ve ons com	erbal, non-	verbal & a	analyt	ical b	y BS Sijv	wali				
Application area: F Tools: LMS	Placement activities and Continuous Evalua Topic Mid-T Text Book 1. A new approac 2. R S Aggarwal 3. Kiran publicati References 1. www.indiabix.o 2. www.testbook	l Competitive exa tion wise evaluation erm & End Term ch to reasoning ve ons com com com com/c/TheAptitu	erbal, non-	verbal & a								

Course Code: CSE7100	Course Title: Mini Project	L- T-P- C	0	0	0	4						
Version No.	1.0											
Course Pre- requisites	Knowledge and Skills related to all the courses	Knowledge and Skills related to all the courses studied in previous semesters.										
Anti-requisites	NIL											
Course Description	Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and inter-personal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/ Company/ Research Laboratory, or Internship Program in an Industry/Company.											
Course Objectives	The objective of the course is to familiarize the le Practice and attain Employability Skills through			-								
Course Outcomes	 On successful completion of this course the studen 11. Identify the engineering problems relation needs. (Understand) 12. Apply appropriate techniques or more problem. (Apply) 13. Design the experiments as per the state (Analyze) 14. Interpret the events and results for mean 15. Appraise project findings and communications. (Create) 	ed to local, reg odern tools fo ndards and sp aningful conclu	gional or sol ecifica usions	ving t ations. s. (Eva	the in	tendeo						

Course Code: CSE7300	Course Title: Capstone Project	L- T-P- C	0	0	0	10					
Version No.	1.0										
Course Pre- requisites	Knowledge and Skills related to all the courses studied in previous semesters.										
Anti-requisites	NIL										
Course Description	Students observe science and technology in action, of scientific experimentation, and often get an opp sophisticated and costly equipment. They also lead principles of management they have learnt in class, teams of experts from engineering, science, en- management deal with techno-economic problems a it enables them to develop and refine their languages skills, both by its very nature, and by the various eva-	portunity to s arn about the when they ob conomics, open at the micro an ge, communica	ee, st imple oserve eration d mac ation a	udy a menta multions res ro lev und int	nd ope tion of disciplin earch, els. Fin ter-pers	the the nary and ally, onal					

	group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. The students have options to pursue this course as either Project Work and Dissertation at the university, or Project Work in an Industry/ Company/ Research Laboratory, or Internship Program in an Industry/Company.
Course Objectives	The objective of the course is to familiarize the learners with the concepts of Professional Practice and attain Employability Skills through Experiential Learning techniques.
Course Outcomes	 On successful completion of this course the students shall be able to: 15. Identify problems based on societal /research needs. (Understand) 16. Apply Knowledge and skill to solve societal problems in a group. (Apply) 17. Develop interpersonal skills to work as member of a group or leader. (Apply) 18. Analyze the inferences from available results through theoretical / Experimental / Simulations. (Analyze) 19. Analyze the impact of solutions in societal and environmental context for sustainable development. (Analyze) 20. Improve in written and oral communication. (Create) 21. Demonstrate capabilities of self-learning in a group, which leads to lifelong learning. (Understand)

Course Code:	Course Title: Data Communications and									
CSE2252	Computer Networks Lab	L- T-P- C	0	0	2	1				
	Type of Course: Lab / PCC									
Version No.	1.0			1						
Course Pre- requisites										
Anti-requisites	NIL									
Course Description	This lab-based course provides hands-on experier data communications and computer networking. It theoretical concepts covered in the associated lect structured experiments and practical exercises, stu configuring, analyzing, and troubleshooting compu	is designed to ure course. Th idents will gain	comp irougl	oleme n a se	ent eries o					
	Key topics include network topology design, IP addressing and subnetting, Ethernet and LAN technologies, routing and switching, TCP/IP protocol suite, and basic network security measures. Students will work with industry-standard tools and equipment, including routers, switches, protocol analyzers, and network simulation software such as Cisco Packet Tracer or Wireshark.									
Course Objective	The objective of this lab course is to provide students with practical, hands-on experience in the configuration, operation, and troubleshooting of data communication systems and computer networks. Through guided experiments and real-world scenarios, students will reinforce theoretical knowledge, develop essential technical									

	skills, and gain a deeper understanding of networking concepts, protocols, and devices used in modern communication systems.									
Course	On successful completion	of the course, the studer	ts shall be able to:							
Outcomes	Design and configure bas devices to meet specified	· ·	ng routers, switches, ar	nd end						
	Analyze and troubleshoot such as Wireshark and ne	5	performance issues us	sing tools						
	Demonstrate understandi DHCP) through practical			P, ICMP,						
	Apply IP addressing and a network resources in vari	÷ .	-	manage						
Course Content:										
Module 1,2,3,4	Physical Layer, Network Layer, Transport Laye	Lab Assignment	Problem Solving	24 Sessions						
List of Laboratory	Tasks:		I							
Lab sheet -1, M-1,	, 3 [2 Hours]									
Experiment No 1:										
Level 1: Study of t	basic network commands a	nd network configuration	commands.							
Lab sheet -2, M-1	[2 Hours]									
Experiment No 1:										
Level 1: Identify a	nd explore Network devices	s, models and cables. Intr	oduction to Cisco							
packet tracer.										
Experiment No. 2:										
Level 2 – Create v	various network topologies	using a cisco packet trace	er.							
Lab sheet -3, M-2,	,3 [2 Hours]									
Experiment No. 1:										
Level 2 - Basic Co	onfiguration of switch/router	using Cisco packet trace	r.							
Experiment No. 2:										
Level 2 -Configure	e the privilege level passwo	rd and user authentication	n in the switch/router.							
Lab sheet – 4, M-3	3 [2 Hours]									
Experiment No. 1:										
Level 2 - Configur	e the DHCP server and wir	eless router and check th	e connectivity							
Lab sheet – 5, M-3	3 [2 Hours]									

Experiment No. 1:
Experiment No. 1:
Level 2 - Configure the static routing in the Cisco packet tracer.
Experiment No. 2:
Level 2 - Configure the dynamic routing protocol in the Cisco packet tracer.
Lab sheet – 6, M-4 [2 Hours]
Experiment No. 1: Configuration of DNS Server with Recursive & amp; Integrative approach in
Cisco packet tracer.
Lab sheet – 7, M-4 [2 Hours]
Experiment No. 1:
Configure the telnet protocol in the router using the Cisco packet tracer.
Lab sheet – 8, M-4[2 Hours]
Experiment No. 1:
Level1- Introduction to NS2 and basic TCL program.
Lab sheet – 9, M-4 [2 Hours]
Experiment No. 1:
Level 1: Simulate three node Point to point network using UDP in NS2.
Experiment No. 2:
Simulate transmission of Ping message using NS2.
Lab sheet – 10, M-4[2 Hours]
Experiment No. 1:
Simulate Ethernet LAN using N-node in NS2.
Experiment No. 2:
Simulate Ethernet LAN using N-node using multiple traffic in NS2
Lab sheet –11, M-3,4 [2 Hours]
Experiment No. 1:
Level 1- Introduction to Wire Shark.
Experiment No. 2:
Level 2- Demonstration of packet analysis using wire shark.
Lab sheet –12, M-1,2,3 [2 Hours]
Experiment No. 1:
Level 2- Demonstration of switch and router configuration using real devices
Targeted Application & Tools that can be used: Cisco Packet Tracer, Wireshark, and NS2.
Case Study/Assignment: Choose and analyze a network from any organization/Assignment proposed for this course in CO1-CO4

Problem Solving: Choose and appropriate devices and implement various

network concepts.

Programming: Simulation of any network using NS2.

Text Book(s):

Behrouz A. Forouzan, "Data Communications and Networking 5E", 5 th Edition, Tata McGraw-Hill, 2017.

Andrew S Tanenbaum, Nick Feamster & amp; David J Wetherall, "Computer Networks" Sixth Edition, Pearson Publication, 2022

Reference(s):

"Computer Networking: A Top-Down Approach", Eighth Edition, James F. Kurose, Keith W. Ross, Pearson publication, 2021.

William Stallings, Data and Computer Communication, 8th Edition, Pearson Education, 2007.

Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 4th Edition, Elsevier, 2007.

- E- Resources:
- 1. https://archive.nptel.ac.in/courses/106/105/106105183/
- 2. http://www.nptelvideos.com/course.php?id=393
- 3.https://www.youtube.com/watch?v=3DZLItfbqtQ
- 4.https://www.youtube.com/watch?v=_fIdQ4yfsfM
- 5. https://www.digimat.in/keyword/106.html
- 6. https://puniversity.informaticsglobal.com/login



Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

Course Code:	Course Title : Data Str	uctures			0							
CSE2253	Type of Course: Theory			L-T -P	-0	3	0	0	3			
Version No.	1.0											
Course Pre- requisites												
Anti-requisites	NIL											
Course Description	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.											
Course Objective	The objective of the cour EXPERIENTIAL LEARNI			<u>OPMEN</u>	T of stud	dent by	using					
Course Out Comes	CO1 :Describe the conc and their operations. [Un CO2: Utilize linked lists fo CO3: Apply an appropria	On successful completion of the course the students shall be able to: CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand] CO2: Utilize linked lists for real-time scenarios. [Apply] CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply] CO4: Demonstrate different searching and sorting techniques. [Apply]										
Course Content:												
Module 1	Introduction to Data Structure and Linear Data Structure - Stacks and Queues	Assignment	Pro	gram ac	tivity		9 H	ours				

Introduction -Introduction to Data Structures, Types and concept of Arrays .

Stack -Concepts and representation, Stack operations, stack implementation using array and Applications of Stack.

Queues -Representation of queue, Queue Operations, Queue implementation using array, Types of Queue and Applications of Queue.

	Line of Dete Officiation			<u> </u>					
Module 2	Linear Data Structure - Linked List								
Topics: Linked L	ist - Singly Linked Li	ist, Op	eration on line	ear	list using singly linke	ed stora	ige		
structures, Circu	ular List, Applications	of Link	ed list.						
Recursion - Re	cursive Definition and	d Proce	esses.						
Non-linear Data									
Module 3	Structures - Trees		Assignment	Pr	ogram activity		12 Hours		
Topics: Trees -	Introduction to Trees	s, Bina	ry tree :Terr	ninc	ology and Properties	, Use o	f Doubly		
Linked List, Bina	ary tree traversals :Pr	re-Ord	er traversal, I	n-O	order traversal, Post	- Orde	r traversal		
.Heaps , Expre	ession Tree ,Red Bl	lack T	ree - AVL	Tre	es ,Binary Serach	Tree			
	Non-linear Data								
Module 4	Structures -	As	Assignment		Program activity	6 Hours			
	Graphs and Hashing								
Taniaa (Qaanha)	-			Dre	nerties Dennesents	tion of a	Orenha		
	: Basic Concept of G y graph operations, N	•	•		• • •		•		
Hashing: Introdu	uction, Static Hashing	j, Dyna	mic Hashing						
Module 5	Searching & Sorting	Assig	nment	F	Program activity	6 Hoi	urs		
Topic: Sorting 8	& Searching - Sequer	ntial ar	nd Binary Sea	arch	Sorting -Selection	and In	sertion sor		
	ge Sort, Bubble sort								
		•							
List of Laborator	ry Tasks:								
Lab sheet -1									
Level 1: Prompobjects	t the user, read input	and pr	int messages	s.Pro	ograms using class,	methoo	ls and		
Loval 2. Progra	mming Exercises on t	fundan	nental Nata o	truc	ture - Arrave based	on Sco	nario		

Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario.

Lab sheet -2
Level 1: Programming Exercises on Stack and its operations
Level 2: Programming Exercises on Stack and its operations with condition
Lab sheet -3
Level 1: Programming on Stack application infix to postfix Conversion
Level 2: -
Lab sheet -4
Level 1: Programming on Stack application – Evaluation of postfix
Lab sheet -5
Level 1: Programming Exercises on Queues and its operations with conditions
Level 2: -
Lab sheet -6
Level 1: Programming Exercises on Linked list and its operations.
Level 2: Programming Exercises on Linked list and its operations with various positions
Lab sheet -7
Level 1: Programming Exercises on Circular Linked list and its operations.
Level 2: Programming Exercises on Circular Linked list and its operations with various positions
Lab abaat 0
Lab sheet -8
Level 1: Programming Exercises on factorial of a number
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -9
Level 1: -
Level 2: Programming the tower of Hanoi using recursion
Lab sheet -10
Level 1: Programming Exercise on Doubly linked list and its operations
Level 2: -
Lab sheet -11
Level 1: Program to Construct Binary Search Tree and Graph
Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and post-
order(and implement BFS and DFS
Lab sheet -12
Level 1: Program to Implement the Linear Search & Binary Search

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018 .

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.

R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources :

For theory :https://onlinecourses.nptel.ac.in/noc20_cs85/preview

https://puniversity.informaticsglobal.com/login

Topics relevant to development of "Skill Development :"

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues



Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

Course Code:	Course Title : Data Stru	uctures Lab		L -T-P -C	0	0	2	1					
CSE2254	Type of Course :Lab				0	0	2						
Version No.	1.0												
Course Pre- requisites													
Anti-requisites	NIL												
Course Description	This course introduces the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development .This course has theory and lab component which emphasizes on understanding the implementation and applications of data structures using Java programming language .With a good knowledge in the fundamental concepts of data structures and practical experience in implementing them, the student can be an effective designer, developer for new software applications.												
Course Objective	The objective of the course EXPERIENTIAL LEARNI			MENT of stud	dent by	using							
Course Out Comes	CO1 :Describe the conce and their operations. [Un CO2: Utilize linked lists fo CO3: Apply an appropriat	On successful completion of the course the students shall be able to: CO1 :Describe the concept of basic data structure, stacks, queues, and arrays and their operations. [Understand] CO2: Utilize linked lists for real-time scenarios. [Apply] CO3: Apply an appropriate non-linear data structure for a given scenario. [Apply] CO4: Demonstrate different searching and sorting techniques. [Apply]											
Course Content:													
Module 1	Introduction to Data Structure and Linear Data Structure - Stacks and Queues	Assignment	Program	n activity		9 H	lours	i					

Introduction -Introduction to Data Structures, Types and concept of Arrays .

Stack -Concepts and representation, Stack operations, stack implementation using array and Applications of Stack.

Queues -Representation of queue, Queue Operations, Queue implementation using array, Types of Queue and Applications of Queue.

	Linear Data Structur	ro						
Module 2	Linked List	ie -	Assignment	Program activity			12 Hours	
Topics: Linked List - Singly Linked List, Operation on linear list using singly linked storage								
•				ear	list using singly linke	ed stora	ige	
structures, Circu	Ilar List, Applications	of Link	ed list.					
Recursion - Re	cursive Definition and	d Proce	esses.					
Madula 0	Non-linear Data			D.,	e energia e etis ita a		40.11	
Module 3	Structures - Trees		Assignment	P	ogram activity		12 Hours	
Topics: Trees -	Introduction to Trees	s, Binai	ry tree :Terr	ninc	ology and Properties	, Use o	f Doubly	
Linked List, Bina	ary tree traversals :Pr	re-Orde	er traversal, l	n-O	order traversal, Post	- Orde	r traversal	
.Heaps, Expre	ession Tree ,Red Bl	lack Ti	ree - AVL	Tre	es ,Binary Serach	Tree		
	Non-linear Data							
Module 4	Structures -	Assignment			Program activity	6 Hours		
	Graphs and							
	Hashing							
	Basic Concept of G	•	•		• • •		-	
ADT, Elementar closure.	y graph operations, N	/linimur	n Cost spanr	ning	trees, Shortest path	and Tr	ansitive	
	uction Static Hashing		mia Uashing					
Hashing. Introdu	uction, Static Hashing	, Dyna				1		
	Searching &							
Module 5	Sorting	Assig	nment	F	Program activity	6 Ho	urs	
Topic: Sorting 8	Searching - Sequer	ntial ar	nd Binary Sea	arch	, Sorting -Selection	and In	sertion sor	
Quick sort, Merg	ge Sort, Bubble sort				C C			
List of Laborator	ry Tasks:							
Lab sheet -1								
Level 1: Promp objects	t the user, read input	and pri	int messages	s.Pro	ograms using class,	methoo	ls and	
Level 2. Progra	mming Exercises on t	fundar	nental Nata e	truc	ture - Arrave based	on Sco	nario	

Level 2: Programming Exercises on fundamental Data structure - Arrays based on Scenario.

Lab about 0						
Lab sheet -2						
Level 1: Programming Exercises on Stack and its operations						
Level 2: Programming Exercises on Stack and its operations with condition						
Lab sheet -3						
Level 1: Programming on Stack application infix to postfix Conversion						
Level 2: -						
Lab sheet -4						
Level 1: Programming on Stack application – Evaluation of postfix						
Lab sheet -5						
Level 1: Programming Exercises on Queues and its operations with conditions						
Level 2: -						
Lab sheet -6						
Level 1: Programming Exercises on Linked list and its operations.						
Level 2: Programming Exercises on Linked list and its operations with various positions						
Lab sheet -7						
Level 1: Programming Exercises on Circular Linked list and its operations.						
Level 2: Programming Exercises on Circular Linked list and its operations with various positions						
Lab sheet -8						
Level 1: Programming Exercises on factorial of a number						
Level 2: Programming the tower of Hanoi using recursion						
Lab sheet -9						
Level 1: -						
Level 2: Programming the tower of Hanoi using recursion						
Lab sheet -10						
Level 1: Programming Exercise on Doubly linked list and its operations						
Level 2: -						
Lab sheet -11						
Level 1: Program to Construct Binary Search Tree and Graph						
Level 2: Program to traverse the Binary Search Tree in three ways)in-order, pre-order and post-						
order(and implement BFS and DFS						
Lab sheet -12						
Level 1: Program to Implement the Linear Search & Binary Search						

Level 2: Program to Estimate the Time complexity of Linear Search

Lab sheet -13

Level 1: Program to Implement and Estimate the Time complexity of Selection Sort

Level 2: Program to Implement and Estimate the Time complexity of Insertion Sort

Lab sheet -14 (Beyond syllabus activity)

Level 1: Program to Construct AVL Tree

Level 2:

Lab sheet -15 (Beyond syllabus activity)

Level 1: Program to Construct RED BLACK Tree

Targeted Application & Tools that can be used

Use of PowerPoint software for lecture slides and use of Modern IDE like VS Code and Eclipse for lab programs to execute.

Project work/Assignment:

Assignment: Students should complete the lab programs by end of each practical session and module wise assignments before the deadline.

Text Book

T1 Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, reprint 2018 .

T2 Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

References

R1 Data structures and program design in C by Robert Kruse, Tondo C L, Bruce Leung, Pearson education publishers, 2017.

R2 Programming and Data Structure by Jackulin C Salini etal., Ane books publishers, 2019.

Web resources :

For theory :https://onlinecourses.nptel.ac.in/noc20_cs85/preview

https://puniversity.informaticsglobal.com/login

Topics relevant to development of "Skill Development :"

Linked list and stacks

Topics relevant to development of "Environment and sustainability: Queues



ict, 1956	YEARS DF ACODEMIC WISDOM

Course Code: CSE2255	Course Title: Object Or Using Java	-	ing L-T- P- C	3 0	0 3		
0012200	Type of Course: Theory	y - PCC					
Version No.	2.0						
Course Pre- requisites	Nil						
Anti-requisites	Nil						
Course Description	This course introduces the core concepts of object-oriented programming. This course has theory and lab component which emphasizes on understanding the implementation and application of object-oriented programming paradigm. It helps the student to build real time secure applications by applying these concepts and also for effective problem solving. The students interpret and understand the need for object oriented programming to build applications.						
Course Objective	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques						
	On successful completion of the course the students shall be able to:						
	CO1: Describe the basic programming concepts. [Understand]						
	CO2: Apply the concept of classes, objects and methods to solve problems. [Application]						
Course Out Comes	CO3: Apply the concept of arrays and strings. [Appy]						
	CO4: Implement inheritance and polymorphism building secure applications. [Apply]						
	CO5: Apply the concepts of interface and error handling mechanism. [Apply]						
Course Content:							
Module 1	Basic Concepts of Programming and Java	Assignment	Problem Solving	9 Sessior	IS		
program structur types, Identifiers	ion to Principles of Prog e, Download Eclipse ID , Variables, Constants ir out functions, Control St	E to run Java prog n java, Operators,	grams, Samp Assignments	ble program s and Expre	, Data		



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Module 2	Classes, objects, methods and Constructors	Assignment	Problem Solving	10 Sessions					
Topics: Classes, Objects and Methods: Introduction to object Oriented Principles, defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.									
	Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.								
Module 3	Arrays, String and String buffer	Assignment	Problem Solving	8 Sessions					
• •	efining an Array, Initiali String: Creation & Ope	• •	•	•					
Module 4	Inheritance and Polymorphism	Assignment	Problem Solving	10 Sessions					
Polymorphism: N functions and with	Topics: Inheritance: Defining a subclass, Types of Inheritance, super keyword. Dynamic Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.								
Module 5	Input & Output Operation in Java	Assignment	Problem Solving	8 Sessions					
Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.									
Text Book									
T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education, 11th Edition,2019.									
References									
R1. Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Tenth Edition, Pearson 2015.									
R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.4th Edition, 2000.									
Page 18 of 477	Page 18 of 477								



R3. E. Balagurusamy, "Programming with Java", Tata McGraw Hill Education, 6th Edition, 2019.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenjl97t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_9III9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword

static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.





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Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi

Course Code: CSE2256	Course Title: Object Orier Using Java Lab Type of Course: Lab - PC	0 0	L-T- P- C) ()	2	1	
Version No.	2.0							
Course Pre- requisites	Nil							
Anti-requisites	Nil							
Course Description	This course introduces the core concepts of object-oriented programming. This course has theory and lab component which emphasizes on understanding the implementation and application of object-oriented programming paradigm. It helps the student to build real time secure applications by applying these concepts and also for effective problem solving. The students interpret and understand the need for object oriented programming to build applications.							
Course Objective	The objective of the course is to familiarize the learners with the concepts of Problem-Solving using JAVA and attain SKILL DEVELOPMENT through EXPERIENTIAL LEARNING techniques							
	On successful completion of the course the students shall be able to:							
	CO1: Demonstrate basic programming concepts. [Apply]							
Course Out	CO2: Apply the concept of classes, objects and methods to solve problems. [Application]							
Comes	CO3: Apply the concept of arrays and strings. [Appy]							
	CO4: Implement inheritance and polymorphism building secure applications. [Apply]							
	CO5: Apply the concepts of interface and error handling mechanism. [Apply]							
Course Content:								
Module 1	Basic Concepts of Programming and Java	Accianmont	Problem Solving	12 Se	essior	IS		



Download Eclipse IDE to run Java programs, Sample programs on Data types, Identifiers, Variables, Constants in java, Operators, Assignments and Expression, Basic Input/ Output functions, Control Statements: Branching and Looping.

Module 2	Classes, objects, methods and Constructors	Assignment	Problem Solving	14 Sessions
----------	--	------------	--------------------	-------------

Problem solving using Classes, Objects and Methods: defining a class, adding data members and methods to the class, access specifiers, instantiating objects, reference variable, accessing class members and methods.

Use Static Polymorphism: Method overloading, constructors, constructor overloading, this keyword, static keyword, Nested classes, Accessing members in nested classes.

Module 3	Arrays, String and String _A buffer	ssignment	Problem Solving	10 Sessions
----------	--	-----------	--------------------	-------------

Using Arrays and Strings : Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Array of objects. String: Creation & Operation. String builder class, methods in String Buffer.

Module 4Inheritance and PolymorphismAssignmentProblem Solving1	12 Sessions
--	-------------

Inheritance: Defining a subclass, Types of Inheritance, super keyword. Dynamic Polymorphism: Method overriding. Final keyword: with data members, with member functions and with class. Abstract keyword: with data members, with member functions and with class, Exception handling.

Module 5	Input & Output Operation in Java	Assignment	Problem Solving	12 Sessions

Input/output Operation in Java(java.io Package), Streams and the new I/O Capabilities, Understanding Streams, working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, Observer and Observable Interfaces.

P1: Programming Exercises on Basic Concepts.

LEVEL 1: Discuss about datatypes and variables.

LEVEL 2: Demonstrate a simple java program

Page 21 of 477



P2: Programming Exercises on Basic Concepts.

LEVEL 1: Discuss about datatypes and variables.

LEVEL 2: Demonstrate a simple java program

P3: Programming Exercises on operators, expressions based on a given scenario.

LEVEL 1: Explain operators, expressions.

LEVEL 2: Demonstrate operators

P4: Programming Exercises Command Line Arguments based on a given scenario.

LEVEL 1: Explain command line arguments

LEVEL 2: Demonstrate command line arguments

P5: Programming Exercises on basic Input/ Output functions and Control Statements: Branching

LEVEL 1: Explain Input/ Output functions

LEVEL 2:Demonstrate Control Statements: Branching

P6: Programming Exercises on Control Statements: Looping

LEVEL 1: Explain variour loops.

LEVEL 2:Demonstrate Control Statements: Looping

P7: Programming Exercises on Creating Objects, classes on a given scenario.

LEVEL 1: Illustrate class, object and methods.

LEVEL 2: Execute java program using class and objects

P8: Programming Exercises on Adding methods and Constructors to the class based on a given scenario.

LEVEL 1: Illustrate methods and constructors

LEVEL 2: Execute java program using methods and constructors

P9: Programming Exercises on methods based on a given scenario.

LEVEL 1: Illustrate method overloading

LEVEL 2: Apply method overloading for the given scenario.





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Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi

P10: Programming Exercises on methods based on a given scenario.

- LEVEL 1: Illustrate constructors overloading
- LEVEL 2: Apply constructor overloading for the given scenario
- P11: Programming Exercises on methods for static members bassed on a given scenario.
- LEVEL 1: Benefits of usage static members
- LEVEL 2: Usage of Static Members for the given scenario
- P12: Programming Exercises on static methods based on a given scenario.
- LEVEL 1: Benefits of usage static methods
- LEVEL 2: Usage of Static Methods for the given scenario.
- P13: Programming Exercises on nested Classes based on a given scenario.
- LEVEL 1: Benefits of usage nested classes
- LEVEL 2: Apply the concept of usage of nested classes for the given scenario
- P14: Programming Exercises on Arrays and its built-in functions based on a given scenario.
- LEVEL 1: Illustrate one dimensional arrays and its functions.
- LEVEL 2: Demonstrate programs with single-dimensional arrays and operations.
- P15: Programming Exercises on Arrays and its built-in functions based on a given scenario.
- LEVEL 1: Illustrate multi dimensional arrays and its functions.
- LEVEL 2: Demonstrate programs with multi-dimensional arrays and operations.
- P16: Programming Exercises on String Class and its built-in functions based on a given scenario.
- LEVEL 1: Explain about String class and String methods.
- LEVEL 2: Execute simple java applications for String and StringBuffer operations
- P17: Programming Exercises on String Buffer Class and its built-in functions based on a given scenario.
- LEVEL 1: Explain about StringBuffer class and String methods.
- LEVEL 2: Execute simple java applications for String and StringBuffer operations



P18: Programming Exercises on String Builders and its built-in functions based on a given scenario.

LEVEL 1: Explain about String Builders.

LEVEL 2: Execute java applications for String Builders

P19: Programming Exercises on single, multi level Inheritance and super keyword based on given scenario.

LEVEL 1: Explain single and multi level inheritance.

LEVEL 2: Demonstrate simple applications for the different types of inheritance

P20: Programming Exercises hierarchical Inheritance and super keyword based on given scenario.

LEVEL 1: Explain hierarchical inheritance.

LEVEL 2: Demonstrate simple applications for hierarchical inheritance

P21: Programming Exercises on Overriding.

LEVEL 1: Differentiate method overloading and method overriding.

LEVEL 2: Demonstrate simple program with dynamic method dispatch.

P22: Programming Exercises on Final based on given scenario.

LEVEL 1: Implement programs using concept of final.

LEVEL 2: Use final keyword for the given problem

P23: Programming Exercises on Abstract keyword based on given scenario.

LEVEL 1: Implement programs using concept of Abstract.

LEVEL 2: Use abstract keyword for the given problem

P24: Programming Exercises on Interface based on a given scenario.

LEVEL 1: Differentiate abstract class about interface

LEVEL 2: Implement interfaces in the given problem

P25: Programming Exercises on Exception Handling based on a given scenario.

LEVEL 1: Explain exception handling

LEVEL 2: Solve the given problem using exception handling mechanism.

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P26: Programming Exercises on Character Stream Classes based on a given scenario.

LEVEL 1: Explain Character Stream Classes

LEVEL 2: Solve the given problem using Character Stream Class.

P27: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P28: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P29: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

P30: Programming Exercises on Read/Write Operations with File Channel based on a given scenario.

LEVEL 1: Explain Read/Write Operations with File Channel

LEVEL 2: Solve the given problem using Read/Write Operations with File Channel.

Targeted Application & Tools that can be used : JDK /Eclipse IDE/Visual Studio Code / net Beans IDE.

Text Book

T1 Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education, 11th Edition,2019.

References



R1. Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Tenth Edition, Pearson 2015.

R2: James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.4th Edition, 2000.

R3. E. Balagurusamy, "Programming with Java", Tata McGraw Hill Education, 6th Edition, 2019.

E book link R1: http://rmi.yaht.net/bookz/core.java/9780134177373-Vol-1.pdf

E book link R2: Java(tm) Design Patterns: A Tutorial([PDF] [7qmsenjl97t0] (vdoc.pub)

Web resources

https://youtube.com/playlist?list=PLu0W_9III9agS67Uits0UnJyrYiXhDS6q

https://puniversity.informaticsglobal.com:2229/login.aspx

Topics relevant to development of "Skill Development":

Static Polymorphism

Method overloading, constructors

constructor overloading

this keyword

static keyword and Inner classes

Inheritance and Polymorphism.

for Skill Development through Experiential Learning techniques. This is attained through assessment component mentioned in course handout.





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Course Code: CSE2271	Course Title: Softwar Development	are Design a	nd	L-T- P- C	3-0-0-3
Version No.	1.0				
Course Pre- requisites	NIL				
Anti-requisites	NIL				
Course Description	The objective of this c Software Engineering	•			entals concepts of
	The course covers sof analysis, design, imple development.	•		• •	
	The course covers sof maintenance.	tware quality	r, configu	ration mai	nagement and
Course Objectives	The objective of the co concepts of Software through Participative L	Engineering	and atta		
Course Out Comes	On successful comple	tion of this co	ourse the	e students	shall be able to:
	1] Describe the Soft models(Knowledge)	ware Engine	ering pr	inciples, e	ethics and process
	2] Identify the requirer a given application(Co	-		appropriate	e design models for
	3] Understand the Agi	le Principles(Knowled	lge)	
	4] Apply an appromination 4] Apply an approximation 4 approxim	•	•	scheduling e(Application	
Module 1	Introduction to Software Engineering and Process Models	Quiz			10 Hours
	(Knowledge level)				



Introduction: Need for Software Engineering, Professional Software Development, Software Engineering Ethics, Software Engineering Practice-Essence of Practice, General Principles Software Development Life Cycle

Models: Waterfall Model – Classical Waterfall Model, Iterative Waterfall Model, Evolutionary model-Spiral, Prototype.

Module 2	Software Requirements, Analysis and Design (Comprehension level)	Assignment	Development of SRS documents for a given scenario	12 Hours
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Requirements Engineering: Eliciting requirements, Functional and non- Functional requirements, Software Requirements Specification (SRS), Requirement Analysis and validation. Requirements modelling- Introduction to Use Cases, Activity diagram and Swim lane diagram. CASE support in Software Life Cycle, Characteristics of CASE Tools, Architecture of a CASE Environment.

Design: Design concepts, Architectural design, Component based design, User interface design.

Module 3	Agile Principles & Devops	Quiz	10 Hours
	(Knowledge level)		

Agile: Scrum Roles and activities, Sprint Agile software development methods - Scaling, User Stories, Agile estimation techniques, Product backlogs, Stake holder roles, Dynamic System Development Method.

Devops: Introduction, definition, history, tools.

Software Testing and Maintenance	Apply the testing concepts using	13 Hours
(Application Level)	Programing	

Software Testing-verification and validation, Test Strategies - White Box Testing, Black box Testing. Automation Tools for Testing.

Software Quality Assurance-Elements of software quality assurance, SQA Tasks, Goals and Metrics, Software configuration management- SCM process, SCM Tools (GitHub).



Maintenance- Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models.

Targeted Application & Tools that can be used: Selenium, GitHub, CASE Tools

Text Book

 Roger S. Pressman, "Software Engineering – A Practitioner's Approach", VII Edition, McGraw-2012] B2. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management", VI Edition, Graw-Hill, 201

References

- Rajib Mall, "Fundamentals of Software Engineering", VI Edition, PHI learning private limited, 2015.
- 11. Ian Sommerville, "Software Engineering", IX Edition, Pearson Education Asia, 2011.
- 12. Agile Software Development Principles, Patterns and Practices.1st Edition, Wiley, 2002

Topics Relevant to "Skill Development: Balck box Testing, White box Testing, Automated Testing for Skill development through Participative Learning Techniques. This is attained through assessment mentioned in the course handout

Course Code: CSE2258	Course Title: Web Technologies	L-T- P- C	2	0	0	2
Version No.	1.0					1
Course Pre- requisites						
Anti-requisites	NIL					
Course Description	This course highlights the compreh languages that are used for creatin The associated laboratory provides concepts and enhance critical thinl	g web-based app an opportunity	lication to impl	is. ement	_	





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Course Objective	concepts of	The objective of the course is to familiarize the learners with the concepts of <mark>Web Technology</mark> and attain <mark>Skill Development</mark> through <mark>Experiential Learning</mark> techniques.					
Course	On successfu	ıl completion of this	course the students shal	l be able to:			
Outcomes	CO1: Implem (Apply)	CO1: Implement web-based application using client-side scripting languages. (Apply)					
	CO2: Apply v (Apply)	arious constructs to e	enhance the appearance of a	a website.			
	CO3: Apply s database. (Apply)	erver-side scripting la	anguages to develop a web	page linked to a			
Course Content:							
Module 1	Introduction to XHTML	Quizzes and Assignments	Quizzes on various features of XHTML, simple applications	20 Sessions			
Basics: V	Veb, WWW, Web l	prowsers, Web server	11				
	2		XHTML: Basic Syntax, St				
			ges, Hypertext Links, Lists,				
	Syntactic Differen TML for Responsi		nd XHTML, Demonstratior	of applications			
Module 2	2 Advanced CSS Quizzes and assignments Quizzes and assignments; Application of CSS in designing webpages 20						
Advance	d CSS: Layout, No	ormal Flow, Positionir	ng Elements, Floating Eleme	ents,			
Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks							
XML: Basics, Demonstration of applications using XML with XSLT.							

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	PHP -			
Module 3	Application Level	Quizzes and assignments	Application of PHP in web designing	20 Sessions
	on to server-side	e Development wit	h PHP, Arrays, Superglobal A	rrays, \$GET
and \$ POST,	+ -			
-	-	e. e	Files, PHP Classes and Obje	
	L in PHP, Applicat		base APIs, Managing a MySQ	L Database.
Project work/A				
		mpletion of each r	nodule which the student n	eed to
-	he stipulated d	-	noutle which the student h	
Textbook(s):				
2016.		5	e Web", Pearson Education, 9	
2]Paul Deitel, I	Harvey Deitel, At	obey Deital,"Intern	et & World Wide Web How to	o Program",
Fifth Edition,	Pearson Educati	ion, 2021.		
3]CSS Notes for	Professionals, ebo	ook available at htt	ps://books.goalkicker.com/C	SSBook/
(Retrieved on Ja	an. 20, 2022)			
4]Deitel, Deitel, Pearson	Goldberg," <i>Intern</i>	et & World Wide W	eb How to Program", Fifth Edi	ition,
Education, 2021	l.			
Reference Book	(s):			
R1. Randy C Education India,	onnolly, Ricardo	Hoar,"Fundame	ntals of Web Developmen	t", Pearson
1st. Edition	n.2016.			
R2. Jeffrey C. S Education, 1st	Jackson,"Web Te	echnologies: A Co	mputer Science Perspective	e", Pearson
Edition,2016	б.			
Additional web-	based resource	S		
W1. W3schools	s.com			
W2. Developer.	mozilla.org/en-L	JS/docs/Learn		



W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

- 13. Web, WWW, Web browsers, Web servers, Internet.
- 14. CSS, PHP.
- **15**. Designing the website for healthcare.

The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2259	Course Ti Web Technolo Lab			L-T- P- C	0	0	2	1
Version No.	240	1.0						I
Course Pre- requisites								
Anti-requisites		NIL						







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Course Description		This course highlights the comprehensive introduction to scripting languages that are used for creating web-based applications. The associated laboratory provides an opportunity to					
		implement the concepts and enhance critical thinking and analytical skills.					
Course		The objective of the course is to familiarize the learners					
Objective		with the concepts of <mark>Web</mark> Technology and attain Skill					
		Development through <mark>Experiential Learning</mark> techniques.					
Course Outcomes		On successful completion of this course the students shall be able to:					
		CO1: Implement web-based application using client-side scripting languages.(Apply)					
		CO2 : Apply various constructs to enhance the appearance of a website. (Apply)					
		CO3: Apply server-side scripting languages to develop a web page linked to a database.(Apply)					
Course Content:							
Module 1	Introductory Introductory Introductory Internet	IL Assignments simple Sessions					
Stand	ard XHTML	Document Structure, Basic Text Markup such as headings,					
parag	raphs, lists, ta	ples, forms, and semantic tags.					







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Modu	le 2	CSS Styling	Quizzes and assignments				10 Sessions	
	110	5	-	0	ayout techniques, colo	or schei	mes,	
	typograph	ny, and responsiv	e design princ	ciples.				
XML:	Basics, Den	nonstration of ap	plications usir	ng XML	with XSLT.		I	
Modu	le 3	PHP – Applicatio Level	N N		Application of PHP ir web designing	1	12 Sessio	
		on to server-side	e Developmen	t with	PHP, Arrays, Superglo	obal Ar	rays, \$GE'	T and
\$ POS	,	¢ Eilea Armary D	oodina (Waitin	a Files	DUD Classes and Ob	anta O	his at Origi	ntod
	\$_SERVER Array, \$_Files Array, Reading/Writing Files, PHP Classes and Objects, Object Oriented							
0	Design, Working with Databases, SQL, Database APIs, Managing a MySQL Database. Accessing MySQL in PHP, Applications.						sing	





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List of Laboratory Tasks:

Experiment No. 1: Demonstration of XHTML features

Level 1: Demonstration of various XHTML Tags (Level 1) Level 2: Design and develop static web pages for an online Book store (Level 2).

Experiment No. 2: Application of CSS in web designing

Level 1: Design a document using XHTML and CSS to create a catalog of items for online electronic shopping.

Level 2: Create and save XML document for students' information and display the same using cascaded style sheet.

Experiment No. 3: Application of PHP in web designing.

Level 1: Write a PHP program to read the personal information of a person such as first name, last name, age, permanent address, and pin code entered by the user into a table created in MySQL. Read the same information from the database and display it on the front end.

Level 2: Using PHP develop a web page that accepts book information such as ISBN number, title, authors, edition, and publisher and store information submitted through the web page in MySQL database.

Experiment No. 4: Building a website.

Build a website for organizing an International Conference. The conference website must be able to collect the author's details and upload a file.

Targeted Application & Tools that can be used: Xampp web server to be used to demonstrate PHP.

Project work/Assignment:

Assignments are given after completion of each module which the student need to submit within the stipulated deadline.



Textbook(s):

3] Robert. W. Sebesta, "*Programming the World Wide Web*", Pearson Education, 9th Edition, 2016. 2]Paul Deitel, Harvey Deitel, Abbey Deital,"Internet & World Wide Web How to Program", Fifth

Edition, Pearson Education, 2021.

3]CSS Notes for Professionals, ebook available at https://books.goalkicker.com/CSSBook/ (Retrieved on Jan. 20, 2022)

4]Deitel, Deitel, Goldberg,"Internet & World Wide Web How to Program", Fifth Edition, Pearson

Education, 2021.

Reference Book(s):

R1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", Pearson Education India,

1st. Edition.2016.

R2. Jeffrey C. Jackson,"Web Technologies: A Computer Science Perspective", Pearson Education, 1st

Edition,2016.

Additional web-based resources

W1. W3schools.com

W2. Developer.mozilla.org/en-US/docs/Learn

W3. docs.microsoft.com

W4. informit.com/articles/ The Relationship Between Web 2.0 and Social Networking

https://presiuniv.knimbus.com/user#/home

Topics related to development of "FOUNDATION":

16. Web, WWW, Web browsers, Web servers, Internet.

17. CSS, PHP.

18. Designing the website for healthcare.

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The objective of the course is to familiarize the learners with the concepts of Web Technology and attain Skill Development through Experiential Learning techniques.

Course Code: CSE2260	Course Title: Database Ma Type of Course: Theory o		stems	L-T-P-C	3	0	0	3
Version No.	1.0							
Course Pre- requisite s Anti-	Foundational understandin knowledge, familiarity with c of set theory, logic, and dis query formulation.	perating system	ns and file ma	anagement	. Ba	isic	knov	vledge
requisites								
Course Descripti on	This course introduces the systems, including data more a solid foundation on the result develops skills in SQL for students to construct and exconcept of object oriented technologies like NoSQL . The data storage structures and	dels, schemas, lational model o or data definiti xecute complex and object rela he also course indexing strate	and archited of data and the on, manipula queries. The ational databated allows the s gies for optin	ctures. This he use of re- ation, and e course als ases and n tudents to nizing quer	co elat con so i nod gaii y pe	urse iona trol ntro lern n in erfo	e pro al alg , ena duce data sight rmar	ovides gebra. abling es the abase abase s into nce.
Course Objective	The objective of the course DatabaseManagement Sys Solving Methodologies.							of
Course Out Comes	 Solving Methodologies. On successful completion of the course the students shall be able to: 25. Describe the fundamental elements of relational database management systems. [Understand] 26. Examine databases using SQL query processing and Optimization. [Apply] 27. Design simple database systems applying the normalization constraints and demonstrate the database transaction processing, recovery, and security. [Apply] 28. Interpret the concept of advanced databases and its applications. [Apply] 							
Course Conter	nt:							
Module 1	Introduction to Database Modelling and Relational Algebra (Understand)	Assignment	Problem	Solving		10 \$	Sess	sions



Topics:

Introduction to Database: Schema, Instance, 3-shema architecture, physical and logical data independence, Data isolation problem in traditional file system, advantages of database over traditional file systems. Entity Relationship (ER) Model, ER Model to Relational Model, Examples on ER model.

Relational Algebra with selection, projection, rename, set operations, Cartesian product, joins (inner and outer joins), and division operator. Examples on Relational Algebra Operations.

Module 2	Fundamentals of SQL andQuery Optimization (Apply)	Assignment	Programming	11 Sessions
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Topics:

SQL Database Querying, DDL, DML, Constraints, Operators, Set Operators, Aggregate Functions, Joins, Views, Procedures, Functions and Triggers.

Database programming issues and techniques: Embedded SQL, Dynamic SQL; SQL / PSM and NoSQL.

Query Optimization: Purpose, transformation of relational expressions, estimating cost and statistics of expression, choosing evaluation plans, linear and bushy plans, dynamic programming algorithms.

Module 3 Relational Database Module 3 Management(Apply)		Problem Solving	12 Sessions
--	--	--------------------	-------------

Topics:

Relational database design: Problems in schema design, redundancy and anomalies, Normal Forms based on Primary Keys-(1NF,2NF, 3NF), Boyce-Codd Normal Form, Multi valued Dependency (Fourth Normal Form), JoinDependencies (Fifth Normal Form), lossy and lossless decompositions, Database De-normalization.

Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; 2PL, Serializability and Recoverability; Lock Management; The write-ahead log protocol; Check pointing; Recovering from a System Crash; Media Recovery; Other approaches and interaction with concurrency control.

Module 4 Advanced DBMS Topics (Apply) Assignment Case Study 12 Sessions
--

Topics:

Advanced topics: Object oriented database management systems, Deductive database management systems, Spatial database management systems, Temporal database management systems, Constraint database management systems.

New database applications and architectures such as Data warehousing, Multimedia, Mobility, NoSQL, NativeXML databases (NXD), Document-oriented databases, Statistical databases.







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Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications. Tools/Simulator used: MySQL DB for student practice.

Also demonstration of ORACLE DB on object-relational database creation and JDBC connection.

- 9. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 10. Programming: Implementation of any given scenario using MySQL.

Text Books:

- T1. Elmasri R and Navathe S B, "Fundamentals of Database System", Pearson Publication, 7th Edition, 2018.
- T2. RamaKrishna & Gehrke, "Database Management Systems" 3rd Edition, 2018, McGraw-Hill Education.
- T3. W. Lemahieu, S. vanden Broucke and B. Baesens, "Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data", Cambridge University Press, 2018.

References

R1 Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill ,7th Edition, 2019.

R2 M. Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems", O'Reilly, 2017.

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database design using ER- Relational mapping, Implementation of given database scenario using MYSQLDB.

Topics relevant to development of Employability: Develop, test and implement computer databases, creatingsophisticated, interactive and secure database applications Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Nil



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Itgalpur, Rajankunte, Yelahanka, Bengaluru - 560064

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Course Code: CSE2261	Course Title: Database Management Systems Lab Type of Course: 1) Laboratory - PCC	L-T-P-C	0	0	2	1	
Version No.	1.0						
Course Pre- requisite s	Foundational understanding of data types, basic progra operating systems and file management.	Foundational understanding of data types, basic programming knowledge, operating systems and file management.					
Anti- requisites	NIL						
Course Descripti on	students with hands-on experience in database de management using SQL and database management too complements theoretical concepts learned in database students to practice database creation, querying, and op DBMS Lab enables students to develop industry-re	The Database Management Systems (DBMS) Laboratory is designed to provide students with hands-on experience in database design, implementation, and management using SQL and database management tools such as MySQL. The lab complements theoretical concepts learned in database courses by allowing students to practice database creation, querying, and optimization techniques. The DBMS Lab enables students to develop industry-relevant skills in database management, preparing them for careers in software development , data engineering , and database administration .					
Course Objective	The objective of the course is to familiarize the le DatabaseManagement Systems and attain Employabi Methodologies.						
Course Out Comes	 On successful completion of the course the students shall be able to: 29. Demonstrate the database concepts, practice, and SQL queries. [Apply] 30. Design and implement database schemas while applying normalization techniques to optimize structure. [Apply]] 31. Develop and implement stored procedures, triggers, and views for automation and efficiency. [Apply] 32. To Design and build database applications for real world problems. [Apply] 						
Course Conte	ent:						
List of Laborat Create Employ	tory Tasks: yee, Student, Banking and Library databases and populat	te them with	n ree	quir	ed d	ata.	

Create Employee, Student, Banking and Library databases and populate them with required data. Do the following experiments of different lab sheets on those databases.

Labsheet-1 [3 Practical Sessions]

Experiment No 1: [1 Session]

1. To study and implement the different language of Structured Query Language. Level 1: Perform operations using Data Definition Language and Data Manipulation Language commands including different variants of SELECT on Student DB.

Level 2: Identify the given requirements; valid attributes and data types and Perform DDL and DML operations on a given scenario. [Banking Databases]

Experiment No. 2: [2 Sessions]

2. To study and implement the concept of integrity constraints in SQL.

Level 1: Create tables on Banking database using PRIMARY KEY, NOT NULL, UNIQUE, FOREIGN KEY and demonstrate the working of relational, logical, pattern matching, BETWEEN, IS NULL, IN and NOT IN Special Operators on Student Database.

Level 2: Enforce different types of data and referential integrity constraints. Then try queries with special operators based on the student database. [Banking Database].

Labsheet-2 [3 Practical Sessions] Experiment No. 3: [1 Session]

3. Implement complex queries in SQL.

Level 1: Implement the conjugate of GROUP BY, ORDER BY and aggregate functions on Banking Database. Level 2: Implement MySQL DB queries on library database using appropriate clauses and aggregate functions. Also order the data either in ascending and descending order using corresponding clause. [Library databases].

Experiment No. 4: [2 Session]

4. To study and implement different types of Set and Join Operations [2 Slots] Level 1: Demonstrate different types of Set Operations (UNION, UNION ALL, INTERSECT, MINUS) and Join Operations (INNER JOINS, OUTER JOINS, CROSS JOIN, NATURAL JOIN) on two or more tables of Airline Database. Level 2: Use Set and Join operations to retrieve the data from two or more relations(tables) as per the given scenario. [Airline Database]

Labsheet-3 [2 Practical Sessions] Experiment No. 5: [2 sessions]

5. To study and implement Views, and Procedures in MySQL DB.

Level 1: Implement MySQL Views, and Procedures in ORACLE DB on Employee database. Level 2: Analyze the requirement and construct views, and Procedures on Mini Project Domain. [Banking Database]

Labsheet-4 [2 Practical Sessions] Experiment No. 6: [2 Sessions]

6. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Analyze the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-5 [2 Practical Sessions] Experiment No. 7: [2 Sessions]

7. To study and implement Functions, and Triggers in MySQL DB.

Level 1: Implement Oracle Functions and Triggers in Oracle on Employee database.

Level 2: Determine the requirement and construct Functions and Triggers. [Supply chain Database]

Labsheet-6 [4 Practical Sessions] Experiment No. 8: [2 Sessions]

8. To implement the concept of forms and reports.

Level 1: Implement the concept of forms and reports.

Level 2: Examine the schema relationship.

Experiment No. 9: [2 Sessions]

9. Create the database using the given schema. (Flight Management)

Level 1: Implement a relational database based on the provided schema for the Flight Management system, including the creation of tables, relationships, and constraints.

Level 2: Demonstrate schema relationships by defining primary and foreign keys to ensure data integrity within the Flight Management database.

Labsheet-7 [4 Practical Sessions]

Experiment No. 10: [2 Sessions]

10. Create the database using the given schema. (Company database)

Level 1: Implement the database schema by defining tables, relationships, and constraints according to the given Company Database schema.

Level 2: Demonstrate the schema's relationships and data integrity by creating and linking tables as per the specified requirements.

Experiment No. 11: [2 Sessions]

11. Create the database using the given schema. (Student Library)

Level 1: Implement forms and reports based on the provided Student Library database schema, ensuring effective data entry and reporting mechanisms.

Level 2: Demonstrate the schema relationships within the Student Library database, demonstrating how these relationships influence the creation and functionality of forms and reports.

Labsheet-8 [1 Sessions]

12. Design a mini project based on the databases such as Inventory Management System, University Management System, Hospital Management System, etc.

Level 1: Implement the real time database.

Level 2: Analyze the working of database in real time.

Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications. Tools/Simulator used: MySQL DB for student practice.

Also demonstration of ORACLE DB on object-relational database creation and JDBC connection.

Percentage of changes in this version: 50% of changes from earlier version. New topics are highlighted initalic.

- 11. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 12. Programming: Implementation of any given scenario using MySQL.

Text Books:

- T1. Elmasri R and Navathe S B, "Fundamentals of Database System", Pearson Publication, 7th Edition, 2018.
- T2. RamaKrishna & Gehrke, "Database Management Systems" 3rd Edition, 2018, McGraw-Hill Education.
- T3. W. Lemahieu, S. vanden Broucke and B. Baesens, "Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data", Cambridge University Press, 2018.

References

- R1 Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill ,7th Edition, 2019.
- R2 M. Kleppmann, "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems", O'Reilly, 2017.

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database designusing ER- Relational mapping, Implementation of given database scenario using MYSQLDB.

Topics relevant to development of Employability: Develop, test and implement computer databases, creatingsophisticated, interactive and secure database applications Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Nil

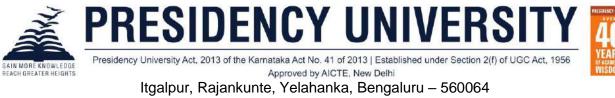
Course Code: CSE2262	Course Title: Analysis of Algorithms Type of Course: Theory PCC	L- T-P- C	3	1	0	4
Version No.	1.0					
Course Pre- requisites						
Anti- requisites	Nil					
Course Description	This course introduces techniques for the design and analysis of applications. This course discusses the classic approaches and Conquer, Dynamic Programming, Greedy method. This c strategies searching solution space. The core concepts of anal them into various complexity classes is covered in the end.	for algorithm course also de	design scribe	such a such a	as Div basic	ide
Course Objective	The objective of the course is to familiarize the learners Algorithms and attain Skill Development through Pro					

Course Out	On successful completion of the course the students shall be able to:					
Comes	1. Compute efficiency of a	given algorithm.[Apply]				
	2. Apply divide and conqu	er technique for searchin	g and sorting Problems.[Apply]			
	3. Apply the Dynamic Pro	gramming technique for	a given problem. [Apply]			
	4. Apply greedy technique	for solving a Problem.[A	Apply]			
	5. Demonstrate Back track	ting technique and limitat	tions of Algorithms.[Apply]			
Course Content:						
Module 1	Introduction	Assignment	Simulation/Data Analysis	10 Sessions		
			case and average case- Sequent thms: Substitution method and I			
Module 2	Divide-and-conquer	Assignment	Simulation/Data Analysis	08 Sessions		
Introduction. Inse	rtion Sort; Merge sort, Quicl	s sort, Binary search.	11			
Module 3	Dynamic programming	Term paper/Assignment	Simulation/Data Analysis	10 Sessions		
	examples, Principles of Me thms. Chain Matrix Multipli		Problem, Bellman-Ford algorit	hm, Floyd-		
Module 4	Greedy technique	Term paper/Assignment	Simulation/Data Analysis	09 Sessions		
-	tional Knapsack Problem, N ortest Path: Dijkstra's Algori		rim's Algorithm and Kruskal's	Algorithm,		
Module 5	Complexity Classes	Term paper/Assignment	Simulation/Data Analysis	08 Sessions		
Complexity Cla	sses- P,NP- NP Hard and	NP Complete - Boolea	an Satisfiability Problem (SAT	·).		
Branch and Bou	nd: Knapsack problem; B	acktracking, - N-Queens	s problem.			
Text Book						
7. A	nany Levitin, "Introductio	n to the Design and A	nalysis of Algorithms", 3rd e	dition, Pearson		
Education	n, 2018.					
8. T	homas H.Cormen, Charles E	E.Leiserson, Ronald L. Ri	vest and Clifford Stein, "Introd	uction to		
Algorithm	as", 4th edition, MIT Press, 2	2022.				
References						
	Kleinberg and E. Tardos, "A	Algorithm Design", Addis	son-Wesley, 2005.			
14. T	im Roughgarden, "Algorithi	ns Illuminated" (books 1	through 3), "Operating System	s Design and		
Implemen	tation", Soundlikeyourself I	Publishing, 2017-2019.				
15. A	VAho I Honoroft ID IIIIm	······································	1	1 1 1074		
	v Allo, J Hoperont, JD Ullin	an, The Design and And	ulysis of Algorithms", Addison-V	Wesley, 1974.		

- 13. NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs47/preview
- 14. Coursera: Analysis of Algorithms by Princeton University
- 15. <u>Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).</u>
- 16. <u>Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of Aarhus</u>

<u>University</u>

Topics relevant to "SKILL DEVELOPMENT": knapsack, prim's, kruskal's algorithm, quick sort, binary search for **Skill Development** through **Problem Solving methodologies**. This is attained through assessment component mentioned in course handout.



•		T	<u> </u>	-	1	1
Course Code:	Course Title: Analysis of Algorithms Lab Type of Course: Lab - PCC					
		L- T-P-	C () (C	2	1
CSE2263						
Version No.	1					<u> </u>
Course Pre-	Nil					
requisites						
Anti- requisites	NIL					
Course Description	This course introduces techniques for the design and analysis of efficie applications. This course discusses the classic approaches for algorithm Conquer, Dynamic Programming, Greedy method. This course also d searching solution space. The core concepts of analyzing algorithms and complexity classes is covered in the end.	m desigr escribes	n suc othe	ch rt	as Div pasic s	vide and trategies
Course Objective	The objective of the course is to familiarize the learners with t Algorithms and attain Skill Development through Experiential Lea					
	On successful completion of the course the students shall be a	able to:				
	1. Compute efficiency of a given algorithm. [Applying]					
Course Out	2. Apply divide and conquer technique for searching and sorting Problem	s.[Apply	ing]			
3. Apply the Dynamic Programming technique for a given problem. [Applying]						
	4. Apply greedy technique for solving a Problem.[Applying]					
	5. Demonstrate Back tracking technique and limitations of Algorithms.[A	pplying]				
Course Content						
Module 1	Introduction				Se	3 ssions
•	Inning time of an algorithm, Compare running time of algorithms, Impole sort, selection sort	blement	sort	ing	j algoi	ithms
Module 2	Divide-and-conquer				Se	3 ssions
Compare sea Merge Sort,	arching algorithms: Linear Search, Binary Search; Compare Sorting QuickSort.	algorithi	ns: l	Ins	ertion	Sort,
Module 3	Dynamic programming 3 Sessions					
Introduction	and memorization: Factorial; Coin Change Problem ; Floyd-Warshal	's Algori	thm			
Module 4	Greedy technique				Se	3 ssions
Fractional Kr	hapsack Problem; Minimal Spanning Tree Algorithms-Prim's Algorith	m, Krusl	kal's	al	gorith	m

Module 5	Complexity Classes	3 Sessions
Branch and I	Bound: Knapsack problem; Backtracking, - N-Queens problem.	
	List of Laboratory Tasks:	
	1. Measuring running time of an algorithm	
	Objective: To experimentally determine the running time of basic algoring input size n=10, 100, 1000, etc. by taking difference of starting time and time.	
	2. Compare running time of algorithms	
	Objective: To execute two algorithms to solve the same problem, and to comparatively evaluate the better algorithm for large values of N.	D
	3. Implement sorting algorithms such as bubble sort, selection sort	
	Objective: To implement comparison based sorting strategies.	
	4. Compare searching algorithms	
	Objective: To implement two searching strategies and compare their pe	erformance
	5. Compare Sorting algorithms	
	Objective: To implement searching strategies that follow top down desi approach (Insertion sort, merge sort).	ign
	6. Quick Sort	
	Objective: To demonstrate Quick sort and its variants, and their impact running time.	on
	7. Dynamic Programming	
	Objective: To demonstrate Dynamic Programming approach with the he Factorial algorithm.	elp of
	8. Coin Change Problem	
	Objective: To implement an efficient algorithm for the Coin Change pro	blem.
	9. Floyd-Warshall's Algorithm	
	Objective: To demonstrate how dynamic programming is used with the Floyd-Warshall's algorithm.	help of
	10. Fractional Knapsack Problem	
	Objective: To demonstrate how greedy method can be used to solve th Fractional Knapsack Problem.	e
	11. Minimal Spanning Tree Algorithm	
	Objective: To implement greedy strategy to solve the Minimal Spanning problem using Prim's Algorithm.	g Tree
	12. Kruskal's Minimal Spanning Tree Algorithm	
	Objective: To implement greedy strategies to solve the Minimal Spanni problem using Kruskal's Algorithm.	ng Tree

13. Knapsack Problem
Objective: To implement Knapsack problem using branch and bound technique.
14. N-Queen's Problem
Objective: To demonstrate backtracking method with the help of N-Queen's problem.
15. Case Study
Objective: To demonstrate how various techniques can be used to solve the same problem with the help of Knapsack problem.
Targeted Application & Tools that can be used
4. PyTorch/Jupyter Notebook – For Python programming
Text Book
T1 Anany Levitin, <i>"Introduction to the Design and Analysis of Algorithms"</i> , 3rd edition, Pearson Education, 2018.
T2 Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, <i>"Introduction to Algorithms</i> ", 4th edition, MIT Press, 2022.
References
R1. J. Kleinberg and E. Tardos, "Algorithm Design", Addison-Wesley, 2005.
R2. Tim Roughgarden, " <i>Algorithms Illuminated</i> " (books 1 through 3), "Operating Systems Design and Implementation", Soundlikeyourself Publishing, 2017-2019.
R3. AV Aho, J Hopcroft, JD Ullman, "The Design and Analysis of Algorithms", Addison-Wesley, 1974.
R4. Donald E. Knuth, "The Art of Computer Programming", Volumes 1 and 3 Pearson.
Web Based Resources and E-books:
W1. NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs47/preview
W2. Coursera: Analysis of Algorithms by Princeton University
W3. Algorithms Specialization in Coursera by Stanford University(Group of 4 courses).
W4. Algorithms Coding Contest Links maintained by Prof Gerth Stølting Brodal of Aarhus
University
Topics relevant to "EMPLOYABILITY SKILLS": The lab experiments and assessments enable the student to acquire Skill Development through Experiential Learning techniques

Course Code: CSE2264Course Title: Essentials of Al Type of Course: Program Core Course - Theory	L-T-P- C	3	0	0	3	
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Version No.	1.0								
Course Pre- requisites	NIL								
Anti- requisites	NIL								
Course Description	course, the student followed by knowled learn about uncerta such as Naïve Baye Topics: Uninformed Constraint satisfacti	first learns the variou dge-based logic repr inty in AI, as well as es Classifier and Hido search, Heuristic se	arch, Local search, Adve r Resolution, Probability	roblem-solving, the student will uch challenges ersarial search,					
Course Objectives	-	The objective of the course is EMPLOYBILITY of student by using EXPERIENTIAL LEARNING techniques.							
Course Out Comes	9. Explai AI [Understar 10. Impler [Apply] 11. Prove [Apply]	n different methods o nd] ment various graphic , by resolution, differo	the students shall be ab of searching, proving, ar al and adversarial searc ent situations using First roblems using HMM [Ap	nd analysis in h algorithms. t Order Logic					
Course Conten			0 11						
Module 1	Search Methods for Problem- Solving	Problem-Solving Tests	NPTEL Assignments	No. of Sessions: 13					
Search; Gener Uninformed S Search, Genera Deepening Dep Algorithms. He	ral Formulation of S earch Algorithms – alized Uniform Cost Se oth-First Search, Time	Search Problems; I Breadth First Searc arch (a.k.a Dijkstra's e and Space Comp rithms – Heuristics	ypes of AI and Learning Data Structures used ch, Depth First Search, Single-Source Shortest lexity Analysis of Uning and Admissibility, Gre	in Searching. Uniform Cost Path), Iterative formed Search eedy Best-First					
Module 2	Advanced Search Methods	Problem-Solving Tests	NPTEL Assignments	No. of Sessions: 12					
Local Search – Local Search, Hill Climbing, Genetic Algorithms, Gradient Descent. Adversarial Search – Minimax Search, Alpha-Beta Pruning, Ideal Ordering. Constraint Satisfaction – Constraint Satisfaction Problems Definitions and Examples – Map Colouring, N Queens, Cryptarithmetic, Generalized CSP; Back-tracking Heuristics; Arc Consistency and Path Consistency									
Module 3	Knowledge-Based Logic Representation	Automated Theorem Proving using FOL Resolution	NPTEL Assignments	No. of Sessions: 10					
Propositional Logic – Syntax and Semantics of Propositional Logic. Logical connectives. Inference Rules. Conjunctive and Disjunctive Normal Forms. First Order Logic – Syntax and Semantics of Propositional Logic. Logical connectives. Inference Rules. Conjunctive and Disjunctive Normal Forms. Resolution – Resolution Principle. Propositional and First Order Resolution. Applications for solving story problems using Resolution									

Module 4	Uncertainty in Al	Representing problems as	NPTEL Assignments	No. of Sessions: 06
		НММ	Assignments	003310113. 00
Classifier. Usin Definition of HM solutions – Fo Natural Langua	Probability Definitions g Naïve Bayes Class IM. Sequence Labelin rward Probability and ge Processing (Eg. Pans, Activation Function	sifier for Supervised g and Markov Assum Viterbi Algorithm. art-of-Speech Taggir	Learning. Hidden Ma option. Sub-Problems i Applications of Seque ng). Introduction to E	arkov Models – In HMM and their ence Labeling in
Targeted Appl	ication & Tools that o	can be used:		
•	ntation of a shortest-pa	•	•	
	nplementation of a sec		•	d for this
Course	ssignment: Mention t	ne type of Project /	Assignment propose	ed for this
	oject on one of the top	ics mentioned above	(Eq. Adversarial sear	ch).
	, ,			,
Edition. 10. La 2021. 11. E	tuart Russel and Peter Pearson Education. 20 avika Goel. <i>Artificial In</i> laine Rich, Kevin Knigl MedTech Science Pre	022. <i>telligence: Concepts</i> ht and Shivashankar	and Applications. 1 st E	dition. Wiley.
References:		55. 2024.		
8. Munesh (Publishers. 9. George <i>Solving</i> . 6 th Weblinks 11. N Link: <u>http</u> 12. S Link: <u>http</u> 13. D Solving". Link: <u>http</u> 14. D and Reas Link: <u>http</u>	Luger. Artificial Intelli Edition. Pearson Educ PTEL Courses: Mauss s://nptel.ac.in/courses hyamanta M. Hazarika s://nptel.ac.in/courses eepak Khemani (IIT M s://nptel.ac.in/courses eepak Khemani (IIT M	issical Approach to A igence: Structures a cation. 2021. am (IIT Delhi), "An In /106102220. a (IIT Guwahati), "Fur /112103280. Useful f adras), "Artificial Inte /106106226. Useful f adras), "Artificial Inte	rtificial Intelligence. 2 nd and Strategies for C troduction to Artificial I ndamentals of Artificial or the full course. Iligence: Search Meth for Module 1 and 2 Iligence: Knowledge F	¹ Edition. Khanna omplex Problem Intelligence" Intelligence". ods for Problem-







Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi

Course Code: CSE2265	Course Title: Essentials of Al Lab Type of Course: Program Core Course - Lab	L-T-P-C	0	0	2	1
Version No.	1.0			•	-	
Course Pre- requisites	NIL					
Anti- requisites	NIL					
Course Description	This course introduces the student to the In this course, the student first learns the problem-solving, followed by knowledge After that, the student will learn about approaches to solve such challenges such Hidden Markov Models. Topics: Uninformed search, Heuristic sea search, Constraint satisfaction, logic, First Naïve Bayes Classifier, and Hidden Markov	ne various e-based log uncertainty n as Naïve f arch, Local st Order Res	sear gic y in Baye sea solut	rch m reprea AI, a es Cla rch, A tion, I	etho senta as w issifi	ds for ations. vell as er and rsarial
Course Objectives	The objective of the course is EMPLC EXPERIENTIAL LEARNING techniques.	YBILITY c	of st	udent	t by	using
Course Out Comes	On successful completion of this course the students shall be able to: 9. Explain different methods of searching, proving, and analysis in AI [Understand] 10. Implement various graphical and adversarial search algorithms. [Apply] 11. Prove, by resolution, different situations using First Order Logic [Apply] 12. Solve sequence labeling problems using HMM [Apply]					
Course Conte Sessions: 15	ent:				No.	-
Level 1: Read	Io. 1: File Handling text files using Python text files using Python					

Experiment No. 2: Implementation of Graph Representations

Level 1: Implement graph representations by taking input from the console Level 2: Implement graph representations by taking input from files.

Experiment No. 3 & 4: Implementation of Uninformed Search Algorithms Level 1: Implement uninformed search algorithms – BFS and DFS – on unweighted graphs. Level 2: Implement uninformed search algorithms – Uniform Cost Search and Dijkstra's SSSP – on weighted graphs

Experiment No. 5: Implementation of Heuristic Search Algorithms

Level 1: Calculate the upper-bounds of admissible heuristics using Dijkstra's SSSP.





Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi

Level 2: Implement Greedy Best-First Search and A* Search Algorithms.

Experiment No. 6 & 7: Implementation of Adversarial Search Level 1: Implement a Game Tree Level 2: Perform Alpha-Beta Pruning and Ideal Ordering

Experiment No. 8 & 9: Implementation of a CSP Solver

Level 1: Implement a CSP solver to solve a cryptarithmetic problem Level 2: Implement a CSP solver for map colouring

Experiment No. 10: Using Python Packages for CSP

Level 1: Implement a CSP solver for Sudoku Level 2: Implement a CSP solver for Addoku

Experiment No. 11: Implement a Family Tree Parser

Level 1: Perform logic programming using logpy. Level 2: Implement a family tree parser

Experiment No. 12 & 13: Implement a Decision Maker

Level 1: Implement a Minesweeper solver Level 2: Implement a Battleship solver

Experiment No. 14 & 15: Hidden Markov Model

Level 1: Implement a generic HMM

Level 2: Build a PoS Tagger using a HMM with the Brown Corpus and the Universal Dependencies Tagset.

Targeted Application & Tools that can be used:

11. Google Colab

12. Python IDEs like PyCharm

Project work/Assignment: Mention the Type of Project /Assignment proposed for this course

The course is a lab-based course with all the assessments centrally evaluated. Every experiment consists of **two sessions**. The first session involves exploring a solution to the problem. The second session involves solving a particular problem.

Textbook(s):

- 5. Stuart Russel and Peter Norvig. *Artificial Intelligence: A Modern Approach.* 4th Edition. Pearson Education. 2022.
- 6. Prateek Joshi and Alberto Artasanchez. *Artificial Intelligence with Python*. 2nd Edition. Packt. 2020.

References:

- 5. Deepak Khemani. A First Course in Artificial Intelligence. 1st Edition. 6th Reprint, 2018.
- 6. Munesh Chandra Trivedi. *A Classical Approach to Artificial Intelligence*. 2nd Edition. Khanna Publishers. 2018.





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Course Code: CSE2266	Course Title: Theory of Con		L- T-P- C	3	0	0	3
Version No.	2.0		I		I		1
Course Pre- requisites	nil						
Anti- requisites	NIL						
Course Description	The course deals with in correspondence between lang them. Topics include: Forn Deterministic and Nondetern state and push-down autom relations with algorithms.	guage classes a nal definitions ministic syster	nd the autor of gramm ns, Gramma	mata ars ar ar	tha and nbig	t reco acce guity,	gnize ptors, finite
Course Objective	The objective of the course i of Theory of Computatio Development through Proble	n as mentio	ned above	and			-
Course Outcomes	On successful completion of Describe various components Automata for the given Lan Regular grammar and Contex Push down Automata. (App Language. (Application)	s of Automata. guage. (Applic t free grammar	(Knowledge cation) 3. D : (Comprehe	e) 2. Distin ensic	Illus Iguis on) 4	strate sh bet . Con	Finite tween .struct
Course Content:							
Module 1	Introduction to automata theory	Assignment	Problems Strings and Language operations	d		6 cl	asses
Topics:							
Languages & c	Automata Theory, Application operations on languages, Repres achines (FSM): Deterministic F tic FSMs	sentation of au	tomata, Lan	guag	ge re	cogni	zers,
Module 2	Finite Automata	Assignment	Assignmen Problems DFA, NFA	on		13 Sess	sions



Topics:

Basic concepts of Finite automata, DFA- definitions of DFA, Deterministic Accepters Transition Graphs and Languages

and DFA's, Regular Languages, NFA- Definition of a Nondeterministic Accepter, Languages and NFA's Why Non- determinism? Equivalence of Deterministic and Nondeterministic Finite Accepters, Reduction of the Number of States in Finite Automata.

	Regular Expressions &	Assignment	Problems on RE,	12
Module 3	Context Free Grammar		CFG, PT, PL and	Sessions
			Ambiguity	

Topics:Formal Definition of a Regular Expression, Languages Associated with Regular Expressions, Languages, Regular Languages (RL) and Non-regular Languages: Closure properties of RLs, to show some languages are not RLs, Closure Properties of Regular Context Free Grammars-Examples of Context-Free Languages, Leftmost and Rightmost Derivations, Derivation Trees, Relation Between Sentential Forms and Derivation Trees, Ambiguity in Grammars and Languages: Ambiguous Grammars, Removing Ambiguity, Chomsky Normal Form, Gribiche Normal Form.

Module 4	Push down	Assignment	Problems on	08 Sessions
	Automata		pushdown	
			Automaton	

Topics:

Definition of a Pushdown Automaton, Language Accepted by a Pushdown Automaton, Acceptance by Final State, Acceptance by Empty Stack, From Empty Stack to Final State, From Final State to Empty Stack Equivalence of PDA's and CFG's: From Grammars to Pushdown Automata.

Module 5	Turing Machine	Assignment	Problems on	07 Sessions
			Turning Machine	

Topics:

Definition of a Turing Machine, Turing Machines as Language Accepters, Example Languages to construct Turing

machine, Turing Machines as Transducers, Halting Programming Techniques for Turing Machines

Targeted Application & Tools that can be used:

Targeted Application:

1. Text Processing





2. Compilers

- 3. Text Editors
- 4. Robotics Applications
- 5. Artificial Intelligence

Tools:

1. JFLAP (Java Formal Language and Automata Package) Software simulation tool. It's interactive educational

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software written in Java to experiment topics in automata theory.

2. Turing machine Online simulators.

Text Book(s):

1. Peter Linz, "An introduction to Formal Languages and Automata", Jones and Bartlett Publications 6th Ed, 2018.

Reference(s):

1. Aho, Ullman and Hopcroft, "Theory of Computation", Pearson India 3rd Edition 2008.

2. Michael Sipser, "Theory of Computation", Cengage India 3rd Ed, 2014.

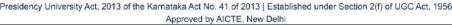
E-Resources

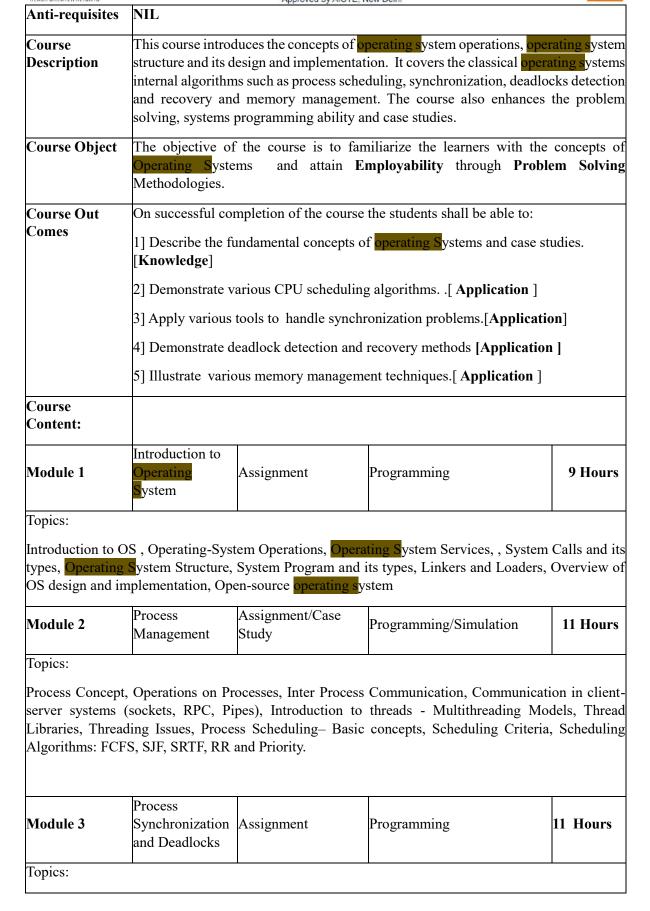
 $NPTEL\ course - https://onlinecourses.nptel.ac.in/noc21_cs83/preview$

Course Code:	Course Title: Operating Systems	L-T- P- C	3	0	0	3
CSE2269						
Version No.	1.0					
Course Pre- requisites	Nil					



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The Critical-Section Problem- Peterson's Solution, Synchronization hardware, Semaphores, Classic Problems of Synchronization with Semaphore Solution- Producer-Consumer Problem, Reader-Writer problems, Dining Philosopher's Problem, . Introduction to Deadlocks, Necessary conditions for deadlock, Resource allocation Graph, Methods for handling deadlock: Deadlock Prevention and Implementation, Deadlock Avoidance and Implementation, Deadlock detection & Recovery from Deadlock.

Module 4	emory anagement	Assignment	Programming/Simulation	10 Hours
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Topics:

Introduction to Memory Management, Basic hardware-Base and Limit Registers, Memory Management Unit(MMU), Dynamic loading and linking, Swapping, Contiguous and Non-Contiguous Memory Allocation, Segmentation, Paging - Structure of the Page Table – Virtual Memory and Demand Paging – Page Faults and Page Replacement Algorithms, Copy-on-write, Allocation of Frames, Thrashing

Introduction to File system management: File System Interface (access methods, directory structures), File system implementation.

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems where in there are resources and entities that use and manage the resources.

Software Tools:

Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install and work on multiple guest Operating Systems on top of a host OS.

Intel Processor identification utility: This software is used to explain about multi-core processors. It helps to identify the specifications of your Intel processor, like no of cores, Chipset information, technologies supported by the processor etc.

Project work/Assignment

Demonstrate process concepts in LINUX OS.

Simulation of CPU scheduling algorithms.

Develop program to demonstrate use of Semaphores in threads.

Develop program to demonstrate use of deadlock avoidance algorithms.

Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019



References

Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.

William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.

Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020

Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau, "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html





Course Code:	Course Title: <mark>Operating S</mark> ystems Lab		0	0	2	1
CSE2270		L-T- P- C				
Version No.	1.0					
Course Pre- requisites	Nil					
Anti-requisites	NIL					
Course Description	This laboratory course provides hands-on operating systems through practical assign covers foundational aspects such as system inter-process communication, synchronizat and file systems. Students will implement and scheduling algorithms, fostering deeper design. The lab also introduces modern OS basics of open-source OS environments.	ments, simulation calls, process an tion, deadlocks, r and simulate real r understanding o	is, and d thr nem -tim of Of	nd o read lory le C S al	case s l man man OS con cchite	tudies. 1 agement agement nponent cture and
Course Object	The objective of the course is to familiar Operating Systems and attain Employ Methodologies.					-
Course Out	On successful completion of the course the s	studente chall he c	1.1.			
Comes	 Demonstrate system-level programming u [Apply] Simulate process scheduling and multithr 	using system calls reading techniques	s and s. [A	1 OS App	ly]	
Comes	1] Demonstrate system-level programming u [Apply]	using system calls reading techniques ration problems us	s and s. [A sing	1 OS App sen	ly] napho	res and

Targeted Application:

Application area is traffic management system, banking system, health care and many more systems where in there are resources and entities that use and manage the resources.

Software Tools:

Oracle Virtual Box/VMWare Virtualization software [Virtual Machine Managers]. Used to install and work on multiple guest Operating Systems on top of a host OS.

Intel Processor identification utility: This software is used to explain about multi-core processors. It helps to identify the specifications of your Intel processor, like no of cores, Chipset information, technologies supported by the processor etc.

List of Laboratory Tasks: Lab sheet -1







Approved by AICTE, New Delhi L1: Write a program to demonstrate the use of fork() and exec() system calls in process creation. L2: A system has limited memory and high-priority real-time processes. Design a scheduling algorithm that ensures responsiveness while preventing starvation. Lab sheet -2 L1: Implement First-Come-First-Serve (FCFS) process scheduling using C or Python. L2: You are designing a server that handles thousands of client connections. Compare multithreading and multiprocessing for this task and implement a basic server model. Lab sheet -3 L1: Implement Round Robin Scheduling with a fixed time quantum. L2: In a banking system, concurrent access to accounts leads to data corruption. Design a synchronization solution to avoid race conditions. Lab sheet -4 L1: Write a program to create threads using Pthreads or Python's threading module. L2: You're tasked with building a file access tracker in an OS. Implement a system to log file access patterns and identify frequent accesses. Lab sheet -5 L1: Demonstrate inter-process communication (IPC) using pipes. L2: A simulation tool needs to emulate process suspension and resumption. Design and implement such a mechanism using signals or condition variables. Lab sheet -6 L1: Simulate the Producer-Consumer problem using semaphores. L2: You're developing a system where sensor devices (producers) generate temperature readings, and data processors (consumers) store and process these readings. To prevent race conditions and ensure buffer safety, implement a synchronization mechanism using semaphores. Lab sheet -7 L1: Implement Dining Philosophers Problem using threads and synchronization. L2: In a multi-threaded cafeteria simulation, five philosophers sit around a circular table, each alternating between thinking and eating. To eat, a philosopher must hold two forks (represented by shared resources). Your task







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is to avoid deadlock and ensure no philosopher starves using thread
synchronization techniques.
Lab sheet -8
L1: Write a program to simulate First Fit, Best Fit, and Worst Fit memory
allocation strategies. L2: A system with limited memory blocks needs to allocate memory to
processes arriving with various size requests. Your task is to implement three
classic memory allocation strategies—First Fit, Best Fit, and Worst Fit—to
allocate memory to each process efficiently. Simulate and compare how
memory gets allocated in each strateg
Lab sheet -9
L1: Demonstrate paging using a simple page table simulation.
L2: A program has a logical address space divided into pages. The system's memory is divided into equal-sized frames. When a program executes, its
pages are loaded into available frames in main memory. Simulate the address
translation process using a page table and demonstrate how a logical address
is converted to a physical address.
Lab sheet -10
L1: Write a program to simulate page replacement algorithms like FIFO and
LRU.
L2: In a virtual memory system, a process accesses pages in a specific order. The memory can only hold a limited number of pages (frames). When a page is
needed and the memory is full, a page replacement algorithm is used to decide
which page to evict. Simulate and compare FIFO and LRU algorithms for a
given page reference string.
Lab sheet -11
14. Simulata fila directoru atructura (cingle laval/two laval)
L1: Simulate file directory structure (single level/two level). L2: A university campus computer lab has limited memory space available for
each student login session. When students open files or run programs,
memory pages are loaded into available memory frames. Due to the limited
number of frames, some pages must be replaced when new ones are needed.
The lab system uses page replacement algorithms to decide which pages to
evict when memory is full.
Lab sheet -12
L1: Write a shell script to demonstrate file handling commands in Linux.
L2: Design a command-line mini shell that can run background and
foreground processes and handle basic built-in commands like cd, pwd, exit.
Project work/Assignment
Demonstrate process concepts in LINUX OS.
Simulation of CPU scheduling algorithms.







Develop program to demonstrate use of Semaphores in threads.

Develop program to demonstrate use of deadlock avoidance algorithms.

Develop program to demonstrate use of page replacement algorithms.

Simulation of memory allocation strategies [first fit, best fit and worst fit].

Text Book

Silberschatz A, Galvin P B and Gagne G, "Silberschatz's Operating System Concepts", Paperback, Global Edition Wiley, 2019

References

Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 10th edition Wiley, 2018.

William Stallings, "Operating Systems", Ninth Edition, By Pearson Paperback ,1 March 2018.

Sundaram RMD, Shriram K V, Abhishek S N, B Chella Prabha, "Cracking the Operating System skills", Dreamtech, paperback, 2020

Remzi H. Arpaci-Dusseau Andrea C. Arpaci-dusseau , "Operating Systems: Three Easy Pieces, Amazon digital Services", September 2018.

E-resources/Weblinks

https://www.os-book.com/OS9/

https://pages.cs.wisc.edu/~remzi/OSTEP/

https://codex.cs.yale.edu/avi/os-book/OS10/index.html

Course Code: APT4002	Course Title: Introduction to Aptitude (Audited) L-T-P-C 0 0 2 0
Version No.	1.0
Course Pre- equisites	
Anti-requisites	Nil
Course Description	The objective of this course is to prepare the trainees to tackle the questions on various topics and various difficulty levels based on Quantitative Ability, and Logical Reasoning asked during the placement drives. There will be sufficient focus on building the fundamentals of all the topics, as well as on solving the higher order thinking questions. The focus of this course is to teach the students to not only get to the correct answers, but to get there faster than ever before, which will improve their employability factor.
Course Objective	The objective of the course is to familiarize the learners with the concepts of Aptitude and attain Skill Development through Problem Solving techniques.





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REACH GREATER HEIGHTS			E, New Delhi	WISDOM
	On successful of	completion of the cou	rse the students shall be able to:	
			cal concepts they learnt in high scho	ol. CO2]
Course	Identify the pr	inciple concept neede	d in a question.	
Outcomes	CO3] Solve the	e quantitative and logi	cal ability questions with the approp	oriate
Outcomes	concept.			
	CO4] Analyze	the data given in com	plex problems.	
	CO5] Rearran	ge the information to	simplify the question	
Course				
Content:				
Module 1	Quantitative	Assignment	Bloom's Level : Application	12
	Ability			Hours
Topics:				
Introduction to	Aptitude, working	g of Tables, Squares, G		
				10
	Logical	Assignment	Bloom's Level : Application	18
Module 2		Assignment	Bloom's Level : Application	18 Hours
Module 2 Topics:	Logical Reasoning			Hours
Module 2 Topics: Linear & Circu	Logical Reasoning	Puzzle, Coding & I	Decoding, Blood Relations, Direction	Hours
Module 2 Topics: Linear & Circu Ordering and R	Logical Reasoning	Puzzle, Coding & I		Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning	Logical Reasoning alar Arrangement Ranking, Clocks ar	Puzzle, Coding & I nd Calendars, Numbe	Decoding, Blood Relations, Direction	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl	Logical Reasoning alar Arrangement Ranking, Clocks ar	Puzzle, Coding & I nd Calendars, Numbe hat can be used:	Decoding, Blood Relations, Directions, Visu	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are	Logical Reasoning alar Arrangement Ranking, Clocks ar	Puzzle, Coding & I nd Calendars, Numbe	Decoding, Blood Relations, Directions, Visu	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS	Logical Reasoning alar Arrangement Ranking, Clocks ar	Puzzle, Coding & I nd Calendars, Numbe hat can be used:	Decoding, Blood Relations, Directions, Visu	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS Text Book	Logical Reasoning alar Arrangement Ranking, Clocks ar ication & Tools t a: Placement activ	Puzzle, Coding & I ad Calendars, Numbe hat can be used: vities and Competitive	Decoding, Blood Relations, Directions, Visu	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS Text Book 1. Quantita	Logical Reasoning Ilar Arrangement Ranking, Clocks ar ication & Tools t a: Placement activ	Puzzle, Coding & I nd Calendars, Numbe hat can be used: vities and Competitive R S Aggarwal	Decoding, Blood Relations, Directions, Visuo r Series, Wrong number series, Visuo examinations.	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS Text Book 1. Quantita 2. Verbal d	Logical Reasoning Ilar Arrangement Ranking, Clocks ar ication & Tools t a: Placement activ	Puzzle, Coding & I ad Calendars, Numbe hat can be used: vities and Competitive	Decoding, Blood Relations, Directions, Visuo r Series, Wrong number series, Visuo examinations.	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS Text Book 1. Quantita 2. Verbal a References	Logical Reasoning lar Arrangement anking, Clocks ar ication & Tools t a: Placement activ ative Aptitude by I & Non-Verbal Rea	Puzzle, Coding & I nd Calendars, Numbe hat can be used: vities and Competitive R S Aggarwal	Decoding, Blood Relations, Directions, Visue r Series, Wrong number series, Visue examinations.	Hours
Module 2 Topics: Linear & Circu Ordering and R Reasoning Targeted Appl Application are Tools: LMS Text Book 1. Quantita 2. Verbal & References 1. www.inc	Logical Reasoning Ilar Arrangement Ranking, Clocks ar ication & Tools t a: Placement activ	Puzzle, Coding & I nd Calendars, Numbe hat can be used: vities and Competitive R S Aggarwal asoning by R S Aggar	Decoding, Blood Relations, Directions, Visue r Series, Wrong number series, Visue examinations.	Hours

component mentioned in course handout.

Course Code: APT4004	Course Title: Aptitude Training- Intermediate	L- T - P- C	0	0	2	0
	Type of Course: Practical Only Course					
Version No.						
Course Pre- requisites	Students should have the basic concepts of Quar applications in real life problems.	ntitative aptitu	de alo	ng with	its	
Anti-requisites	NIL					
Course Description	This is a skill-based training program for the stu enable the students to enhance their skills in Qu			designe	ed to	
Course Objective	The objective of the course is to familiarize the Aptitude and attain Skill Development throu			-		
Course	On successful completion of this course the st	tudents shall	be able	e to:		
Out	CO1: Recall all the basic mathematical concepts	s.				
Comes	CO2: Identify the principle concept needed in a	question.				
	CO3: Solve the quantitative and logical ability of	questions with	the ap	propria	te con	cept.
	CO4: Analyze the data given in complex proble	ms.	_	_		_
Course						







Assignment Average, Mixture and All Assignment e Interest, Compound Inter ve examinations. Tools: I	erest, Probability,
Average, Mixture and All Assignment e Interest, Compound Inte	egation, Time and 14 Hours erest, Probability,
Assignment e Interest, Compound Inte	erest, Probability,
Assignment e Interest, Compound Inte	erest, Probability,
e Interest, Compound Inte	erest, Probability,
e Interest, Compound Inte	erest, Probability,
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-	
ve examinations. Tools: I	LMS
ve examinations. Tools: I	LMS
ve examinations. Tools: 1	LMS
e Test Assignment	
us antituda for <u>Chill Da</u>	valorment through
th components mentioned	
	ve aptitude for <mark>Skill De</mark> gh components mentioned

Course ode: APT4005	Course Title: Aptitude For Type of Course: Practica		ty	L-T-P-C	0	0	2	1
Version No.	1.0							
Course Pre- requisites	Students should have the b with its applications in rea	-	-	ntitative apti	tude, V	erbal a	abilit	y along
Anti- requisites	Nil							
Course Description	This course is designed to quantitative aptitude and v			to enhance	their	skills	in	
Course Objective	The objective of the course Aptitude and Verbal abilit career development.					1	No.	
Course Outcomes	On successful completion CO1] Recall all the basic in CO2] Identify the principl CO3] Solve the quantitate concept.	mathematical co le concept neede	oncept ed in a	s question			appr	opriate
Course Conte	nt:							
Module 1	Quantitative Ability	Lab-10hrs		Platform A 10hrs	ssessm	ent-	20 H	Iours



DENCY UNIVE Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956 Approved by AICTE, New Delhi



Topics: Number System, Percentage, Ratio and Proportion, Average, Mixture and Allegation, Time and Work, Profit and Loss, Time Speed and Distance, Simple Interest and Compound Interest, Probability, Permutation and Combination.

Module 2	Verbal Ability	Lab-5hrs		Platform Assessment- 5hrs	10 Hours
Topics: - Part	s of Speech, Subject Verb	Agreement, S	potting	Error, Cloze Test, Ver	bal
Analogies, Rea	ading Comprehension, Idion	ns & Phrases, P	ara Jun	nbles	
Targeted App	olication & Tools that can l	be used:			
Application ar	ea: Placement activities and	Competitive ex	aminat	tions. Tools: LMS	
Evaluation	Continuous Evaluation				
Evaluation,	Topic wise evaluation				
Text Book					
1. Fast tra	ck objective by Rajesh Verma				
2. R S Ag	6				
3. S.P Bal	kshi				
References					
1. <u>www.ir</u>	ndiabix.com				
	estbook.com				
	outube.com/c/TheAptitudeGuy				
Topics releva	nt to Skill development: Q	uantitative and	reason	ing aptitude for <mark>Skill</mark> De	velopment
through Proble	<mark>em solving Techniques</mark> . This	is attained thro	ough as	sessment	
component me	entioned in course handout.				

Course Code: CIV7601	Course Title: Universal Human Values and Ethics Type of Course: MAC courseL-T-P-C0
Course Pre- requisites	NIL
Anti-requisites	NIL
Course Description	The purpose of the course is to develop a holistic perspective in students' life. The course adopts a self-reflective methodology of teaching and is designed to equip the students to explore their role in all aspects of living as a part of the society. It presents a universal approach to value education by developing the right understanding of reality through the process of self-exploration.
	This self-exploration develops more confidence and commitment in students enabling them to critically evaluate their pre-conditioning and present beliefs. As an outcome of the holistic approach, the students will be able to practice the ethical conduct in the social and professional life. The prime focus throughout the course is toward affecting a qualitative transformation in the life of the student rather than just a transfer of information. This course is designed to cater to Human Values and Professional Ethics.
Course Objective	The objective of the course is 'SKILL DEVELOPMENT' of the student by using 'SELF LEARNING' techniques
Course Outcomes	 On successful completion of this course the students shall be able to: CO.1 Recognize the importance of Value Education through the process of self-exploration CO.2 Explain the human being as the co-existence of the self and the body in harmony. CO.3 Describe the role of foundational values in building harmonious relationships. CO.4 Summarize the importance of a holistic perspective in developing ethical professional behavior.
Course Content:	

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GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	

MARCH 12 A	HTS	Approved by	AICTE, New Delhi		WISDOM
Module 1	Introduction to Value		Online Assessme	ent MCQ Quiz	5 Sessions
Topics:				I	
Right Understa	anding, Relationship an	nd Physical Facilit	ty (Holistic Develop	oment and the Role	of Education),
Understanding	Value Education, Self-	exploration as the	e Process for Value	Education, Continu	ous Happiness
and Prosperity	- the Basic Human Asp	oirations, Happine	ess and Prosperity -	- Current Scenario,	Method to Fulfil
the Basic Hum	an Aspirations.				
Module 2	Harmony in the Hurr	nan Being	Online Assessme	ent MCQ Quiz	5 Sessions
Topics:	,				
•	Human being as the Co	o-existence of the	Self and the Body	Distinguishing betw	veen the Needs
-	the Body, The Body as		-		
	the Body, Programme				
	the body, i rogramme	to choose schilleg			
Module 3	Harmony in the Fam	nily and Society	Online Assessme	ent MCQ Quiz	5 Sessions
Topics:					
•	e Family – the Basic Uni	it of Human Intera	action, 'Trust' – the	Foundational Value i	in Relationship,
	the Right Evaluation, O		-		
•	Society, Vision for the	•		р,	e na e e e e e e e e e
	Implications of	the Holistic	Online		
Module 4	Understanding –	A Look at	Assessment	MCQ Quiz	5 Sessions
	Professional Ethics		Assessment		
Topics:					
Natural Accep	tance of Human Values	s, Definitiveness	of (Ethical) Humar	n Conduct, A Basis	for Humanistic
Education, Hu	manistic Constitution an	nd Universal Hum	an Order, Compete	ence in Professional	Ethics, Holistic
Technologies,	Strategies for Transition	towards Value-ba	ased Life and Profe	ession	
Targeted Appli	cation & Tools that can b	be used:			
	as are Personal life, Ed		er, Workplace, Soo	ciety and Environme	ntal
Responsibility			· · ·		
	Tools – NPTEL and Swa	avam.			
Project work/A		,			
Assessment 7	•				
 Online 		conducted by the	Department of Civi	I Engineering throug	th Linways
Online	exams (MCQs) will be	conducted by the	Department of Civi	I Engineering throug	Jh Linways.
		conducted by the	Department of Civi	I Engineering throug	ıh Linways.
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9. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.

 William P. Cunningham and Mary Ann Cunningham (2020), Principles of Environmental Science: Inquiry & Applications, 9th Edition, McGraw-Hill Education, USA.

Resources:

- 1. https://onlinecourses.swayam2.ac.in/imb25_mg195/preview
- 2. https://onlinecourses.nptel.ac.in/noc25_mg141/preview
- 3. https://onlinecourses.swayam2.ac.in/ini25 hs52/preview
- 4. https://onlinecourses.nptel.ac.in/noc25 hs219/preview
- 5. <u>https://onlinecourses.swayam2.ac.in/cec25_mg14/preview</u>
- 6. <u>https://onlinecourses.swayam2.ac.in/imb25_mg195/preview</u>
- 7. https://onlinecourses.swayam2.ac.in/imb25 mg196/preview

Topics relevant to Skill Development:

- 1. An attitude of enquiry.
- 2. Write reports

The topics related to Human values and Professional ethics:

All topics in are relevant to Human values and Professional ethics.



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Course Code: APT4006	Course Title: Type of Cours	Logical and Cri e: Audited	tical Thinking	L- T-P- C	0	0	2	0
Version No.	1.0							
Course Pre- requisites			concepts of Logic tions in real life p	-	nd Cr	itical		
Anti- requisites	Nil							
Course Description	(Undergraduate	e). This course is	ogram for the eng designed to enab Critical thinking.	-		hance	e thei	r
Course Objective		Critical thinking	o familiarize the l through problem					
Course	CO1] Underst	and all the conc	-	ents shall be ab	le to:			
Outcomes		e concepts in pr and structure th	oblem solving. e reasoning techn	iques and spati	al vis	ualiza	ation	
Course Content	t:							
Module 1	Logical Thinking	Assignment				16	Houi	'S
Topics:								
	· · · · · ·		mages, Paper cutt ion, Data sufficie	U	g, En	ıbedd	led	
Module 2	Critical Thinking	Assignment				14	Houi	*S
Topics:		<u> </u>				1		
Analogy, Symbo conclusion, Puzz		Statement and a	ssumption, Cause	e of action, Stat	emen	t and		
Targeted Appli	cation & Tools t	hat can be used	:					
Application area	: Placement activ	vities and Comp	etitive examinatio	ons. Tools: LMS	S			
	Continuous Ev	valuation						
Evaluation	Topic wise eva	luation						



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Internal Assessments

Text Book

- 1. A new approach to reasoning verbal, non-verbal & analytical by BS Sijwali
- 2. R S Aggarwal
- 3. Kiran publications

References

- 1. www.indiabix.com
- 2. www.testbook.com
- 3. www.youtube.com/c/TheAptitudeGuy/videos

Topics relevant to Skill Development Logical reasoning and Critical thinking for Skill Development through Problem solving Techniques. This is attained through assessment component mentioned in course handout.

Course Code: FIN1002	Course Title: Essentials of Finance Type of Course: HSMC	L-T-P-C	3	0	0	3
Version No.	1.0	I			1	
Course Pre- requisites	This course is designed to be accessible to their prior financial knowledge.	all students	, re	gar	dles	s of
Anti-requisites						
Course Description	This course is designed to equip stude understanding of key financial concept enable them to comprehend the core funct the intricacies of financial management gain insights into the fundamental aspect aims to develop students' abilities to interprevaluate investment opportunities, und decisions, and navigate the basics of tax	ots and prin tions of fina within organ its of taxation pret financia lerstand cap	ncip nce niza on. I st oital	les , de tio The ate	. It elve ns , e co me	will into and urse nts,
Course Objective	 Upon successful completion of this course, Understand the basic forms of b their financial implications. Understand the fundamental pri influence financial decision-making in var Analyse and interpret financial financial health and performance of an or Identify income under various Income Tax Act, 1961 and determine 	usiness organciples and Tious contexts statements Tganization. heads of in	con 5. to	ati cep ass	on ots	and that the
Course Outcomes	List the course outcomes On successful completion of this course able to:				ll b	e
	1. Understand the basic concepts markets and organizations. 2. Apply and interpret financial in					



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		ify various heads of	f income ar	nd deduction
Course		e Tax Act, 1961.		
Content:				
Module 1	Introduction to Finance	Assignment/ Quiz	Numerical solving Task	10 Sessions
Investments, Markets: Mon Forms of Bu Maximization	d Scope of Financ Financial Institutions ey Markets vs. Capit siness Organization vs. Profit Maximiza and Income Stateme	s, International Fina al Markets, Primary and Financial Goa ntion; Understanding	ance; Types vs. Second ls: Shareho g Financial	of Financia ary Markets Ider Wealth
Module 2	Financial Management	Assignment/ Quiz	Numerical solving Task	18 Sessions
Numerical; Ca Theory of Cap	Index (PI), Internal apital Structure Deci ital Structure; Cost of ncing Dividend Policy.	sions: Optimal Capi Capital: Equity, Debt	ital Structur	e, Trade-of
Numerical; Ca Theory of Cap Factors influe Module 3	apital Structure Deci ital Structure; Cost of ncing Dividend Policy. Taxation	sions: Optimal Capi Capital: Equity, Debt Assignment/ Quiz	Numerical solving Task	e, Trade-off idend Policy: 17 Sessions
Numerical; Ca Theory of Cap Factors influer Module 3 Principles of a vs. Indirect Ta Income; Salar A; Computatio	apital Structure Decidital Structure; Cost of Incing Dividend Policy. Taxation Good Tax System: Equaxes; Residential States, House Property- Bases on of Taxable Income Ication & Tools that construction of Spreadsheet Software (Construction)	sions: Optimal Capi Capital: Equity, Debt Assignment/ Quiz uity, Certainty, Conve us of an Individual- E asic Numerical; Dedu and Tax Liability; E-F	Numerical solving Task enience, Eco Basic Problec ctions under filing proced	re, Trade-off idend Policy Sessions nomy; Direct ms; Heads of Chapter VI- ure.
Numerical; Ca Theory of Cap Factors influer Module 3 Principles of a vs. Indirect Ta Income; Salar A; Computatio Targeted Appl Textbooks, PPT, Tax Department	apital Structure Decidital Structure; Cost of Incing Dividend Policy. Taxation Good Tax System: Equation A Good Tax	sions: Optimal Capi Capital: Equity, Debt Assignment/ Quiz uity, Certainty, Conve us of an Individual- E asic Numerical; Dedu and Tax Liability; E-F	Numerical solving Task enience, Eco Basic Problec ctions under filing proced	re, Trade-of idend Policy 17 Sessions nomy; Direct ms; Heads o r Chapter VI ure.
Numerical; Ca Theory of Cap Factors influer Module 3 Principles of a vs. Indirect Ta Income; Salar A; Computatio Targeted Appl Textbooks, PPT, Tax Department Project Work/ 1. Presentation topic. They will	apital Structure Decidital Structure; Cost of Incing Dividend Policy. Taxation Good Tax System: Equation A Good Tax	sions: Optimal Capital: Equity, Debte Capital: Equity, Debte Assignment/ Quiz uity, Certainty, Conve us of an Individual- E asic Numerical; Dedu and Tax Liability; E-F an be used: (e.g., Microsoft Excel), of presentation, where the	Numerical solving Task enience, Eco Basic Probles ctions under filing proced	re, Trade-off idend Policy 17 Sessions nomy; Direct ms; Heads of r Chapter VI- ure. te of Income
Numerical; Ca Theory of Cap Factors influer Module 3 Principles of a vs. Indirect Ta Income; Salar A; Computatio Targeted Appl Textbooks, PPT, Tax Department Project Work/ 1. Presentation topic. They will the same. 2. Case Study: business model	apital Structure Decidital Structure; Cost of Incing Dividend Policy. Taxation Good Tax System: Equates; Residential States, Residential States, House Property- Bases and for Taxable Income Iication & Tools that complexity of Taxable Income Iication & Tools that c	sions: Optimal Capital: Equity, Debta Capital: Equity, Debta Assignment/ Quiz uity, Certainty, Conve us of an Individual- E asic Numerical; Dedu and Tax Liability; E-F an be used: (e.g., Microsoft Excel), presentation, where the strate the working and rse students will be gives or tax evasion by re-	Numerical solving Task enience, Eco Basic Probles ctions under filing proced Official Websit	re, Trade-off idend Policy 17 Sessions nomy; Direct ms; Heads of r Chapter VI- ure. te of Income vill be given a pplications for



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2. Pandey, I. M. (2025). Financial Management. Vikas Publishing House.

Reference Book (s):

1. Bhole, L.M., & Mahakud, J. (Current Edition). *Financial Institutions and Markets: Structure, Growth and Innovations*. McGraw Hill Education India.

2. Mehrotra, H.C., & Goyal, S.P. (Latest Assessment Year Edition). *Income Tax Law & Practice*. Sahitya Bhawan Publications.

3. Gordon, E., & Natarajan, K. (Current Edition). *Financial Markets and Services*. Himalaya Publishing House.

Online Resources (e-books, notes, ppts, video lectures etc.):

1. <u>https://presidencyuniversity.linways.com</u>

2. <u>https://onlinecourses.nptel.ac.in/noc24_ec01/preview</u>

3. <u>https://www.incometax.gov.in/iec/foportal/</u>

Topics relevant to "**SKILL DEVELOPMENT**": This course is designed to provide practical financial skills through participative learning techniques. Students will engage in performing suitable calculations to determine financial parameters (e.g., time value of money, investment returns, tax liabilities) and analysing financial statements to assess organizational performance and make informed decisions.

Rajanukunte, Yelahanka, Bengaluru 560 119