

PRESIDENCY UNIVERSITY

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

School of Engineering

Bachelor of Technology Degree

Program Regulations and Curriculum 2020-2024

B. Tech. Computer Science and Engineering (Data Science)

2020-2024

Regulations No: PU/AC-20.3/SOCSE01/CSD/2020-24 Resolution No.3 of the 20th Meeting of the Academic Council held on 15th February, 2023, and Ratified by the Board of Management in its 21st Meeting held on, 22nd February, 2023.

February-2023

REGISTRAR

PU/AC-20.3/SOCSE01/CSD/2020-2024

Page **1** of **156**

Bachelor of Technology Degree Program Regulations and Curriculum 2020-2024

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, 2019, of the University, the Academic Council hereby makes the following Regulations, namely;

Preliminary:

Short Title and Commencement

- (a) These Regulations shall be called the **Bachelor of Technology Degree Program Regulations and Curriculum 2020-2024**.
- (b) These Regulations are subject to, and, pursuant to the Academic Regulations, 2019.
- (c) These Regulations shall be applicable to the ongoing Bachelor of Technology Degree Programs of the 2020-2024 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 2020-2021.

Definitions:

In these Regulations, unless the context otherwise requires:

- a) "Academic Council" means the Academic Council of the University;
- b) "Academic Regulations" means the Academic Regulations, 2019, of the University;
- c) "Academic Term" means a Semester or Summer Term;
- d) "Act" means the Presidency University Act, 2013;
- e) "Board of Examinations (BOE)" means the Board of Examinations of the University;
- f) "Board of Management (BOM)" means the Board of Management of the University;
- g) "CGPA" means Cumulative Grade Point Average as defined in the Academic Regulations, 2019;
- *h) "Clause" means the duly numbered Clause, with Sub-Clauses included, if any, of these Regulations;*
- *i)* "Course" means, a specific subject usually identified by its Course Code and Course Name, with specified Credit Structure and Credits, Course Description/Content/Syllabus, a set of textbooks/references, taught by assigned Course Instructor(s) to a specific class (group of students) during a specific Academic Term;
- *j)* "Course Instructor" means the faculty member who is the Teacher/Course Instructor for the concerned Course;
- *k) "DAC" means the Departmental Academic Committee;*
- *l) "Dean" means the Dean of the concerned School;*
- *m) "HOD" means the Head of the concerned Department;*
- n) "Parent Department" means the Department that offers the Degree Program that a

REGISTRAR

anne

student undergoes;

- o) "Program" means the Bachelor of Technology (B. Tech.) Degree Program;
- *p)* "Program Regulations" means the Bachelor of Technology Degree Program Regulations and Curriculum 2020-2024;
- *q)* "Registrar" means the Registrar of the University;
- *r)* "SGPA" means the Semester Grade Point Average as defined in the Academic Regulations, 2019;
- s) "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;
- *t)* "Section" means the duly numbered Section, with Clauses included in that Section, of these Program Regulations;
- *u)* "Statutes" mean the Statutes of Presidency University;
- v) "Sub-Clause" means the duly numbered Sub-Clause of these Program Regulations;
- w) "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, and,
- *x) "University" means Presidency University, Bengaluru;*

1. INTRODUCTION:

- 1.1. The Academic Regulations, 2019, are applicable to all existing Degree Programs of the University. The Academic Regulations, and any amendments made therein, shall also be applicable to new Degree and Diploma Programs that may be offered by the University in future.
- 1.2. The **Bachelor of Technology Degree Program Regulations and Curriculum 2020-2024** are subject to, and, pursuant to the Academic Regulations, 2019.
- 1.3. These Program Regulations shall be applicable to the following **Bachelor of Technology (B. Tech.) Degree Programs of 2020-2024:**
 - 1.3.1. Bachelor of Technology in Civil Engineering, abbreviated as B. Tech. (Civil Engineering);
 - 1.3.2. Bachelor of Technology in Computer Engineering, abbreviated as B. Tech. (Computer Engineering);
 - 1.3.3. Bachelor of Technology in Computer Science and Engineering, abbreviated as B. Tech. (Computer Science and Engineering);
 - 1.3.4. Bachelor of Technology in Information Science and Engineering, abbreviated as B. Tech. (Information Science and Engineering);
 - 1.3.5. Bachelor of Technology in Information Science and Technology, abbreviated as B. Tech. (Information Science and Technology);
 - Bachelor of Technology in Computer Science and Technology, abbreviated as B. Tech. (Computer Science and Technology);

- 1.3.7. Bachelor of Technology in Electronics and Computer Engineering, abbreviated as B. Tech. (Electronics and Computer Engineering);
- 1.3.8. Bachelor of Technology in Computer Science and Engineering (Cyber Security), abbreviated as B. Tech. (Computer Science and Engineering-Cyber Security);
- 1.3.9. Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence and Machine Learning), abbreviated as B. Tech. (Computer Science and Engineering-Artificial Intelligence and Machine Learning);
- 1.3.10. Bachelor of Technology in Computer Science and Engineering (IoT), abbreviated as B. Tech. (Computer Science and Engineering-IoT);
- 1.3.11. Bachelor of Technology in Computer Science and Engineering (Block Chain), abbreviated as B. Tech. (Computer Science and Engineering-Block Chain);
- 1.3.12. Bachelor of Technology in Computer Science and Engineering (Data Science), abbreviated as B. Tech. (Computer Science and Engineering-Data Science);
- 1.3.13. Bachelor of Technology in Computer Science and Technology (DevOps), abbreviated as B. Tech. (Computer Science and Technology-DevOps);
- 1.3.14. Bachelor of Technology in Computer Science and Technology (Big Data), abbreviated as B. Tech. (Computer Science and Technology-Big Data);
- 1.3.15. Bachelor of Technology in Electronics and Communication Engineering, abbreviated as B. Tech. (Electronics and Communication Engineering);
- 1.3.16. Bachelor of Technology in Electrical and Electronics Engineering, abbreviated as B. Tech. (Electrical and Electronics Engineering);
- 1.3.17. Bachelor of Technology in Mechanical Engineering, abbreviated as B. Tech. (Mechanical Engineering); and,
- 1.3.18. Bachelor of Technology in Petroleum Engineering, abbreviated as B. Tech. (Petroleum Engineering).
- 1.4. These Program Regulations shall be applicable to other similar programs, which may be introduced in future.
- 1.5. These Program 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.
- 1.6. 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.
- 1.7. These Program Regulations are structured as follows:
 - 1.7.1. **Part A:** Specific regulations relevant to the Bachelor of Technology (B. Pech.) Degree Programs in pursuant of the provisions in Section 6.0 of the Academic Regulations, 2019, of the University.

anne

1.7.2. **Part B:** Program Curriculum for the specific ongoing Bachelor of Technology (B. Tech.) Degree Program of study as enumerated and named in Clause 1.3.



2. PART A: PROGRAM REGULATIONS

2.1. Program Description and Duration

B. Tech. Degree Programs are offered in the following branches/disciplines by the respective Parent Departments as indicated in Table 2.1.

Table 2.1 B. Tech. Degree Programs and Respective Parent Departments						
S. No.	B. Tech. Program (Branch/Discipline)	Parent Department				
1	B. Tech. (Civil Engineering)	Department of Civil Engineering				
2	B. Tech. (Computer Engineering)					
3	B. Tech. (Computer Science and Engineering)					
4	B. Tech. (Information Science and Engineering)					
5	B. Tech. (Information Science and Technology)					
6	B. Tech. (Computer Science and Technology)					
7	B. Tech. (Electronics and Computer Engineering)	Department of Computer Science and Engineering				
8	B. Tech. (Computer Science and Engineering-Cyber Security)					
9	B. Tech. (Computer Science and Engineering-Artificial Intelligence and Machine Learning)					
10	B. Tech. (Computer Science and Engineering-IoT)	\mathcal{O}				
11	B. Tech. (Computer Science and Engineering-Block Chain)	REGISTRAF				

	Table 2.1 B. Tech. Degree Programs and Respective Parent Departments							
S. No.	B. Tech. Program (Branch/Discipline)	Parent Department						
12	B. Tech. (Computer Science and Engineering-Data Science)							
13	B. Tech. (Computer Science and Technology-DevOps)							
14	B. Tech. (Computer Science and Technology-Big Data)							
15	B. Tech. (Electronics and Communication Engineering)	Department of Electronics and Communication Engineering						
16	B. Tech. (Electrical and Electronics Engineering)	Department of Electrical and Electronics Engineering						
17	B. Tech. (Mechanical Engineering)	Department of Mechanical Engineering						
18	B. Tech. (Petroleum Engineering)	Department of Petroleum Engineering						

anno REGISTRAR

The 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.

2.2. Admission Criteria to the Four-Year Bachelor of Technology (B. Tech.) Degree Programs:

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 Programs are listed in the following Sub-Clauses:

- 2.2.1. An applicant who has successfully completed the 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 recognised university of India or outside or from Senior Secondary Board or equivalent, constituted or recognised 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 course.
- 2.2.2. 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.
- 2.2.3. The applicant must have appeared for the Joint Entrance Examinations (JEE) Main/JEE (Advanced)/Karnataka CET/COMED-K, or any other State-level Engineering Entrance Examinations.
- 2.2.4. 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.
- 2.2.5. Admissions are offered to Foreign Nationals and Indians living abroad in accordance with the rules applicable for such admissions, issued from time to time by the Government of India.
- 2.2.6. Candidates must fulfil the medical standards required for admission as prescribed by the University.
- 2.2.7. 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.
- 2.2.8. The decision of the BOM regarding the admissions is final and binding.

2.3. 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. Program of the University are listed in the following Sub-Clauses:

- 2.3.1. Admission to the 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 recognised by the University), who have secured not less than forty-five percent (45%) marks in the final year examination (fifth and sixth 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%).
- 2.3.2. 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.
- 2.3.3. 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.
- 2.3.4. 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.
- 2.3.5. 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.
- 2.3.6. 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 2020-2024, minus the number of Credits prescribed for the 1st Year (total number of Credits

egistra

prescribed for the 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 (Data Science)) 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. Degree in Computer Science and Engineering (Data Science) for a student who joins the Program through the provision of the Lateral Entry shall be "N – M" Credits.

2.3.7. 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.

2.4. 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/B. E./B. S., 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:

- 2.4.1. The concerned student fulfils the criteria specified in Sub-Clauses 2.3.1, 2.3.2 and 2.3.3.
- 2.4.2. The student shall submit the Application for Transfer along with a nonrefundable 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) of the B. Tech. Program commencing on August 1 on the year concerned.
- 2.4.3. The student shall submit copies of the respective Marks Cards/Grade Sheets/Certificates along with the Application for Transfer.
- 2.4.4. 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./B. E./B. S., four-year Degree Program from the concerned University, are declared equivalent and acceptable by a Committee constituted by the Vice Chancellor for this purpose. Further, the 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.
- 2.4.5. The Branch/Discipline allotted to the student concerned shall be the decision of the University and binding on the student.

2.5. Change of Branch/Discipline

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 the 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.

- 2.5.1. 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 6.00 at the end of the 2nd Semester, shall be eligible for consideration for a change of Branch.
- 2.5.2. 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.
- 2.5.3. The student(s) 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.
- 2.5.4. 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.
- 2.5.5. The eligible student may be allowed a change in Branch, strictly in order of *inter se* merit, subject to the conditions given below:
 - 2.5.5.1. The actual number of students in the third 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; and,
 - 2.5.5.2. 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.
- 2.5.6. 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.

2.6. Professional Practice Courses

Professional Practice Courses (Professional Practice-I and Professional Practice-II) are practice based Courses with the objective to equip students with the skills of problem identification, root cause analysis and 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 Professional Practice Courses shall be prescribed and approved by the concerned Departmental Academic Committee (refer Annexure A of the Academic Regulations, 2019). The same shall be prescribed in the Course Handout.

2.7. Professional Practice–I

Professional Practice–I is a 5-Credit Course. This first level practice based course is conducted after the 4th Semester of the B. Tech. Program, during the summer break (usually June-July), in accordance with the following options and guidelines:

2.7.1. Internship Program in an Industry/Company:

A student may undergo an Internship Program for a period of 6–8 weeks in an Industry/Company, subject to the following conditions.

- 2.7.1.1. The Internship Program shall be conducted in accordance with the Internship Policy prescribed by the University from time to time.
- 2.7.1.2. 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 for award of the Internship to a student.

- 2.7.1.3. 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 providing the Internship, as stated in Sub-Clause 2.7.1.2 above.
- 2.7.1.4. A student may opt for Internship in an Industry/Company 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 offering such Internship confirms to the University that the Internship program shall be conducted in accordance with the Program Regulations and Internship Policy of the University.
- 2.7.1.5. A student selected for an Internship in an Industry/Company shall adhere to all the rules and guidelines prescribed in the Internship Policy of the University.

2.7.2. Project Work:

A student may opt to do a Project Work in an Industry/Company/Research Laboratory or the University Department(s) subject to the following conditions:

- 2.7.2.1. The Project Work shall be approved by the concerned HOD and be carried out under the guidance of a faculty member.
- 2.7.2.2. The student may do the project work in an Industry/Company/Research Laboratory of her/his choice subject to the above mentioned condition (Sub-Clause 2.7.2.1). Provided further, that the Industry/Company/Research Laboratory 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.

2.8. Professional Practice–II

Professional Practice-II is an intensive practice based course with 15 Credits offered during the final (4th) year of the B. Tech. Program. Students may register for Professional Practice–II in the 8th Semester of the B. Tech. Program, in accordance with the following guidelines:

2.8.1. Internship Program in an Industry/Company:

A student may undergo an Internship Program for a period of about 15 weeks in an Industry/Company, subject to the following conditions:

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

- 2.8.1.2. The selection criteria (minimum CGPA, pass in all Courses as on date, any other qualifying criteria) as applicable/stipulated by the concerned Industry/Company for award of Internship to a student.
- 2.8.1.3. The number of Internships available for the concerned Academic Term: further, the available number of Internships will 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 providing the Internship, as stated in Sub-Clause 2.8.1.2 above.
- 2.8.1.4. A student may opt for Internship in an Industry/Company 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 offering such Internship confirms to the University that the Internship program shall be conducted in accordance with the Program Regulations and Internship Policy of the University.
- 2.8.1.5. A student selected/awarded an Internship Program in an Industry/Company shall adhere to all the rules and guidelines prescribed in the Internship Policy of the University.

2.8.2. Project Work with a Dissertation:

A student may do an extensive Project Work (with a Dissertation) in an Industry/Company/Research Laboratory or the University Department(s), subject to the following conditions:

- 2.8.2.1. The Project Work shall be approved by the concerned HOD and be carried out under the guidance of a faculty member.
- 2.8.2.2. The student may do the Project Work in an Industry/Company/Research Laboratory of her/his choice subject to the above mentioned condition (Sub-Clause 2.8.2.1). Provided further, that the Industry/Company/Research Laboratory 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.

2.9. Social Immersion Courses

The objective of a Social Immersion Course (SIC) is to sensitize and inculcate commitment to social and environmental issues and make a contribution through service and experiential learning. The outcome is to produce graduates who are sensitized and committed to serving the social and environmental needs of society.

The SIC is a 1-Credit Course coordinated by the Parent Department or a group of Departments and the student is required to complete this course ideally during any of the Semesters of the 2nd or 3rd Year of the B. Tech. Program. The nature and details of the SIC shall be approved by the

egistra

concerned Departmental Academic Committee (DAC). As per the Academic Regulations, the 'S' grade is awarded for "satisfactory completion" of the Course and the 'NC' grade is awarded for "non-completion" of the Course. The student who receives the 'NC' grade shall repeat the SIC (it may be another type of SIC as approved by the concerned DAC) until the concerned student secures the 'S' grade in the SIC. The 'S' and 'NC' grades do not carry grade points and, hence, are not included in the SGPA, CGPA computations.

2.10. Open Electives

Open Electives are Courses offered by any Department/School of the University. The primary objective of offering Open Electives is to provide interdisciplinary/transdisciplinary learning experiences. The outcome is a graduate with a fair exposure to disciplines beyond the chosen Branch in the B. Tech. Program.

Open Electives offered by any Department/School of the University are listed in the Course Structure under the Open Elective category and offered to students of any Department including the parent Department/School.

The Course details and method of evaluation shall be clearly prescribed in the concerned Course Handout.

2.11. Specific Regulations regarding Assessment and Evaluation

(Refer Sections 8.5 to 8.8 in the Academic Regulations, 2019)

The components of continuous assessments, weightage for each component and the method of evaluation shall be assigned considering the nature of the Courses in terms of the pedagogy and outcomes.

2.11.1. Normally, for the Courses that have only the Lecture and Tutorial or Lecture Credit Structure (L–T–0 or L–0–0), with no Practical component, the components of Continuous Assessment and the distribution of weightage

among the components of Continuous Assessment and duration of the examination/assessment shall be as detailed in Table 2.11.1 below:

	Table 2.11.1 Method of Assessmentfor Courses with Credit Structures L–T–0 and L–0–0						
S. No.	Components of Continuous Assessment	Weightage (% of Total Marks)	Duration of Assessment				
1	Mid Term Examination	30%	1.5 hours				

2	Continuous Assessment: This component of Continuous Assessment shall consist of at least two (02) of the following: (1) Assignment(s), (2) Quiz, (3) Technical Seminar/Report, (4) Attendance/Class participation, (5) Assessment on the self-learning topic(s), or, (6) Any other type of assessment as prescribed in the concerned Course Handout.	20%	NA		
3	End Term Final Examination	50%	3 hours		
	Total	100%			
 Note: (i) An additional Test 3 may be conducted as an optional test to allow for improvement with approval of the Dean, School of Engineering. If a Test 3 is provided, then the higher marks obtained in any two tests shall be considered for evaluation. (ii) Normally, the End Term Final Examination shall cover the entire course coverage as prescribed in the Course Handouts. 					

2.11.2. Normally, for Laboratory/Practice Based Courses with a Credit Structure of (0–0–P) or (L–0–P) the components of Continuous Assessment and the distribution of weightage among the components of Continuous Assessment and duration of the examination/assessment shall be as detailed in Table 2.11.2 that follows.

S. No.	Components of Continuous Assessments	Weightage (% of Total Marks)	Duration of Assessment
1	Mid Term Examination: Laboratory Work/Practical exercises, conducted in every Laboratory/Practice session/activity, including Laboratory records, practice/project reports, attendance/class participation as applicable, and as prescribed by the Course Handout.	30%	NA REGISTRAR

2	Continuous Assessment : Practical Test/Viva-Voce/Quiz/Practice Assignments/Presentations and other assessments as prescribed in the Course Handout.	20%	NA
3	End Term Practical Examination: Practical Experiment/Practice Test(s) with Viva-Voce, Jury or any other type of assessment as prescribed in the Course Handout.	50%	2 or 3 hours
	Total	100%	

- 2.11.3. Normally, for Practice/Skill based Courses, without a defined credit structure (L–T–P) but with assigned Credits (as defined in Clause 5.2 of the Academic Regulations, 2019), 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 prescribed in the concerned Course Handout. There shall be no component of End Term Final Examinations for such Courses.
- 2.11.4. In case any exception is required for a particular Course, where the methods of assessment prescribed in the specific regulations mentioned above in Sub-Clauses 2.11.1, 2.11.2 and 2.11.3 are not suitable/relevant for assessing the performance in the concerned Course, the DAC shall recommend the appropriate method of assessment for approval by the BOS.

2.12. Course Handout

The Course Handout (Refer Clause 6.2 of the Academic Regulations, 2019) is a comprehensive document describing the Objectives/Outcomes of the Course, the detailed syllabus (with the prescribed Textbook(s) and Reference Material), the Lesson/Session-wise Plan, and all the relevant and necessary details regarding the pedagogy, expectation from the students regarding preparation, participation and self-learning, components of continuous assessment and respective weightage (in percentage (%) of the total marks of all components of assessment) given to the components, and the method of evaluation. The guidelines for preparation of the Course Handout, its approval and delivery are listed in the following Sub-Clauses:

- 2.12.1. The Course Handout will be prepared as per the Outcome Based Education Guidelines of the University.
- 2.12.2. Normally, the Course Handout is prepared by the Course Instructor(s) assigned

to teach the Course. In cases of multiple sections of students registered for the same Course, an Instructor In-Charge, assigned by the DAC, shall prepare the Course Handout in consultation with the other Course Instructors assigned to the concerned Course.

- 2.12.3. The DAC shall examine each Course Handout and arrange for necessary deliberations as required. On acceptance of the completeness and quality of the Course Handout, the DAC shall approve the Course Handout.
- 2.12.4. A consolidated printed/soft copy of the Booklet of all Course Handouts corresponding to the concerned Semester of a particular Program of Study shall be provided to every student concerned on the first day/Registration day of the concerned Semester.
- 2.12.5. The Course Handout Booklet is a very important guide for the students registered in the concerned course. The students are expected to use the Course Handout Booklet to prepare regularly and benefit from each session (Lecture/Tutorial/Practical) of the Course(s) and perform well in the Continuous Assessments and End Term Final Examinations, as applicable. Every student shall read and adhere to all the guidelines prescribed in the Course Handout Booklet.

2.13. Rules and Guidelines for Transfer of Credits from Massive Open Online Courses

(Refer Section 18.0 of the Academic Regulations, 2019.)

The provisions and rules pertaining to the transfer of credits through Massive Open Online Courses are outlined in Section 18.0 of the Academic Regulations, 2019.

With reference to Clause 18.2 of the Academic Regulations, the rules and guidelines for transfer of credits specifically from Study Webs of Active-Learning for Young Aspiring Minds-National Program on Technology Enhanced Learning (SWAYAM-NPTEL) are as stated in the following Sub-Clauses:

- 2.13.1. A student may complete SWAYAM-NPTEL courses and transfer equivalent credits to partially or fully complete the mandatory credit requirements of Discipline Elective Courses and/or the mandatory credit requirements of Management Sciences Courses as prescribed in the concerned B. Tech. Program Regulations and Curriculum. However, it is the sole responsibility of the student to complete the mandatory credit requirements of the Discipline Elective Courses and the Management Sciences Courses as prescribed by the Program Regulations and Curriculum of the concerned B. Tech. Program.
- 2.13.2. Approved SWAYAM-NPTEL Courses shall be included as annexes to the Program Regulations and Curriculum for the concerned B. Tech. Program and shall be announced through University Notifications to the students from time to time. A student shall only request for transfer of credits from strend approved/notified SWAYAM-NPTEL Courses as published by the concerned Departments.

- 2.13.3. SWAYAM-NPTEL Courses are considered for transfer of credits only if the concerned student has successfully completed the SWAYAM-NPTEL Course(s) and obtained the SWAYAM-NPTEL Certificate to this effect.
- 2.13.4. A student cannot transfer credits from SWAYAM-NPTEL Courses to earn the mandatory credits assigned for any other type of Courses (other than Discipline, Open Elective Courses and Management Sciences Courses) as prescribed in the concerned Program Regulations and Curriculum. However, a student may complete SWAYAM-NPTEL Courses and transfer equivalent credits in excess of the required mandatory Credits (and Courses). In the case of such transfers beyond the mandatory Credits the transferred Credits will be included in the calculations of SGPA and CGPA.
- 2.13.5. Before the commencement of each Semester or during Pre-Registration schedule as per the Academic Calendar, Parent Departments may release a list of SWAYAM-NPTEL courses approved as Discipline Elective courses for each B. Tech. Program offered by them. In addition, Departments may also release a list of Open Elective courses offered for all B. Tech. Programs.
- 2.13.6. Students may Pre-Register for the approved SWAYAM-NPTEL Courses in the respective Departments and register for the SWAYAM-NPTEL Courses as per the schedule announced by SWAYAM-NPTEL.
- 2.13.7. The credit equivalence of the SWAYAM-NPTEL Courses are based on course durations and/or as recommended by SWAYAM-NPTEL. The Credit Equivalence mapped to SWAYAM-NPTEL course durations for transfer of credits is summarised in Table 2.13.1 below.

Table 2.13.1 SWAYAM-NPTEL Course Durations and Credit Equivalence						
S. No.	Course Duration	Credit Equivalence for Transfer of Credits				
1	4 Weeks	1 Credit				
2	8 Weeks	2 Credits				
3	12 Weeks	3 Credits				

2.13.8. A student who has successfully completed the approved SWAYAM-NPTEL Course(s) and wants to avail the provision of transfer of equivalent credits to fulfil (partially or fully) the mandatory credit requirements of the Discipline Electives and/or Open Electives and/or Management Sciences Courses as prescribed in the concerned Program Regulations and Curriculum, must submit the original SWAYAM-NPTEL Course Certificates to the Head of the Parent Department concerned, with a written request for the transfer of the equivalent credits. On verification of the SWAYAM-NPTEL Course Certificates and approval by the Head of the Department concerned, the SWAYAM-NPTEL Course(s) and equivalent Credits will be included in Course (with associated Credits) Registration of the concerned student in the

egistra

Semester immediately following the completion of the SWAYAM-NPTEL Course(s).

Table 2.13.2 Grading System for SWAYAM-NPTEL Courses						
S. No.	Final Score on the SWAYAM-NPTEL Certificate	Grade Awarded				
1	90% and above	0				
2	From 80% to 89%	A+				
3	From 70% to 79%	А				
4	From 60% to 69%	B+				
5	From 50% to 59%	В				
6	From 40% to 49%	С				

2.13.9. The grading system for such SWAYAM-NPTEL Courses with transfer of credits is specified in Table 2.13.2 below.

- 2.13.10.A student may submit a request for credit transfer from SWAYAM-NPTEL Courses before the last instruction day of the seventh (7th) Semester of the B. Tech. program as specified in the Academic Calendar. Requests for credit transfers shall not be permissible in the eighth (8th) semester.
- 2.13.11.The maximum permissible number of credits that a student may request for transfer in a Semester is ten (10) credits.
- 2.13.12.The University shall not reimburse any fees/expense, a student may incur for the SWAYAM-NPTEL Courses.



3 PART B: PROGRAM CURRICULUM

BACHELOR OF TECHNOLOGY DEGREE PROGRAM IN COMPUTER SCIENCE ANDENGINEERING B.TECH (COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)) 2020-2024

B.Tech in Computer Science and Engineering (Data Science) is a program that is offered by the Department of CSE, SOE. The faculty work with motivation and dedication to impart the best knowledge to the budding thoughts admitted in our department. A wide range of courses is offered to students to help them in the understanding of the various intricacies involved in computing. The courses are designed in a way to invoke students' ability to think originally and creatively. The faculty members of CS department are trained to produce computer engineers with the ability to design and develop systems involving the integration of software and hardware devices. The department is equipped with modern computer labs with well-trained lab assistants to empower students with a better understanding of the theory lecture sessions and to give them an exposure to practical problem solving.

The program will also prepare students for postgraduate studies and helps in cracking different national and international aptitude tests for getting admission to IITs, NITs as well as different top ranked Universities in countries like USA, Australia, Singapore and Europe. The students are encouraged to take online courses, from SWAYAM, NPTEL at national level and MOOCs from Harvard, MIT, Microsoft and other top universities and institutions across the World. The program also includes value added courses like SIC and NSS activities that help the students to build moral and ethical standards and also to inherit qualities such as integrity, transparency, respect, professionalism and teamwork.

The Program Educational Objectives, Program Outcomes, Program Specific Outcomes and Learning Objectives of the B.Tech. Program in Computer Science and Engineering (Data Science) at Presidency University are as follows.

Program Educational Objectives (PEO)

After the completion of B.Tech. Program in Computer Science and Engineering (Data Science) from Presidency University, the graduates shall:

- **PEO-1** :Demonstrate as a Computer Engineering Professional in Data Science.
- **PEO-2** :Engage in lifelong learning through research and professional development.

PEO-3 :Serve as a leader in the profession through consultancy, extension activities and/ or entrepreneurship.

Program Outcomes (PO)

Graduates of the B. Tech. Program in Computer Science and Engineering (Data Science) will acquire:

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 analyze 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.

Program Specific Outcomes (PSO)

At the end of the B. Tech. Program in Computer Science and Engineering (Data Science) the students shall:

PSO 01: [**Problem Analysis**]: Identify, formulate, research literature, and analyze complex engineering problems related to Data Science principles and practices, Programming and Computing technologies reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PSO 02: [Design/development of Solutions]: Design solutions for complex engineering problems related to Data Science principles and practices, Programming and Computing technologies and design system components or processes that meet t h e specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PSO 03: [Modern Tool usage] : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering

activities related to Data Science principles and practices, Programming and Computing technologies with an understanding of the limitations

Learning Outcome (LO)

LO1: To gain recognition as a Department of Excellence.

LO2: To provide opportunity to students to excel in curricular, extra-curricular and co-curricular activities.

LO3: To provide students an environment of innovation and train students to pursue research.

LO4: To equip students to face societal challenges.

PROGRAM CURRICULUM

3.1.1 Mandatory Courses and Credits

The B.Tech (Computer Science and Engineering (Data Science)) Program structure (2020-2024) consists of a minimum of 61 Courses totaling 182 Credits.

Table 3.1.1 summarizes the type of Courses, number of Courses under each type and the associated Credits that are mandatorily required for the completion of the Degree.

3.1.1.1 Students have an option of obtaining a specialization in any of the prescribed minors by earning 15 credits from the Course Basket listed under that particular minor within the Discipline Elective Courses.

TABLE 3.1.1Courses and Credits					
S. No.	TYPE OF COURSES	NO. OF COURSES	CREDITS		
1	Humanities (HS)	3	6		
2	Management Sciences (MS)	2	6		
3	Basic Sciences (BS)	8	24		
4	Engineering Sciences (ES)	8	24		
5	Core (Professional) Course (CC)	20	63		
6	Discipline (Professional) Elective (DE)	10	REASTRAR		

7	Open Elective (OE)	3	9			
8	Professional Practice (PP)	2	20			
9	Personal and Professional Skills (PPS) (Compulsory to be audited.)	4	0			
10	Social Immersion Course (SIC)	1	0			
	TOTAL	Minimum of 61	182			
Th	The mandatory minimum Credits required for the award of the Degree is 182 Credits.					

The Table 3.1.1 is indicative of various components such as Foundation Courses (Basic Sciences, Engineering Sciences, Humanities, Social Sciences and Management Sciences), Professional Core, Discipline and Open Elective Courses. The unique feature of this Program is Professional Practice - I of 6-8 weeks during the end of 4th Semester and before the commencement of 5th Semester for the student to have industry exposure. The Professional Practice - II will be during their 7th / 8th Semester for about 15 weeks. Social Immersion Course, which is mandatory, is introduced in the curriculum for the student to give value of social service such as community service, clean and green, NSS, Protection of environment and health hazards, etc.

Table 3.1.1 lists the mandatory Courses, type of Courses, number of type of Courses and the associated credits required for the completion of the B.Tech (Computer Science and Engineering (Data Science)) Program.



Fir	rst Year	Second		Second Year		Third	l Year		Fourth	Year
Physics Cycle Sem. 1/2	Chemistry Cycle Sem. 1/2		Sem.3	Sem 4	Γc	Sem 5	Sem 6		Sem 7	Sem 8
BS-3	BS-4	Summer Term	MAT – BS- 1	Mat - BS 1	Term/PP-I	OE -1 DE -1 MS-1	DE -4 MS-1 OE-1	Summer Term	DE-4 OE-1 Core-	РР- 1
ES-4	ES-3	Summ	OE 1 PPS1 Core 4	DE 2 Core – 5 PPS-1	Summer	PP-1 SIC -	Core- 2	Summ	2	
HS-2	HS-1		Cole 4	FF5-1	01	Core- 3				
PPS-1	PPS-1									

3.1.2 B. Tech. (Computer Science and Engineering (Data Science)) Program Suggested Year Wise Structure

Mandatory Minimum Credits required for the award of the B.Tech (Computer Science and Engineering (Data Science)) Degree: 182

Nomenclature:

- **BS** Basic Sciences
- **ES** Engineering Sciences
- HS Humanities
- MS Management Sciences
- CC Core Course
- DE Discipline/Professional Electives
- **OE** Open Electives
- PP-I/PP-II Professional Practice
- PPS Personal and Professional Skills
- SIC Social Immersion Course

In the entire Program, the practical and skill based Course component contribute to an extent of approximately 30% out of the total credits of 182 for B.Tech (Computer Science and Engineering (Data Science)) Program of four years duration.

REGISTRAR

3.2 SUGGESTED PROGRAM STRU	JCTURE

		I SEM - PHY	SICS	S CY	'CL	E (Aug-De	c)*		
S.	COURS				REI UC'	DIT FURE	CONTA	TYPE OF	COUR SE
NO	E CODE	COURSE NAME	L	Т	Р	CREDI TS	CT HOURS	SKILL	ADDR ESSES TO
1	MAT 105	Calculus and Linear Algebra	3	1	0	4	4	\mathbf{F}^{1}	-
2	PHY 101	Engineering Physics	4	0	0	4	4	F	-
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3	P ²	-
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3	Р	Env ⁴
5	MEC 152	Engineering Graphics	2	0	4	4	6	Р	-
6	ENG 103	Technical Written Communication	2	1	0	3	3	F/E ³	-
7	KAN 101	Kannada Kali	1	0	0	1	1	F	-
8	PHY 151	Engineering Physics Lab	0	0	2	1	2	F	-
9	MEC 151	Workshop Practice	0	0	2	1	2	Р	-
10	PPS 105	Building Self Confidence	0	0	2	0	2	Е	-
		TOTAL	18	2	8	24	30		
	ndation Cou fessional Sk					mployabili nvironmen	•		0

anne REGISTRAR

		I SEM - CHEM	IIST	RY	CY	CLE (Aug-	Dec)#		
S.	COURSE	COURSE NAME				CDIT CTURE	CONTACT HOURS	TYPE OF	
NO.	CODE		L	Т	Р	CREDITS	nouks	SKILL	ADDRESSES TO
1	MAT 105	Calculus and Linear Algebra	3	1	0	4	4	F	-
2	CHE 101	Engineering Chemistry	4	0	0	4	4	F	-
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3	Р	-
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	Р	-
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG 104	Technical Spoken Communication	1	0	2	2	3	Е	-
7	CSE 151	Computer Programming	2	0	4	4	6	E	-
8	CHE 151	Engineering Chemistry Lab	0	0	2	1	2	F	-
9	PPS 105	Building Self Confidence	0	0	2	0	2	F	PE ⁵ /S ⁶
		TOTAL	1 9	1	8	24	30		
	fessional Ethi ainability Iss								
		II SEM - CHEM	IST	RY	CYC	CLE (Jan-N	1ay)#		
S. NO.	COURSE CODE	COURSE NAME				DIT TURE	CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
NO.	CODE		L	Т	Р	CREDITS	noons	SKILL	ADDRESSES TO
1	MAT 106	Calculus, Differential Equations and Complex Variables	3	1	0	4	4	F	-
2	CHE 101	Engineering Chemistry	4	0	0	4	4	F	-
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3	Ρ	0
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	Р	REGISTRA

5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG 104	Technical Spoken Communication	1	0	2	2	3	Е	-
7	CSE 151	Computer Programming	2	0	4	4	6	E	-
8	CHE 151	Engineering Chemistry Lab	0	0	2	1	2	F	-
9	PPS 106	Effective Communication	0	0	2	0	2	E	-
		TOTAL	1 9	1	8	24	30		

		II SEM - Pl	HYSI	CS	CYC	CLE (Jan-May) *			
S.	COURSE	COURSE NAME	(CRE	DIT	STRUCTURE	CONT ACT HOUR	TYPE OF SKILL	COURSE ADDRESSE
NO.	CODE		L	Т	Р	CREDITS	S		S TO
1	MAT 106	Calculus, Differential Equations and Complex Variables	3	1	0	4	4	F ¹	-
2	PHY 101	Engineering Physics	4	0	0	4	4	F	-
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3	P ²	-
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3	Ρ	Env
5	MEC 152	Engineering Graphics	2	0	4	4	6	Р	-
6	ENG 103	Technical Written Communication	2	1	0	3	3	F/E ³	-
7	KAN 101	Kannada Kali	1	0	0	1	1	F	-
8	PHY 151	Engineering Physics Lab	0	0	2	1	2	F	-
9	MEC 151	Workshop Practice	0	0	2	1	2	Р	-
10	PPS 106	Effective Communication	0	0	2	0	2	E	-
		TOTAL	18	2	8	24	30	0	
							1	0	ALULLA ENCY

Note: At the end of the 1st year (Common to all B. Tech. Programs) the total credits offered is 48.

REGISTRAR

egisti

The 1st year B. Tech Program structure is executed in two cycles.

The students undergoing the "Physics" cycle shall take the Courses as indicated.



Page **28** of **156**

 $^{^{\#}}$ The students undergoing "Chemistry" cycle shall take the Courses as indicated

		III SEMES	TER					
S.No.	COURSE CODE	COURSE NAME		CR STRU	EDIT CTUR	E	CONTACT HOURS	TYPE OF
			L	Т	Р	С		SKILL
1	MAT2001	Transform Techniques and Partial Differential Equations	3	0	0	3	3	F
2	CSE2006	Data Structures	3	0	2	4	5	S
3	CSE2009	Computer Organization and Architecture	3	0	0	3	3	S
4	CSE2017	Graph Theory and Combinatory	3	0	0	3	3	S
5	XXXXXXX	Open Elective – I	3	0	0	3	3	P/E
6	PPS107	Design Thinking and Team Building	0	0	2	0	2	Е
7	CSE2008	Programming in Java	1	0	4	3	5	S
8	CSEXXXX	Discipline Elective – I	3	0	0	3	3	S/EM
		TOTAL	19	0	8	22	27	

*Student has to register for Social Immersion Course in any one semester 3/4/6 to earn the mandatory credits



PU/AC-20.3/SOCSE01/CSD/2020-2024

		IV SEMEST	ſER					
S.No.	COURSE CODE	COURSE NAME		CRI STRU	EDIT CTUR	E	CONTACT HOURS	TYPE OF
			L	Т	Р	С		SKILL
1	MAT2002	Numerical Methods, Probability and Sampling Techniques	3	0	0	3	3	F
2	CSE 2007	Design and Analysis of Algorithms	2	0	2	3	4	S
3	ECE2002	Digital Electronics	3	0	2	4	5	S
4	CSE 2010	Operating Systems	3	0	0	3	3	S
5	CSE 2012	Database Management Systems	2	0	4	4	6	S
6	CSE 2016	Discrete Mathematical Structures	3	0	0	3	3	S
7	XXXXXX	Open Elective – II	3	0	0	3	3	P/E
8	PPS108	Being Corporate Ready	0	0	2	0	2	Е
		TOTAL	19	0	10	23	29	



		V SEMESTER						
S. No.	COURSE	COURSE NAME	CF	REDIT	г ѕтғ	RUCTURE	CONTAC	TYPE OF
	CODE		L	Т	Р	CREDITS	T HOURS	SKILL
1	CSE2026	Data Handling and Visualization	2	0	2	3	4	S
2	CSE 2014	Software Engineering	3	0	0	3	3	S
3	CSE2011	Data Communications and Networking	3	0	0	3	3	S
4	CSE2018	Theory of computation	3	0	0	3	3	S
5	CSE3001	Artificial Intelligence and Machine Learning	2	0	2	3	4	S/EM
6	CSE2067	Web Technologies	2	0	2	3	4	S
7	MGT112/ MGT113	Engineering Economic/ Digital Entrepreneurship	3	0	0	3	3	S/EM/E N
8	CSEXXXX	Discipline Elective-II	3	0	0	3	3	S/EM
<mark>9</mark>	PIP101	Professional Practice - I	-	-	-	<mark>5</mark>	<mark>0</mark>	<mark>P/E</mark>
		TOTAL	21	0	6	29	27	



		VI SEMES	TER					
S. No.	COURSE CODE	COURSE NAME	CR	EDIT S	STRUC	TURE	CONTA CT	TYPE OF
1	1	'	L	Т	Р	С	HOURS	SKILL
1	CSE 2013	Cloud computing	3	0	0	3	3	EM
2	CSE 3039	Social Media Analytics	2	0	2	3	4	S
3	CSE3035	R programming for Data Science	1	0	4	3	5	S
4	CSE3036	Predictive Analytics	2	0	2	3	4	S
5	CSE3037	Optimization for Data Science	2	0	2	3	4	S
6	CSEXXXX	Discipline Elective – III	3	0	0	3	3	S/EM
7	CSEXXXX	Discipline Elective – IV	3	0	0	3	3	S/EM
8	MGT112/MG T113	Engineering Economic/ Digital Entrepreneurship	3	0	0	3	3	S/EM/E N
9	SIC 501	Social Immersion Course	0	0	0	0	0	Р
		TOTAL	19	0	10	24	29	



PU/AC-20.3/SOCSE01/CSD/2020-2024

		VII SEME	STER					
S.No.	COURSE CODE	COURSE NAME	s	CRE TRU(EDIT CTUI		CONTACT HOURS	TYPE OF SKILL
			L	Т	Р	С	1	·
1	CSEXXXX	Discipline Elective – V	3	0	0	3	3	S/EM
2	CSEXXXX	Discipline Elective – VI	3	0	0	3	3	S/EM
3	CSEXXXX	Discipline Elective – VII	3	0	0	3	3	S/EM
4	CSEXXXX	Discipline Elective – VIII	3	0	0	3	3	S/EM
5	CSEXXXX	Discipline Elective – IX	3	0	0	3	3	S/EM
6	CSEXXXX	Discipline Elective – X	3	0	0	3	3	S/EM
7	XXX XXXX	Open Elective – III	3	0	0	3	3	P/E
		TOTAL	18	0	0	21	21	

		VIII SEME	STER					
S.No.	COURSE CODE	COURSE NAME		CRI STRU	EDIT CTUR	E	CONTACT HOURS	TYPE OF
			L	Т	Р	С		SKILL
<mark>1</mark>	PIP 102	Professional Practice- II	-	-	ł	<mark>15</mark>	0	P/E
		TOTAL	0	0	0	15	0	

ame REGISTRAR

		TABLE — 3.	2.1					
		LIST OF MANAGEMENT SC	IENC	CES CO	URS	ES		
S.NO	COURSE CODE	COURSE NAME	L	Т	Р	С	CONTACT HOURS	TYPE OF SKILL
1	MGT112	Engineering Economics	3	0	0	3	3	S/EM/E N
2	MGT113	Digital Entrepreneurship	3	0	0	3	3	S



Page **34** of **156**

PU/AC-20.3/SOCSE01/CSD/2020-2024

			Table 3	3.2.2				
		DISC	PLINE	ELECT	IVE			
S.NO	COURSE CODE	COURSE NAME	L	Т	Р	С	CONTAC T HOURS	TYPE OF SKILL
1	CSE2027	Fundamentals of Data Analysis	3	0	0	3	3	S/EM
2	CSE3082	Object Oriented Analysis and Design	3	0	0	3	3	S/EM
3	CSE2021	Data Mining	3	0	0	3	3	S/EM
4	CSE3073	Game Design and Development	3	0	0	3	3	S/EM
5	CSE3086	Information Theory and Coding	3	0	0	3	3	S/EM
6	CSE3146	Advanced Java Programming	1	0	4	3	5	S/EM
7	CSE2036	Programming in C++	1	0	4	3	5	S/EM
8	CSE3068	Advanced Database Management Systems	2	0	2	3	4	S
9	CSE3069	Introduction to Bioinformatics	3	0	0	3	3	F
10	CSE3070	Advanced Computer Networks	3	0	0	3	3	S/ EM
11	CSE3071	Computer Vision	2	0	2	3	3	F
12	CSE3072	Wireless Sensor Networks	3	0	0	3	3	S/EM
13	CSE3073	Game Design and Development	3	0	0	3	3	S
14	CSE3074	Microprocessors and Microcontrollers	3	0	0	3	3	S/EM
15	CSE3075	Mobile Application Development	1	0	4	3	5	S/EM/EN
16	CSE3077	Compiler Design	2	0	2	3	4	S/EM/EN
17	CSE3150	Front End Full Stack Development	2	0	2	3	4	EM
18	CSE3151	Java Full Stack Development	2	0	2	3	4	FREATISTRAF

19	CSE3152	.Net Full Stack Development	2	0	2	3	4	EM
20	CSE2033	Go Programming	3	0	0	3	3	S/EM
21	CSE2039	Ethical Hacking	2	0	2	3	4	S/EM
22	CSE2024	NOSQL	2	0	2	3	4	S/EM
23	CSE3050	Software Project Management	3	0	0	3	3	S/EM
24	CSE3022	Cryptocurrency	2	0	2	3	4	S/EM
25	CSE3075	Mobile Application Development	1	0	4	3	5	S/EM
26	CSE2037	Cyber Forensics	2	0	2	3	4	S/EM
27	CSE3046	DevOpsTools Internals	2	0	2	3	4	S/EM

	Table 3.2.3										
OPEN ELECTIVES OFFERED											
S.NO	COURSE CODE	COURSE NAME	L	Т	Р	С	CONTAC T HOURS	TYPE OF SKILL			
1	ECE1004	Microprocessor based Systems	3	0	0	3	3				
2	CIV 1001	Disaster Management & Mitigation (DM&M)	3	0	0	3	3				
3	CIV 2002	Occupational Health & Safety (OH&S)	3	0	0	3	3				
4	CIV 2001	Sustainaibility Concepts in Engineering (SCE)	3	0	0	3	3				
5	CIV 2004	Integrated Project Management (IPM)	3	0	0	3	3				
6	CIV 383	Infrastructure Systems for Smart Cities (ISSC)	3	0	0	3	3				
7	PET 2025	Oil and Gas Quality Management (O&GQM)	3	0	0	3	3	0			
8	PET 2028	Petroleum Economics (PE)	3	0	0	3	3	REGISTRAR			

gistra

		-						
9	PET 2023	Petroleum Corrosion Technology (PCT)	3	0	0	3	3	
10	PET 2026	Health, Safety and Environment (HS&E)	3	0	0	3	3	
11	EEE 1003	Basic Circuit Analysis using NI LAB view (BCA- NI LAB)	3	0	0	3	3	
12	EEE 1004	Automation and Control in Industries using PLC Programming (A&CI- PLC)	3	0	0	3	3	
13	CHE1011	Chemical and Petrochemical catalysts (C&PC)	3	0	0	3	3	
14	CHE1009	3D printing with polymer (3DPP)	3	0	0	3	3	
15	CHE1015	Waste to fuel (WTF)	3	0	0	3	3	
16	CHE1008	Energy and Sustainability (E&S)	3	0	0	3	3	
17	MEC1001	Fundamentals of Automobile Engineering (FAUE)	3	0	0	3	3	
18	MEC1002	Introduction to Matlab and Simulink (IM&S)	3	0	0	3	3	
19	MEC1003	Engineering Drawing (ED)	3	0	0	3	3	
20	MEC2001	Renewable Energy Systems (RES)	3	0	0	3	3	
21	MEC2002	Operations Research & Management (OR&M)	3	0	0	3	3	
22	MEC2003	Supply Chain Management (SCM)	3	0	0	3	3	
24	MEC2004	Six Sigma for Professionals (SSP)	3	0	0	3	3	0
25	MEC2005	Fundamentals of Aerospace Engineering (FAE)	3	0	0	3	3	REGISTRAR

gistr

26	MEC2006	Safety Engineering (SE)	3	0	0	3	3	
27	MEC2007	Additive Manufacturing (AM)	3	0	0	3	3	
28	MEC3001	Electric Vehicles & Battery Technology (EV&BT)	3	0	0	3	3	
29	MEC3069	Engineering Optimisation (EO)	3	0	0	3	3	
30	MEC3070	Electronics Waste Management (EWM)	3	0	0	3	3	
31	MEC3071	Hybrid Electric Vehicle Design (HEVD)	3	0	0	3	3	
32	MEC3072	Thermal Management of Electronic Appliances (TMEA)	3	0	0	3	3	
33	CIV 280	Environmental Impact Assessment (EIA)	3	0	0	3	3	
34	CIV 2044	Geospatial Applications for Engineers (GAE)	3	0	0	3	3	
35	CIV 382	Systems Design for Environment and Sustainability (SDES)	3	0	0	3	3	
36	CIV 383	Infrastructure Systems for Smart Cities (ISSC)	3	0	0	3	3	
37	CIV 1001	Disaster Management & Mitigation (DM&M)	3	0	0	3	3	
38	CIV 2004	Integrated Project Management (IPM)	3	0	0	3	3	
39	CIV 2002	Occupational Health & Safety (OH&S)	3	0	0	3	3	
40	PET 406	Polymer Technology (PT)	3	0	0	3	3	
41	PET 408	Oil and Gas Transportation and Marketing (O>&M)	3	0	0	3	3	Janue
42	PET 409	Material Science and Engineering (MS&E)	3	0	0	3	3	REGISTRAR

43	EEE 221	Energy Audit (EA)	3	0	0	3	3	
44	EEE 223	Smart Grid Technology (SGT)	3	0	0	3	3	
45	MEC 102	Automotive Vehicles (AV)	3	0	0	3	3	
46	MEC 103	Nanotechnology (NT)	3	0	0	3	3	
47	MEC 328	Engineering Optimisation (EO)	3	0	0	3	3	
48	MEC 329	Operations Research for Engineers (ORE)	3	0	0	3	3	
49	MEC 104	Operations Management (OM)	3	0	0	3	3	
50	MEC 105	Work Study (WS)	3	0	0	3	3	
51	MEC 106	Project Management (PM)	3	0	0	3	3	
52	MEC 107	Organizational Behaviour (OB)	3	0	0	3	3	
53	MEC 330	Renewable Energy Systems (RES)	3	0	0	3	3	
54	MEC 331	Design of Automatic Control Systems (DACS)	3	0	0	3	3	
55	ECE295	Artificial Neural Networks (ANN)	3	0	0	3	3	
56	ECE 297	IOT: Internet of Things (IOT)	3	0	0	3	3	
57	ECE 299	Computational Intelligence and Machine Learning (CI&ML)	3	0	0	3	3	
58	ENG1012	Gender and Society in India - (G&S)	3	0	0	3	3	
59	ENG1008	Indian Literature - (IL)	3	0	0	3	3	
60	ENG1013	Indian English Drama - (IED)	3	0	0	3	3	Jame
61	CIV1001	Disaster mitigation and management - (DM&M)	3	0	0	3	3	REGISTRAR

								T
62	CIV1002	Environment Science and Disaster Management - (ESDM)	3	0	0	3	3	
63	CIV2001	Sustainability Concepts in Engineering - (SCE)	3	0	0	3	3	
64	CIV2002	Occupational Health and Safety - (OH&S)	3	0	0	3	3	
65	CIV2003	Sustainable Materials and Green Buildings - (SM&GB)	3	0	0	3	3	
66	CIV2005	Environmental Impact Assessment - (EIA)	3	0	0	3	3	
67	EEE1006	Smart Sensors for Engineering Applications - (SSEA)	3	0	0	3	3	
68	MEC 2005	Fundamentals of Aerospace Engineering - (FAE)	3	0	0	3	3	
69	MEC 1001	Fundamentals of Automobile Engineering - (FAUE)	3	0	0	3	3	
70	MEC 1003	Electronic Waste Management - (EWM)	3	0	0	3	3	
71	MEC 3070	Engineering Drawing - (ED)	3	0	0	3	3	
72	MEC 1005	Workshop Practice - (WSP)	3	0	0	3	3	
73	MEC2001	Renewable Energy Systems - (RES)	3	0	0	3	3	
74	CHE1013	Chemistry for engineers - (CFE)	3	0	0	3	3	
75	CHE1006	Introduction to Nano technology - (INT)	3	0	0	3	3	
76	CHE1004	Smart materials for IOT - (SMFI)	3	0	0	3	3	
77	CHE1014	Surface coatings technology and corrosion Science - (SCT&CS)	3	0	0	3	3	Jan
78	CHE1010	Bioinformatics - (BI)	3	0	0	3	3	REGISTRAR

				-				
79	CHE1008	Energy and sustainability - (E&S)	3	0	0	3	3	
80	COM 2004	Introduction to Banking - (ItoB)	3	0	0	3	3	
81	COM 2001	Introduction to Human Resource Management - (IHRM)	3	0	0	3	3	
82	PET1006	Overview of Energy Industry - (OEI)	3	0	0	3	3	
83	PET1005	Geology for Engineers - (GFE)	3	0	0	3	3	
84	ECE1004	Microprocessor Based Systems - (MBS)	3	0	0	3	3	
85	ECE1005	Fundamentals of Communication Systems - (FCS)	3	0	0	3	3	
86	MBA1004	Essentials of Leadership - (EL)	3	0	0	3	3	
87	DES2001	Design Thinking - (DT)	3	0	0	3	3	
88	DES1121	Introduction to UX Design - (IUXD)	3	0	0	3	3	
89	DES1122	Introduction to Jewellery Making - (IJM)	3	0	0	3	3	
90	DES1123	Introduction to packaging Design - (IPD)	3	0	0	3	3	
91	DES1124	Spatial Stories - (SS)	3	0	0	3	3	
92	DES1125	Wonder clay - (WC)	3	0	0	3	3	

anne REGISTRAR

3.3 COURSE DESCRIPTION AND SYLLABUS

Course Name:	Calculus and Linear Algebra					
Course Code:	MAT 105	Credit Structure :	L	Т	Р	С
Course Coue:		Crean Structure :	3	1	0	4

Course Description: This course aims to introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions. Also introduces the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems. Develops the tool of power series and Fourier series for learning advanced Engineering Mathematics. Familiarize the student with functions of several variables that is essential in most branches of engineering and develop the essential tool of matrices and linear algebra in a comprehensive manner.

Textbooks:

1. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 9th Edition, John Wiley & Sons, 2006. Reference Books:

- 2. B. S. Grewal, 'Higher Engineering Mathematics", Khanna Publishers, 36th Edition 2010.
- 3. Cengage, Mathematics I (Calculus & Linear Algebra), ITL Education Solutions Ltd., 2018.



Course Name:	Engineering Physics					
Course Code:	PHY 101	Credit Structure :	L	Т	Р	С
Course Coue:		Creun Structure :	4	0	0	4

Course Description: The main objective of this course is to study the basic concepts of physics that helps developing the ability to identify, formulate and apply to engineering applications. This course covers the areas, namely, applied physics and modern physics. The course includes the concepts of free electron theory, electrical properties and applications of contemporary and useful materials such as semiconductors, superconductors and dielectric materials are discussed in detailed manner. It also emphasizes on modern concepts such as the concepts of lasers and its applications in the field of optical fiber communication system and other areas. Finally, the need of quantum mechanics, the quantum approach concepts like, matter waves, Heisenberg's uncertainty principle, Schrodinger's time independent equation and application of Schrodinger's wave equation are discussed.

Textbooks:

1. Wiley, Engineering Physics, 2014 Wiley India.

- 1. G Aruldhas, Engineering Physics, 2014 PHI Learning Pvt. Ltd, Delhi.
- 2. M.N Avadhanulu, P G Kshirsagar, Engineering Physics, 2010 S Chand & Co. Pvt. Ltd.
- 3. Md. N. Khan, S Panigrahi, Principles of Engineering Physics 1 & 2, 2014 Cambridge Univ. Press.
- **4.** Serway Raymond and Jewett John, *Physics for Scientists and Engineers with Modern Physics*, 2003 Cengage.
- 5. Arthur and Beiser Concepts of Modern physics 2017 7th Edition McGraw Hill Education.



Course Name:	Elements of Electrical Engineering							
Course Code	EEE 101	Credit Structure :	L	Т	Р	С		
Course Code:	EEE 101	Creun structure :	3	0	0	3		

Course Description: The course aims at nurturing the students with the significance of Electrical Engineering. The course provides exhaustive knowledge about the basic laws of electrical sciences, AC/ DC circuit analysis, AC & DC machines. It also includes Measuring Instruments, Earthing, Electrical wiring and safety measures.

Textbook:

1. John Hiley, Keith Brown and Ian McKenzie Smith, "Hughes Electrical and Electronic Technology", Pearson.

- 1. K Uma Rao and A Jayalakshmi, "*Basic Electrical Engineering*" 2016 Revised Edition, I K International Publishing House Pvt. Ltd.
- 2. D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education.
- 3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI.



Course Name:	Elements of Civil Engineering					
Course Code:	CIV 101	Credit Structure :	L	Т	Р	С
Course Coue:		Crean Structure :	3	0	0	3

Course Description: The objective of this Course is to make students learn the basics of Civil Engineering concepts, role of civil engineers, infrastructure development, sustainability, and solve problems involving forces, loads and moments and know their applications in allied subjects. It is a pre-requisite for several Courses involving Forces and Moments.

The students should have a prior knowledge of basic mathematics and physics to pursue the Course. The Course consists of an introduction of civil engineering through an exposition of its disciplines, types of Infrastructure, different types of construction materials, composition of forces, concepts of resultants and equilibrium of forces.

After successful completion of the Course, the students would acquire knowledge on the basics of Civil Engineering, its scope of study, knowledge about green buildings, roads, airports, bridges and dams. They would be able to comprehend the action of Forces, Moments and other loads on systems of rigid bodies; Compute the reactive forces and the effects that develop as a result of the external loads.

Textbooks:

- 1. M.N. Shesha Prakash, Ganesh B. Mogaveer, "Elements of Civil Engineering and Engineering Mechanics", PHI Learning.
- 2. Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das, "Elements of Civil Engineering", PHI Learning Pvt Ltd.

- 3. Shrikrishna A Dhale and Kiran M Tajne, "Basics of Civil Engineering", S Chand Publication.
- 4. S. S. Bhavikatti, "Basic Civil Engineering", New Age International Publication
- 5. Satheesh Gopi, "Basic Civil Engineering", Pearson Publication



Course Name:	Engineering Graphics					
Course Code:	MEC 152		L	Т	Р	С
Course Coue:	MIEC 152	Credit Structure :	2	0	4	4

Course Description: The course is designed with the objective of giving an overview of engineering drawing with the help of software tools. It is introductory in nature and acquaints the students with the techniques used to create engineering drawings with computerised drafting tools. Computerised drafting provides accurate and easily modifiable graphic entities, easy data storage, easy retrieval facility and it enhances creativity. It will expose students to the concept of engineering drawing and teach them to draw different views of planes and solids in different orientations.

The course will teach students to use AutoCAD to produce engineering drawings. They will learn to create drawing layouts, dimensioning, the theory of projection, orthographic projection of points, lines, planes and solids, isometric projection and be introduced to the development of surfaces.

Textbook:

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

Reference Books:

1. D. A. Jolhe, "Engineering Drawing: With an Introduction to AutoCAD," Tata McGraw Hill.

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

Course Material:

"Engineering Graphics Lab Manual," Presidency University



Course Name:	Technical Written Communication							
Course Code:	ENG 103	Credit Structure :	L	Т	Р	С		
			2	1	0	3		

Course Description: A course on Technical Written Communication facilitates writing skills; letters, emails, notice, agenda, minutes of the meeting, reports, etc. The course will train the students to write better English and face the corporate wold with determination and self belief. The course includes theoretical session on communication, reading and writing skill with special emphasis on letters, emails and reports. Practical sessions in form of tutorials will help the students to practice vocabulary, reading, common errors, sentence transformations, etc.

- 6. Greg Satell. "Why Communication is Today's Most Important Skill." FORBES. Feb 6, 2015.
- 7. Bacon, Francis. "Of Studies." Selected Writings of Francis Bacon. Ed. Hugh G. Dick. New York. Random House, 1955. P. 22.
- 8. Bovee, Courtland L. Thill, John V, Chatterjee. Abha. *Business Communication Today*. 10th Edition. Pearson.
- 9. Raman, Meenakshi. Sharma, Sangeetha. *Technical Communication: Principles and Practice*. Oxford University Press, New Delhi. 2015.
- 10.Hart, Steve. Nari, Aravind R. and Bhambhani, Veena. Embark: *English for Undergraduates*. New Delhi; Cambridge University Press, 2016.
- 11. Online Resources: a. Globarena Online Language Learning Software



Course Name:	Engineering Physics Lab					
Course Code:	РНҮ 151	Credit Structure .	L	Т	Р	С
		Credit Structure :	0	0	2	1

Course Description: This Course includes the laboratory sessions on determination of the wave length of Laser, rigidity modulus, Planck's constant, dielectric constant, radius of curvature by Newton's rings, calculation of Numerical Aperture, Resistivity by four probe method, Fermi energy of copper and acceleration due to gravity by simple pendulum. It also includes experiments on characteristics of Zener diode.

Course Material: "Engineering Physics Lab manual" Presidency University (2020-21).



Course Name:	Workshop Practice					
Course Code: MEC 151	MEC 151	Credit Structure :	L T	Р	С	
	Credit Structure :	0	0	2	1	

Course Description: The primary objective of this course is to expose students to the basic skills in handling various tools in a workshop and cover some of the processes used for converting raw materials to finished products.

The course involves a hands on approach to fitting of metal components, concept of development of surfaces through sheet metal work, usage of engineering measurement devices, metal joining by arc welding, and an introduction to plumbing and electrical connections.

Course Material:

"Engineering Workshop Lab Manual," Presidency University, 2017-18.

Reference Books:

1. B. S. Nagendra Parashar, R. K. Mittal, "Elements of Manufacturing Processes," Prentice Hall of India.

2. S. K. Hajra Choudhury, "Elements of Workshop Technology - Volume I - Manufacturing Processes," Media Promoters and Publishers Pvt. Ltd.



Course Name:	Calculus, Differential H	Calculus, Differential Equations and Complex Variables							
Course Code: M	MAT 106	Credit Structure :	L T	Р	С				
	MAT 100	Crean Structure :	3	1	0	4			

Course Description: This course aims to acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage. Also to introduce effective mathematical tools for the solutions of differential equations that model physical processes and introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.

Textbooks:

4. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & Sons, 2006.

- 5. B. S. Grewal, 'Higher Engineering Mathematics'', Khanna Publishers, 44th Edition, 2007.
- 6. Cengage, Mathematics II (Calculus, Ordinary Differential Equations & Complex Variables), ITL Education Solutions Ltd., 2018.



Course Name:	Transform Techniques and Partial	Transform Techniques and Partial Differential Equations						
Course Codor	MAT 2001	Cradit Structure .	L	Т	Р	С		
Course Code:	MAT 2001	Credit Structure :	3	0	0	3		

Course Description: This course aims to introduce Fourier transform, z-transform and Laplace transform. The topics include the applications of Laplace transform in LCR circuits and solution of difference equations using z-transform. This course is commonly designed for all engineering branches and the contents learned in the previous semester are the prerequisite for this course. Solution of second and higher order, linear ordinary differential equations with constant and variable coefficients. Formation of Partial Differential Equations (PDE), solution of homogeneous and non-homogeneous PDEs and the application of PDEs. Laplace transforms of functions and properties; Laplace transform of periodic and unit step functions. Inverse Laplace Transforms, Application of Laplace transforms and solution of differential equations.

The course aims at introducing students to quantitative uncertainty analysis and risk assessment for engineering applications. Probability theory is of great use in understanding and modeling phenomena that exhibit random behavior and the emphasis is on real-world applications to engineering problems. The topics covered include basic concepts of probability and conditional probability, Baye's law and correlation analysis, Linear Regression and method of least square.

Textbooks:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons (India), 2014.

2. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, 2014.

Reference Books:

1. Peter V. O'Neil, Advanced Engineering Mathematics, 7th Edition, Cengage Learning, 2012.

2. Ronald E. Walpole, Raymond H. Myers & Sharon L. Myers, "Probability & Statistics for Engineers & Scientists", Ninth Edition.



Course Name:	Numerical Methods, Probability Di	stributions and Samplin	ig Te	chniq	lues	
Comme Contra	CSE2002		L	Т	Р	С
Course Code:	CSE2002 Credit Structure :	3	0	0	3	

Course Description: The objective of Engineering Mathematics – IV is to equip the students with adequate knowledge of basic mathematics that will enable them in formulating problems and solving them analytically as well as numerically in their Engineering programme. The course enables students to incorporate the knowledge of complex variables and their significance in engineering, Numerical methods and sampling theory to support their concurrent, subsequent engineering studies to explore complex systems, physicists, engineers and mathematicians require computational methods since mathematical models are rarely solvable analytically. This course provides an introduction to basic numerical methods such as fitting of various curves, interpolation, differentiation, integration. This course also provides an introduction to numerical solution of algebraic and transcendental equations, ordinary differential equations such as Taylor's series method, modified Euler's method and Runge-Kutta Methods. The course aims at introducing students to quantitative uncertainty analysis and risk assessment for engineering applications. Probability theory is of great use in understanding and modeling phenomena that exhibit random behavior and the emphasis is on real- world applications to engineering problems, sampling distributions of means and variances, chi-squared, t and F distributions, methods of estimation, estimating means, proportions and variances, maximum likelihood estimation, tests of hypothesis on means, proportions and variances, chisquared test of goodness of fit.

Textbooks

- 1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons (India), 2014.
- 2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computations, 6th Edition, New age Publishing House, 2015.
- 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.

- 1. B.S. Grewal, "Higher Engineering Mathematics", 43rd edition, Khanna Publishers.
- 2. B.S. Grewal, Numerical methods in engineering and science, 10th Edition, Khanna publishers, 2016. Kishor S Trivedi, "Probability ansd Statistics with reliability, Queuing and Computer Science Applications", John Wiley & Sons, 2nd edition, 2008.

Course Name:	Building Self Confidence					
Course Code: PPS 105 Credit Str	DDS 105	Credit Structure .	L	Т	Р	С
	Credit Structure :	0	0	2	0	

Course Description: Developing right attitude, effective communication skills and confidence to be successful in this highly competitive environment is of utmost importance. This course helps the students to develop their personality and drives them to create their personal brand. The students are exposed to various fun-filled activities to gain confidence in facing people, facing crowd and expressing their ideas.

Textbooks:

Building Self Confidence Training Manual

Reference Books:

12. Prakash Iyer, "The Habit of Winning", 2nd Edition, Penguin Books Ltd., 2016.

13. Jack Canfield, "The Success Principles", 8th Edition, HarperCollins Publishers India, 2015.

14. Shiv Khera, 3d Edition, "You Can Win", Bloomsbury India, 2014.



Course Name:	Engineering Chemistry					
Course Code: CHE 101		Cradit Structure .	L T	Р	С	
	Credit Structure :	4	0	0	4	

Course Description: The primary objective of the course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. It aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Engineering materials such as Polymers & Liquid crystals, Introduction to Computational Chemistry, Electrochemistry principles & its application to batteries, Corrosion and its control, Fuels and combustion.

Textbooks:

1. Wiley, "Engineering Chemistry", Wiley.

- 1. Dr. K. Pushpalatha, "Engineering Chemistry", Revised Edition, Wiley.
- F Jain and Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company. New Delhi, 2019.
- Koch, W., & Holthausen, M. C. (2015). A chemist's guide to density functional theory. John Wiley & Sons.
- 4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, 2015.
- 5. Principles of Physical Chemistry B.R.Puri, L.R. Sharma & M.S. Pathania, S. Nagin Chand & Co., 41 Ed., 2004.
- 6. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4th Edition, 1996.
- 7. M.G. Fontana, N. D. Greene, Corrosion Engineering, McGraw Hill Publications, New York, 3rd Edition, 1996.
- 8. Jurs, P.C., 1996. Computer software applications in chemistry. John Wiley & Sons.
- 9. Stephen Wilson (auth.) Chemistry by Computer: An Overview of the Applications of Computers in Chemistry-Springer US (1986).



Course Name:	Elements of Electronics Engineering						
Course Code: ECE 101	ECE 101	Credit Structure .	L	Т	Р	С	
	ECE 101	Credit Structure :	3	0	0	3	

Course Description: The course aims at nurturing the students with the fundamental principles of electronics engineering, prevailing in various engineering applications. The course begins with the fundamentals of electronic systems and some basic laws of electricity. The topics include: classification of materials, types of Semiconductor materials, p-n Junction, Diodes, Characteristics, Rectifiers, Junction Transistor, BJT Configurations, Characteristics, BJT Biasing basics, Transistor Applications. Subsequently the student is introduced to Digital Electronics – Codes and Number systems – viz. Decimal, Binary and hexadecimal systems, conversions. 1's and 2's complements, binary addition. Boolean logic, basic gates and Universal Gates, and laws for reduction of the logic expressions, implementation using basic gates. Basics of communication systems, introduction to microprocessors and its applications.

Textbooks:

15. John Hiley, Keith Brown and Ian McKenzie Smith, "Hughes Electrical and Electronic Technology", Pearson.

Reference Books:

16. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI.

17.D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education.

18. Rajendra Prasad, "Fundamentals of Electronics Engineering", Cengane Learning.



Course Name:	Elements of Mechanical Engineering						
Course Code: MEC 101	MEC 101	Credit Structure .	L T	Т	Р	С	
	Credit Structure :	3	0	0	3		

Course Description: This course is designed to acquaint students with the fundamentals of mechanical engineering by covering some basics of thermal engineering, design engineering and manufacturing processes.

The discussion on thermal engineering includes the study of different forms of energy, the laws of thermodynamics, properties of steam, heat engines, heat pumps, steam boilers and an introduction to fluid properties and machinery. The discussion on design engineering covers transmission of motion and power. The discussion on manufacturing processes includes metal cutting and machines tools.

Textbooks:

19.K. P. Roy, S. K. Hajra Choudhury, Nirjhar Roy, "*Elements of Mechanical Engineering*," Media Promoters and Publishers Pvt. Ltd. Mumbai.

Reference Books:

20. Pravin Kumar, "Basic Mechanical Engineering," Pearson.

21.V. K. Manglik, "Elements of Mechanical Engineering," PHI.

22.Dr. D. S. Kumar, "Elements of Mechanical Engineering," S. K. Kataria & Sons.



Course Name:	Environmental Science and Disaster Management						
Course Code:	CIV 102	Credit Structure .	L	Т	Р	С	
	CIV 102	Credit Structure :	3	0	0	3	

Course Description: The overall objective of the course is to provide clear understanding of natural resources, environment, its maintenance and the basic concepts of disaster management. The course consists of the concepts of renewable and non-renewable resources, conservation of these resources, ecosystems, role of human being in maintaining a clean and useful environment for the future generations, maintaining ecological balance and conservation of biodiversity. It includes causes of environmental deterioration and its control; human environmental disturbances, water and air pollution, mitigation measures, disaster and waste management etc. After successful completion of the course, the students would be able to understand the various types of natural resources and problems due to over exploitation. Also gain knowledge about the different components of the ecosystem, their interrelation, various hazards, natural disasters, their effects and management.

Textbooks:

1. Benny Joseph, "Environmental Studies", McGraw-Hill.

- 2. R. Rajagopalan, "Environmental studies-From Crisis to Cure", Oxford University Press.
- 3. P. Anandan and R. Kumaravelan, "Environmental Science and Engineering", Scitech.
- 4. ErachBharucha, "Environmental Studies for Undergraduate courses", Universities Press.
- 5. R.B. Singh (Ed), "Disaster Management", Rawat.
- 6. MahuaBasuand S. Xavier "Fundamentals of Environmental Studies" Cambridge University Press.



Course Name:	Technical Spoken Communication						
Course Code: ENG 104	ENC 104	Cradit Structure .	L T	Т	Р	С	
	Credit Structure :	1	0	2	2		

Course Description: A Course on Technical Spoken Communication in the field of technical education will train the students to speak better English and face the corporate world with determination and selfbelief. The theoretical and practical sessions on pronunciation, listening, conversation, narration, speech presentation, will make the target audience to stand out in the forefront of their field of operation. At the end of the course, the students will have better skills, and the students will also be able to excel in middlehigher level management in the corporate world.

- 1. Tomson, Robert. "The Interview." Stories of Work, Life and the Balance in Between. The Write Place.
- 2. Daniel. J. C. "Unforgettable Salim Ali." *Inspiring People: Fifty People Who Made a Difference*. Readers Digest Selection.
- 3. Bovee, Courtland L. Thill, John V, Chatterjee. Abha. *Business Communication Today*. 10th Edition. Pearson
- 4. Carmine, Gallo. "11 Presentation Lessons You Can Still Learn From Steve Jobs." FORBES, October 12, 2012.
- 5. Thrishna's: How to Do well in GDs and Interview. New Delhi: Pearson 2013
- 6. Raman, Meenakshi. Sharma, Sangeetha. *Technical Communication: Principles and Practice*. Oxford University Press, New Delhi. 2015.
- 7. Hart, Steve. Nari, Aravind R. and Bhambhani, Veena. Embark: *English for Undergraduates*. New Delhi; Cambridge University Press, 2016.
- 8. J. K. Gangal, A Practical course in Spoken English, PHL Learning Private Limited, Delhi-2014.



Course Name:	Kannada Kali					
Course Code:	IZ A NI 101	Cuedit Star stars	L T	Р	С	
	KAN 101	Credit Structure :	1	0	0	1

Course Description: This course aims to help the non Kannada speaking students to converse in Kannada for their day-to-day life activities. It supports to develop strong cognitive skills, use of local language, helps to mingle with the local society, ensures security, facilitates interaction with auto and cab drivers, shop owners, employees of local government, etc. It also helps Law students to understand local client's complaints and also to the students of Engineering for a better communication. Furthermore, this course is offered to all the students, irrespective of their domain.

Text Books:

- 1. G Kannada Kali Linga Devaru Hale Mane, Publication Prasaranga Kannada Vishvavidyalaya, Hampi.
- 2. Spoken Kannada Publication Kannada Sahitya parishath Bengaluru.
- 3. Kannada Kirana Publication Bangaore Institute of Languages, Bangalore.



Course Name:	Computer Programming					
Course Code: CSE 151	CSF 151	Cradit Structura :	L T	Р	С	
	Credit Structure :	2	0	4	4	

Course Description: This course will provide an introduction to foundational concepts of computer programming to students of all branches of Engineering. This module includes a mix of traditional lectures and laboratory sessions. Each meeting starts with a lecture and finishes with a laboratory session. Topics covered in this course are problem formulation and development of simple programs, Pseudo code, Flow Chart, Algorithms, data types, operators, decision making and branching, looping statements, arrays, functions, pointers, structures, union and basic file operations. In the lab secession students are required to solve problems based on the above concepts to illustrate the features of the structured programming.

Textbook:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill.

Reference Books:

1. Yale Patt, Sanjay Patel, "Introduction to Computing Systems: From bits and gates to C and beyond", McGraw Hill.

2. Ehrouz A Forouzan, Richard F Gilberg, "*Computer science: A structured programming approach using C*", Cengage Learning.



Course Name:	Engineering Chemistry Lab					
Course Code:	CHE 151	Credit Structure :	L	Т	Р	С
Course Coue:		Credit Structure :	0	0	2	1

Course Description: The lab course intends to train the students to develop their experimental skills and apply fundamental chemical principles in problems related to chemistry in engineering. The experiments are designed to support the theory lectures and the hands-on experience will thus enhance students' in understanding the concepts.

The course includes the estimation of total hardness of water by EDTA complexometric method, determination of the total alkalinity of a given water sample, estimation of Iron (II) in Mohr's salt, estimation of calcium oxide in cement, determination of Chemical Oxygen Demand (COD) of Industrial Waste Water sample, determination of pKa value of weak acid using pH meter, Estimation of copper colorimetrically, determination of Iron (II) by potentiometry, determination of viscosity co-efficient of a liquid using Ostwald's Viscometer, estimation of strength of mixture of acids by conductometry method.

Course Material: "Engineering Chemistry Lab Manual", Presidency University.



Course Name:	Calculus, Differential Equations and Complex Variables					
Course Code:	MAT 102	Credit Structure :	L	Т	Р	С
Course Coue:	MAT 102	Credit Structure :	3	1	0	4

Course Description: This course is also commonly designed for all engineering branches and the contents learned in the previous semester are the prerequisite for this course. Probability theory is of great use in understanding and modeling phenomena that exhibit random behavior and the emphasis is on real-world applications to engineering problems. The topics covered include basic concepts of probability and conditional probability, Baye's law and correlation analysis, Linear Regression and method of least square, Solution of second and higher order, linear ordinary differential equations with constant and variable coefficients. Formation of Partial Differential Equations (PDE), solution of homogeneous and non-homogeneous PDEs and the application of PDEs. Evaluation of double and triple integrals, change of order of integration, change of coordinates, beta and gamma functions, line integral, surface integral and volume integral of vector and scalar functions. Laplace transforms of functions and properties; Laplace transform of periodic and unit step functions. Inverse Laplace Transforms, Application of Laplace transforms and solution of differential equations.

Textbooks:

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley-India Publishers, 2014.
- 2. 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.

- 1 Peter V. O'Neil, Advanced Engineering Mathematics, 7th Edition, Cengage Learning, 2012.
- 2 B. S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, 2014.



Course Name:	Effective Communication					
Course Code:	PPS 106	Credit Structure :	L	Т	Р	С
Course Coue:		Credit Structure :	0	0	2	0

Course Description: In order to succeed in the world that has become more global than being confined to smaller areas, we need to be very good in communication. This programme introduces students to different techniques of communication that makes them communicate clearly and effectively. During this programme, students are given a lot of exercises to inculcate better flow of thought and speech with emphasis on being effective in communication.

Text Book:

1. Presidency University "Effective Communication" Training Manual

Course Name:	Design Thinking and Team Building					
Course Code:	PPS107	Credit Structure :	L	Т	Р	С
Course Coue.	115107	Credit Structure.	0	0	2	0

Course Description

Developing right attitude, effective communication and problem solving skills along with confidence is very essential in this highly competitive environment. This course helps the students to develop the necessary attitudes and traits of problem solving coupled with thinking out of the box, brainstorming, root cause analysis etc. and adds to the students' overall personality and drives them to solve problems and innovate. The students are exposed to various type of problem solving techniques followed by simulation exercises, group brainstorming and other activities like discussions, case-studies etc. The students get the right guidance from the faculty to develop and polish their skills which will make them successful in the corporate world.

Books:

(i) Textbook(s)

Design Thinking & Team Building Training Manual

(ii) Reference Book(s)

Emrah Yayici, "Design Thinkking Methodology Book" Diane Deacon and Mike Vance, "*Think Out Of The Box*" John Adair, "*Decision Making and Problem Solving Strategies*" John Adair "*The Art Of Creative Thinking*"

Course Name:	Being Corporate Ready					
Course Code:	PPS108	Credit Structure :	L	Т	Р	С
Course Coue:	115106	Credit Structure :	0	0	2	0

Course Description

Being Corporate Ready (BCR) is to help the students to get a glimpse of the acceptable corporate readiness and equip them with the fundamental necessities of being able to confidently deal with the highly competitive corporate environment. This course helps the students to develop the necessary skills like Presentation Skills, E-mail Etiquette, Group Discussion, Personal Interview and Resume Building etc. This course will definitely add value to the students in terms of their overall personality development and drive them to be acceptable in corporate world with essential skills required and create their own personal brand.

The students are exposed to the corporate culture through real-time presentations, real-life e-mail writing scenarios, group discussions and other allied activities like discussions, case-studies, role-plays etc.

The students will get the right guidance from L&D faculty members to help develop and polish their skills which will make them successful in corporate environment.

Books: (i) Textbook(s)

Being Corporate Ready Training Manual

(ii) Reference Book(s)

"Group Discussion and Interview Skills by Pataki, Priyadarshi, Cambridge University Press: 2016" Prakash Iyer, "The Habit of Winning', Second Ed, Penguin Books Ltd, 2016. Jack Canfield, "The Success Principles", 8th Edition, Harper Collins India, 2015



I. Course Catalogues:

Each course shall have a course catalogue with the following details:

- i) Pre –Requisites of the course
- ii) Course Description
- iii) Course Outcome
- iv) Course Content
- iv) Reference Resources.

The Course Catalogues for the Courses offered in each basket are attached below:

Course Code: CSE1001	Course Title: Introduction to Object Oriented Programming Type of Course: Program Core Theory and Laboratory Integrated	L-P-C	1	4	3
Version No.	1.0				
Course Pre- requisites	NIL				
Anti-requisites	NIL				
Course Description	This course introduces the core concepts of object-oriented p theory and lab component which emphasizes on understand application of object-oriented programming paradigm. It he time secure applications by applying these concepts and also f The students interpret and understand the need for object or applications.	ing the ir Ips the st or effecti	npleme udent ve prot	entation to build plem sol	and real ving.
Course Out Comes	 On successful completion of the course the students shall be a 1. Write programs using basic concepts. 2. Apply the concept of arrays, strings, polymorphism & inher 3. Implement interface building secure applications 4. Apply the concepts of error handling mechanism 5. Apply the concepts of input output streams to develop sim 	itance fo		-	top
Course Content:			0		
	1		0	anne	ENCY UN

REGISTRAR

Module 1	Introduction to Principles of Programming	Assignment	Programming	No. of Classes:10
-	n Solving using algorithms , Environment set up to ru Arguments.			-
Module 2	Data Types, Variables and Control Statements	Assignment	Programming	No. of Classes:6

Topics:

Data types, Variables, Identifiers, Operators, Assignments and Expression, Basic Input/ Output, Functions, Control Statements: Branching and Looping.

Module 3	Object Oriented Concepts	Assignment	Programming	No. of Classes:8
----------	-----------------------------	------------	-------------	---------------------

Topics: Object Oriented Principles

Introduction to object Oriented Principles: Object, class, Data abstraction, Encapsulation, Polymorphism, Inheritance.

Classes, Objects and Methods: Defining a class, access specifiers, instantiating objects, reference variable, accessing class members and methods, constructors, method overloading, constructor overloading, static members and static methods.

Module 4	Arrays, String, Inheritance and Interface	Assignment	Programming	No. of Classes:12
----------	--	------------	-------------	----------------------

Topics: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array. Passing arrays to method, returning arrays.

Creating Strings & Operation on String.

Defining a subclass, Types of Inheritance, Method overriding, Dynamic method invocation.

Interface - Definition, Implementing interface, abstract methods.

		1	1	alluce
Module 5	Exception Handling and Input Output Streams	Assignment	Programming	REGISTRAR HO. ON CONCEPTION

Exceptions: Types of Exceptions, Handling the Exception with try, catch, finally.

Streams: Type of Streams, Input Stream, Output Stream, File - writing to the File and Reading from the File, Serialization.

List of Laboratory Tasks:

Experiment No 1: Problem Solving Level 1: Problem solving using Algorithms and Flowcharts.

Experiment No. 2: Programming assignment using Variables and Expression
 Level 1: Basic programs using data types and variables
 Level 2: Programs using operators and flow control statements.

Experiment No. 3: Programming assignment using Object Oriented Concepts
 Level 1: Programming scenarios which build class, methods to solve a problem.
 Level 1: Programming scenarios which uses Constructors and Method overloading to solve a problem.

Experiment No. 3: Programming assignment using Arrays and Strings. (Application: Develop application on Matrices, build String based application like Telephone directory)

Level 1: Programming scenarios which build single dimensional and multidimensional array, apply the different methods to operate on strings.

Level 2: Programming assignment which will manipulate the data stored in matrices and identify the appropriate usage String methods.

Experiment No. 4: Programming assignment using Inheritance

Level 1: Programming assignment on building applications using Inheritance.

Experiment No. 5: Programming assignment using Interface Level 1: Programming scenarios for building applications using Interface.

Experiment No. 6: Programming assignment using Exception Handling.Level 1: Programming Scenarios to apply and use the exception handling mechanism.

Experiment No. 7: Programming assignment to build Input Output based Applications.Level 1: Programming Scenarios to build IO based application for a given scenario using File Handling concepts.

REGISTRAR

ann

Targeted Application & Tools that can be used:

- Platform independent Application Development
- Secure Application Development
- Database Management Systems
- Banking software
- Mobile Applications

Tools: Integrated Development Environment (IDE), Apache NetBeans, Eclipse.

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

After completion of each module a programming based Assignment/Assessment will be conducted. A scenario will be given to the student to be developed as a Java Application.

Text Book

1) Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education.

References

1) Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Pearson

2)James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.

Topics relevant to development of "Employability": Real time application development using OOPs concept. Topics relevant to "PROFESSIONAL ETHICS": Naming and coding convention for Project Development

Catalogue	Ms. Vinitha Dominic
prepared by	Mr. Md Ziaur Rahman
	Mr. Ravindranath R C
	Dr. Malepati Chandra Sekhar
Recommended by the Board of Studies on	BOS NO: 11 th. BOS held on 23/4/21
Date of Approval by the Academic Council	Academic Council Meeting No. 14, Dated 21/5/21

CSE1002 Version No. Course Pre- requisites Anti-requisites Course Descrip	NIL The purpose of the programming fead develops analytic The associated ladenhances the abid On successful condended 1. Summarize the 2. Demonstrate por 3. Illustrate user- 4. Identify the var	Theory & Integrated Lak of Computers and Mathema nis course is to enable the st atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the to basic Concepts of python. oroficiency in using data stru defined functions and except arious python libraries.	atics tudents to de the Python I gramming abi tunity to valio ations. students sha	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
Course Pre- requisites Anti-requisites Course Descrip	1.0 Basic knowledge NIL tion The purpose of the programming feat develops analytic The associated late enhances the abitering the structure of the	Theory & Integrated Lak of Computers and Mathema nis course is to enable the st atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the to basic Concepts of python. oroficiency in using data stru defined functions and except arious python libraries.	atics tudents to de the Python I gramming abi tunity to valio ations. students sha	velop pyth DLE and of ilities. date the co	ther soft	wares. Th	nis course
Course Pre- requisites Anti-requisites Course Descrip	Basic knowledge NIL NIL The purpose of th programming fea develops analytic The associated la enhances the abi On successful con 1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	of Computers and Mathema nis course is to enable the st atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the e basic Concepts of python. proficiency in using data stru defined functions and except arious python libraries.	atics tudents to de the Python I gramming abi tunity to valio ations. students sha	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
Course Pre- requisites Anti-requisites Course Descrip	Basic knowledge NIL NIL The purpose of th programming fea develops analytic The associated la enhances the abi On successful con 1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	his course is to enable the statures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the basic Concepts of python. Droficiency in using data stru defined functions and except arious python libraries.	tudents to de the Python I gramming abi tunity to valio ations. students sha ictures.	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
requisites Anti-requisites Course Descrip Course Outcon	NIL tion The purpose of the programming feat develops analytic The associated late enhances the abit of the associated late enhances the abit of the second term of	his course is to enable the statures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the basic Concepts of python. Droficiency in using data stru defined functions and except arious python libraries.	tudents to de the Python I gramming abi tunity to valio ations. students sha ictures.	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
Anti-requisites Course Descrip Course Outcon	tion The purpose of th programming fea develops analytic The associated la enhances the abi 1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the e basic Concepts of python. proficiency in using data stru defined functions and except arious python libraries.	e the Python I gramming abi tunity to valie ations. students sha	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
Course Descrip	tion The purpose of th programming fea develops analytic The associated la enhances the abi 1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the e basic Concepts of python. proficiency in using data stru defined functions and except arious python libraries.	e the Python I gramming abi tunity to valie ations. students sha	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
Course Outcon	programming fea develops analytic The associated la enhances the abi On successful con 1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	atures and also to familiarize cal skills to enhance the prog boratory provides an oppor lity to build real time applica mpletion of this course the e basic Concepts of python. proficiency in using data stru defined functions and except arious python libraries.	e the Python I gramming abi tunity to valie ations. students sha	DLE and of ilities. date the co ill be able t	ther soft	wares. Th	nis course
	1. Summarize the 2. Demonstrate p 3. Illustrate user- 4. Identify the va t: Basics of	e basic Concepts of python. proficiency in using data stru defined functions and excep arious python libraries.	ictures.		:0:		
Course Conten	3. Illustrate user- 4. Identify the va t: Basics of	defined functions and except arious python libraries.		g.			
Course Conten	t: Basics of						
	Python						
Module 1	programming	Assignment	Program	nming		14	Classes
Topics: Data typ Repetitive strue		essions, Input and Outpu	t Statement	s. Control	Structu	ires – Sel	ective and
Module 2	Indexed and Associative Data Structures	Simple applications	Program	nming		20	Classes
Topics: Strings,	Lists, Sets, Tuples, Dict	ionaries					
	Functions,						
Module 3	Exception handling and libraries	Case study	Prograr	nming		10 CI	asses
Topics: User de	efined functions, except	tion handling, Introductic	on to python	built-in li	braries		
List of Laborat	ory Tasks						
List of Laborat	UIY IASKS:						
SI. No. Ex	periment Name					0	
L/	OGRAMS ON OPERATO	RS AND EXPRESSIONS				Jan	ULL NCY UN
Lev	vel - 1 : Basic programs	on Operators and Expres itions to solve mathemati		าร		REGISTRA	AR Registrar

		PROGRAMS ON CONTROL STRUCTURES				
	2	Level - 1 : Basic programs on Control structures				
		Level - 2 : Create applications to solve the real time problems				
		PROGRAMS ON SELECTIVE AND REPETITIVE STRUCTURES				
	3	Level - 1 : Basic programs on Selective and Repetitive structures				
		Level - 2 : Create applications to solve the real time problems				
		PROGRAMS ON STRINGS				
	4	Level - 1 : Basic programs on Strings and its manipulation				
		Level - 2 : Develop Real world applications that involves string matching				
	-	PROGRAMS ON LISTS, TUPLES and SETS				
	5	Level - 1: Basic programs on lists, Tuples and Sets				
	5	Level - 2 : Create applications that involves sequential and Random access of data				
		PROGRAMS ON DICTIONARIES				
	6	Level - 1 : Basic programs on dictionaries				
		Level - 2: Create applications that involves structuring of data.				
		PROGRAMS ON FUNCTIONS				
	7	Level - 1 : Basic programs on Functions				
		Level - 2 : Develop Real world applications using functions				
		PROGRAMS ON EXCEPTION HANDLING				
	8	Level - 1 : Basic programs on exception handling				
		Level - 2 : Develop applications that involves exception handling				
		BASIC PROGRAMS ON BUILT-IN LIBRARIES				
	9	Level - 1 : Basic programs on python modules				
	-	Level – 2: Develop applications using python libraries				
	L					
	Targeted A	pplication & Tools that can be used:				
	-	opplication & Tools that can be used.				
	•	non IDLE, ANACONDA				
	 Δn 	plication Areas:				
Web Development						
	• Gai	me Development				
	• Scie	entific and Numeric Applications	_			
	• Art	ificial Intelligence and Machine Learning	E.			
	• Sof	tware Development	ar			
	• Ent	erprise-level/Business Applications	NE NO			

- Education programs and training courses
- Language Development
- Operating Systems
- Web Scrapping Applications
- Image Processing and Graphic Design Applications

Professionally Used Software: Python IDLE, Spyder, Jupyter Notebook, Google Colab

Project work/Assignment:

Project Assignment: Developing python scripts using built in methods and functions

Text Books:

• Charles Dierbach, "Introduction to Computer Science Using Python", Wiley India Edition, 2015.

References:

- 1. E. Balagurusamy, "Introduction to Computing and Problem Solving Using Python", Tata McGraw-Hill, 2016
- 2. Y. Daniel Liang, "Introduction to Programming Using Python", Pearson, 2017
- 3. Python Tutor Visualize Python, Java, C, C++, JavaScript, TypeScript, and Ruby code execution
- 4. <u>https://practice.geeksforgeeks.org/courses/Python-Foundation</u>

Topics relevant to development of "FOUNDATIONS SKILLS"- Solve the real time problems by analyzing and visualizing the data.

Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS"- Data collection and its arrangement

Skill Level: Foundation	on, Skill Development, Employability
Catalogue prepared by	Prof. Isaac Joel Raj. S, Ms. GANGA V C, Ms. PALLAVI M, Ms.AKSHATHA Y, Mr.JOBIN THOMAS, Ms. POORNIMA GALIVEETI
Recommended by the Board of Studies on	BOS NO: 11 th. BOS held on 23/4/21
Date of Approval by the Academic Council	Academic Council Meeting No. 14, Dated 21/5/21

Course Code: CSE1003	Course Title: Computer Hardware Workshop		0	2	1
	Type of Course:1] Program Core 2] Laboratory only	L- P- C			
Version No.	1.0				
Course Pre- requisites	Elements of electrical and electronics engineering (EEE1001)- Basic logic operations, measuring voltages, measuring current, measuring of resistance, series and parallel connections, implementing simple circuits using resistors, capacitors, inductors.				imple
Anti-requisites	NIL			- Charles I h	The Regis

Course	Course description:
Description	Computer hardware workshop course is designed to train students to identify and handling
Description	
	the equipment's for assembling computer hardware (SK 6,8). This course will
	enhance the students attitude of enquiry for trouble shooting (SK 1,4). Students
	shall be able to learn basics of electrical and electronic components related to hardware and
	networking system along with installation of operating system. At the end of course students
	will possess professional & employability skill.
Course Out	On successful completion of the course the students shall be able to:
Comes	1] Identify electrical and electronic components in computer system.
	2] Demonstrate assembling of computer hardware.
	3] Diagnose and resolve of hardware-related problems.
	4] Installation of different operating system.
	5] Share the resources and folders over network.
Course Content:	List of Laboratory Tasks:
	Experiment No 1 1 Lab Session
	Implement basic circuit using breadboards and components to measure current and voltage.
	Level No 01:
	Implement the given circuit with 3 resistors connected in series with power source of voltage
	5volts and calculate over all current flowing in this circuit.
	Level No 02:
	Implement the given circuit with 3 resistors connected in parallel with power source of voltage
	5 volts and calculate over all current flow in this circuit.
	Experiment No 2: 1 Lab Session
	Perform soldering & de-soldering using discrete components for a specific circuit.
	Level No 01: Implement the given simple circuits.
	Level No 02: Implement the given simple circuits.
	Experiment No 3: 1 Lab Session
	Identify the computer hardware components
	Level No. 01: Identify the specific hardware components in desktop system -motherboards
	components, connectors, slots, ports (USB, VGA, DVI, and HDMI), cables and connectors.
	Level No. 02: Identify the specific hardware components with specification (Manufacturer,
	specifications of hardware devices like RAM (Memory), ROM drives graphic cards, sound cards)
	Experiment No 4: 2 Lab Session
	Assembling and disassembling the desktop system
	Level No. 01: Assembling CPU (Processor), RAM (Memory), ROM, Drives, graphic cards, sound
	cards and connecting with mother board.
	Level No. 02: Disassembling the desktop system.
	Experiment No 5: 1 Lab Session
	To demonstrate BIOS setup program
	Level No. 01: Learn to use the BIOS SETUP program
	Level No. 02: Configure the BIOS SETUP for given specification.
	Experiment No 6: 2 Lab Session
	Identify the computer hardware problems and trouble shoot.
	Level No 01: Trouble shoot simple problems – (computer won't turn on, Turns on but still does
	not work, Screen freezes, CMOS error, Missing operating system, Hard drive not detected)
	Level No. 02: Trouble shoot complex problems -(Booting infinite, resetting system clock,
	overheating of PC, dysfunctional of USB port)
	Experiment No 7: To Install different operating system and drivers 3 Lab Session Strag
	Level No 01: Partitioning the hard disk and Installation of windows operating system.
	Level No 02: Partitioning the hard disk and Installation of Linux Operating system.

	Experiment NO 8: To share folders and control the resources through no Level No 01: Sharing of folders, printers and scanners	etwork.	1 Lab	Session	
Targeted Applica	Level No 02: Granting privileges to access resources. tion & Tools that can be used:				
	ment sector is processor manufacturing and memory c	hin fahric	ation	vendors	like
	argeted job profiles include hardware engineers and ne	•			inc
	system information tool. That gives information abou	t design,	portal	ble suppo	ort
	st of <u>hardware</u> and <u>software</u> components.				
	ee system information tool that shows detail on nume	rous devi	ices ar	nd other	parts
of the system.					
Text Book-					
Govindarajulu. B	., IBM PC and Clones Hardware trouble shooting and m	aintenand	ce <i>,</i> Mo	Graw Hil	l, New
Delhi,					
Denn,					
Mueller.S, Upgra	ding and repairing PCS, 4th Edition, Prentice Hall.				
References <u>ht</u>	tps://www.cpuid.com/softwares/cpu-z.html				
h	tps://www.chtips.com/				
Entrepreneurship:	Students can become entrepreneur in the computer hardware	field.			
Skill Development	Practical hands on assembling, troubleshooting makes them co	mputer ha	ardware	e professio	nals.
Human Values &	Professional ethics: Set of standard procedures to assemble	and troul	ble sho	ot the co	mputer
hardware compone					
Catalogue prepared by	Prof. Shanmugharathnam Prof. Mohammed Mujeer ulla				
prepared by	Prof. Afroz Pasha				
	Prof. Preeti				
Recommended by	Prof. Muthupandi BOS NO: 11 th. BOS held on 23/4/21				
the Board of	BOS NO: 11 th. BOS held on 23/4/21				
Studies on					
	Academic Council Meeting No. 14, Dated 21/5/21				
by the Academic	Academic Council Meeting No. 14, Dated 21/5/21				
by the Academic	Academic Council Meeting No. 14, Dated 21/5/21				
by the Academic Council	Academic Council Meeting No. 14, Dated 21/5/21 Course Title: Data Structures and Algorithms			6	
Date of Approval by the Academic Council Course Code: CSE2001				0	
by the Academic Council Course Code:		L- P- C	2	2 au	HUR RENCY

1.0

Version No.

requisites	Java or Python			
Anti-requisites	NIL			
Course Description	algorithm, to emphasize the for program development. The student should have problems. The associated laboratory critical thinking and analys. With a good knowledge	he importance of cho ve basic programmi y provides an oppor tical skills. in the fundamental al experience in imp	e fundamental concepts of da osing an appropriate data struct ing skills, to solve engineer tunity to implement the conc concepts of data structures lementing them, enabling the applications.	ture and algorithm ing/computational cepts and enhance and algorithm the
Course	On successful completion	of this course the stu	idents shall be able to:	
Outcomes	structures. 2. Apply an appropr 3. Apply an appropr	iate linear data struc iate non-linear data	given problem using fundamer ture for a given computation. structure for a given computat and sorting algorithms.	
Course Content:				
Module 1	Fundamentals of Data Structure (Comprehension)	Assignment	Programming Task	06 Classes
Non Linear Data	Structures. Recursion: R	Recursive Definition	primitive, Types of Data Str n and Processes, Program	
Fundamentals of A	Algorithmic problem solving, Linear Data Structure	Important Problem t	ypes.	
Module 2	Stack, Queues & Linked List (Application)	Case Study	Programming Task	08 Classes
Topics: Stack- Concepts of Stack. Queues- Repre of Queue, Appl Linked List- Sin	Linked List (Application) and representation, Stack esentation of queue, Qu lications of Queue.	operations, stack eue Operations, (n on linear list usi	Programming Task implementation using arr Queue implementation us ng singly linked storage str	ray. Applications

Topics:

Introduction to Trees, Binary tree: Terminology and Properties, Binary tree traversals: Pre-Order traversal, In-Order traversal, Post-Order traversal.

Module-4	Non-linear	Data	Assignment	Programming Task	03 Classes
	Structures	–Graphs			
	(Comprehen:	sion)			

Topics:

Graph – Basic Concept of Graph Theory and its Properties, Representation Of Graphs.

Module-5	Searching & Sorting	Assignment	Programming Task	06 Classes
	Performance Analysis			
	and Management			
	(Comprehension)			

Topics:

Sorting & Searching: Performance Analysis and Management - Time and space analysis of algorithms – Average, best and worst case analysis. Searching – Sequential Search and Binary Search, Sorting – Bubble Sort, Selection Sort.

List of Laboratory Tasks:

Lab sheet 1:	[02 Classes]
To implement the Programs on User define functions	
Level 1: Implement a program to compute factorial using functions. Level 2: Implement a program to pass array to a function and manipulate the data in array.	
Lab sheet 2:	[02 Classes]
To implement the Programs on User define functions	
Level 1: Implement a program to compute factorial using recursion. Level 2: Implement a program to solve towers of Hanoi using recursion.	
Lab sheet 3:	[04 Classes]
To implement the Programs on Stack.	
Level 1: Implement the operations of the Stack. Level 2: Implement the evaluation of postfix expression	
	0
Lab sheet 4:	[04 Clauses]
To implement the programs on Queue.	REGISTRAR

Level 1: Implement all the operations of the Queue

Level 2: Issuing to	oken for doctor appointment.	
Lab sheet 5:		[06 Classes]
Lab sheet 5.		
To implement the	Programs on Linked List.	
	nt all the operations of the Singly Linked List nt Stack and Queue with Linked List.	
Lab sheet 6:		[04 Classes]
To implement th	ne Programs on Trees and Traversals	
Level 1: Implement Level 2: Implement	nt construction of the Binary tree. nt tree traversals.	
	lement the Programs on Graphs. to implement graph	[2 Classes]
Level 1: Program	omplexity and implement the Programs on searching and sorting. on searching and sorting. yze the time complexity.	[6 Classes]
-	re and Application software Programming Jsed Software : Eclipse / Jupyter notebook IDE	
Professionally U Project work/As 1. Problem	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: n Solving: Choose an appropriate data structure and impleme	
Professionally U Project work/As 1. Problem	Jsed Software : Eclipse / Jupyter notebook IDE ssignment:	
Professionally U Project work/As 1. Problem 2. Program	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: n Solving: Choose an appropriate data structure and impleme	
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: n Solving: Choose an appropriate data structure and impleme nming: Implementation of given scenario using Java or pytho	n
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: n Solving: Choose an appropriate data structure and impleme nming: Implementation of given scenario using Java or pytho FERIALS: Text Book(s):	n on, January 2019.
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhor Heidelberg, 200 2. Thomas H.Co	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: In Solving: Choose an appropriate data structure and implement mming: Implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Too	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAN 1. R. Venka 2. Anany L References 1. Kurt Mehlhon Heidelberg, 200 2. Thomas H.Co Algorithms", PH	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: In Solving: Choose an appropriate data structure and implement mming: Implementation of given scenario using Java or python TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Too 8. ormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introd	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhor Heidelberg, 200 2. Thomas H.Cc Algorithms", PH Topics relevant	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: m Solving: Choose an appropriate data structure and implement mming: Implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Too 8. prmen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction I Learning Private Limited.	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to structure, "Skill
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhor Heidelberg, 200 2. Thomas H.Co Algorithms", PH Topics relevant to Development" -	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: In Solving: Choose an appropriate data structure and impleme mming: Implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Tool 8. ormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction I Learning Private Limited. to development of "Foundation Skills": Fundamentals of Data	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to structure, "Skill
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhon Heidelberg, 200 2. Thomas H.Co Algorithms", PH Topics relevant to Development" - Data Structure	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: In Solving: Choose an appropriate data structure and implement mming: Implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Too 8. ormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introdu I Learning Private Limited. to development of "Foundation Skills": Fundamentals of Data – Implementation Linear and nonlinear data structure, "Employ Dr. Nagaraja S R	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to structure, "Skill
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhor Heidelberg, 200 2. Thomas H.Cc Algorithms", PH Topics relevant for Development" - Data Structure	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: n Solving: Choose an appropriate data structure and implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Tool 8. ormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introd I Learning Private Limited. to development of "Foundation Skills": Fundamentals of Data - Implementation Linear and nonlinear data structure, "Employ Dr. Nagaraja S R Mr. Asif Mohamed H B	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to structure, "Skill
Professionally U Project work/As 1. Problem 2. Program REFERENCE MAT 1. R. Venka 2. Anany L References 1. Kurt Mehlhor Heidelberg, 200 2. Thomas H.Co Algorithms", PH Topics relevant f Development" - Data Structure	Jsed Software : Eclipse / Jupyter notebook IDE ssignment: In Solving: Choose an appropriate data structure and implement mming: Implementation of given scenario using Java or pythol TERIALS: Text Book(s): atesan, S. Lovelyn Rose, "Data Structures" Wiley, Second edition evitin, "Introduction to the Design and Analysis of Algorithms", rn, and Peter Sanders – Algorithms and Data Sturctures The Basic Too 8. ormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introdu I Learning Private Limited. to development of "Foundation Skills": Fundamentals of Data – Implementation Linear and nonlinear data structure, "Employ Dr. Nagaraja S R	n on, January 2019. , Pearson Education. olbox, Springer-Verlag Berlin duction to structure, "Skill yability"-Linear & Nonlinear

	Dr. Mahalakshmi R
Recommended	BOS NO: 11 th. BOS held on 23/4/21
by the Board of	
Studies on	
Date of	Academic Council Meeting No. 14, Dated 21/5/21
Approval by the	
Academic	
Council	

Course Code: CSE2006	Course Title: Data Stru	ctures						
	Type of Course: Progra	m Core		L- P- C	2	4	4	
	Theory-Integrated Labo	oratory						
Version No.	1.0	.0						
Course Pre- requisites	Introduction to Programm	ning						
Anti-requisites	NIL							
Course Description	The purpose of the course is to provide the fundamental concepts of data structures and to emphasize the importance of choosing an appropriate data structure and technique for program development. The associated laboratory provides an opportunity to implement the concepts and enhance critical thinking and analytical skills. 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 Outcomes	structures such as a 2. Apply an approp 3. Apply an approp	ularized solutions for gi rrays, structures. riate linear data structu riate non-linear data st	ven problem u ure for a given ructure for a g	ising fund computa iven com	tion. putation			
Course Content:		4. implement graph operations, graph traversals and applications.						
Module 1	Fundamentals of Data Structure (Comprehension)	Assignment	Programmi	ng Task		10	Hours	
Non Linear Data								
Module 2	Linear Data Structure Stack, Queues (Application)	Assignment	Programmi	ng Task		6 Hd	UTS ENCY	

Topics:

Stack- Concepts and representation, Stack operations, stack implementation using array. Applications of Stack.

Queues- Representation of queue, Queue Operations, Queue implementation using array, Types of Queue, Applications of Queue.

Module 3 (Application)	Assignment	Programming Task	08 Hours
---------------------------	------------	------------------	----------

Topics:

Linked List- Singly Linked List, Operation on linear list using singly linked storage structures, Doubly Linked List, Circular List, Applications of Linked list.

Module 4	Non-linear Data Structures – Trees (Application)	Assignment	Programming Task	06 Hours
----------	--	------------	------------------	----------

Topics:

Introduction to Trees, Binary tree: Terminology and Properties, Binary tree traversals: Pre-Order traversal, In-Order traversal, Post-Order traversal. Binary Search tree: Operations in BST.

,	/	1		
Module-5	Non-linear Data	Assignment	Programming Task	06 Hours
	Structures – Graphs			
	(Comprehension)			
	•			

Topics:

Graph – Basic Concept of Graph Theory and its Properties, Representation Of Graphs, Elementary Graph operations, Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree.

List of Laboratory Tasks:

Lab sheet 1:

To implement the Programs on Fundamentals of Programming. Basic Programs

Level 1:

a) Prompt the user, read input and print messages

- b) Programs using operators and conditional statements
- c) Calculate simple interest
- d) Perform swapping of numbers

Level 2: Write programs to solve various patterns.

Lab sheet 02:

To implement the Programs on User define functions

Level 1: Implement a program to compute factorial using functions. Level 2: Implement a program to pass array to a function and manipulate the data in array.



[6 Hours]



Lab sheet 03:	[02 Hours]
To implement the Programs on User define functions	
Level 1: Implement a program to compute factorial using recursion. Level 2: Implement a program to solve towers of Hanoi using recursion.	
Lab sheet 04:	[04 Hours]
To implement the Programs on pointers and Dynamic Memory Allocation	
Level 1: Implement a program to use pointers, pointer to array, pointer to function, use dynamic me Level 2: a) Implement a simple banking program using pointers.a) Implement a program to prepare grocery list that vary every month.	emory allocation.
Lab sheet 05:	[08 Hours]
To implement the Programs on Abstract Data Type and user defined data type.	
Level 1: Implement a program to read details of the students and use typedef. Level 2: Implement a program to read array of type Student and perform required operation. Implement a program to represent, read and add complex numbers.	
To implement the Programs on Union and Enumeration.	
Level 1: Implement a program on Lucky Dip Activity using Union Level 2: Use enumeration to define various prizes to the Level 1 activity.	
Lab sheet 06:	[06 Hours]
To implement the Programs on Stack.	
Level 1: Implement the operations of the Stack using array. Level 2: Implement the operations of stack using structure.	
Lab sheet 07:	[06 Hours]
To implement the application of Stack.	
Level 1: Implement program to verify the balance of parenthesis.Level 2: a) Implement the conversion of infix to postfix expression.b) Implement the evaluation of postfix expression	
Lab sheet 08:	[06 Hours]
To implement the programs on Queue.	0
Level 1: Implement all the operations of the Queue Level 2: Implement all the operations of the Circular Queue. Issuing token for doctor appointment.	REGISTRAR
Lab sheet 09:	[08 Hours

To implement the Programs on Linked List.	
Level 1: Implement all the operations of the Singly Linked List Level 2: Implement Stack and Queue with Linked List.	
Lab sheet 10:	[08 Hours]
To implement the Programs on Linked List.	
Level 1: Implement all the operations of the Doubly Linked List. Level 2: Implement all the operations of the Circular Linked List.	
Lab sheet 11:	[08 Hours]
To implement the Programs on Trees and Traversals	
Level 1: Implement the operations of the Binary tree. Level 2: Implement the operations of the Binary search tree and the tree traversals	
Lab sheet 12: To study and implement the Programs on Graphs. Level 1: Program to implement graph Level 2: Implement Depth first & breadth first search	[6 Hours]
Targeted Application & Tools that can be used: System software and Application software Programming Professionally Used Software : MinGW / C/C++ IDE	
Project work/Assignment:	
 Problem Solving: Choose an appropriate data structure and imp Programming: Implementation of given scenario using C or C++. 	
REFERENCE MATERIALS: Text Book(s):	
3. R. Venkatesan, S. Lovelyn Rose, "Data Structures" Wiley, Second	edition, January 2019.
 Seymour Lipschutz ,"Data Structures with C" (Schaum's Outline Se July 2017 	eries) McGraw Hill Education,
References	
1. Robert L Kruse, Bruce P Leung and Clovis L Tondo, "Data Structures and Pearson.	na Program Design in C",
 Richard F Gilberg and Behrouz A Forouzan, "Data Structures: A Pseudocode Cengage learning. 	
Topics relevant to development of "Foundation Skills": Fundamentals of Development" – Implementation Linear and non linear data structure, "E linear Data Structure	

Catalogue	Dr. Nagaraja S R				
prepared by	Asst.Professor, Dept of CSE				
	Dr. Blessed Prince P				
	Associate Professor, CSE				
Recommended	nded BOS NO: 11 th. BOS held on 23/4/21				
by the Board of					
Studies on					
Date of	Academic Council Meeting No. 14, Dated 21/5/21				
Approval by the	proval by the				
Academic					
Council					

Course Code:	Course Title: Design and Analysis of Algorithms						
CSE2007	Type of Course:1] Program Core 2] Theory – Laboratory integrated	L-P-C	2	2	3		
Version No.	2.0			1			
Course Pre- requisites	 C programming Discrete mathematics. Data structure. 						
Anti-requisites	Nil						
Course Description	The main goal of this course is to study the fundamental techniques to design and analyze the efficient of algorithms and their running time. After a brief review of prerequisite material (search, sorting, asymptotic notation), solving various real time problems through various algorithmic techniques such as divide and conquer algorithms, dynamic programming, greedy algorithm etc.						
Course Out Comes	On successful completion of the course the students shall be able to:						
comes	1) Analyze the asymptotic performance of algorithms.						
	2) Analyze the time and space complexity of an algorithm.						
	3) Apply the different techniques of algorithm in solving real world problems.						
	 Summarize the performance of various real time problems using different algorithmic techniques. 						
Course Content:			0	anne	SENCI		

Module 1	Design of basic Tree and Graph problems	Assignment	Problem Solving	08 Hours					
	-	e .	Problem Types-Sorting, Searching	-					
		,	ndamental Data Structures -Line	ar Data					
Structures, Graphs,		ctionaries. [Blooms 'level s	selected: Comprehension]	Γ					
Module 2	Analysis of Recursive and Non-recursive algorithms	Term paper/Assignment	Programming/ Problem Solving	06Ho urs					
Topics: Algorithm Design paradigms - motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Recurrences- substitution method. [Blooms 'level selected : Comprehension]									
Module 3	Divide-and- conquer	Term paper /Assignment	Programming/Problem Solving	06 Hours					
			search, quick sort, Merge sort, Bina ooms 'level selected: Application]	ary Tree					
Module 4	Greedy Algorithms and Dynamic Programming	Term paper /Assignment	Problem Solving	08Ho urs					
Dynamic Programm	iruskal's Algorithm, ning : blem, Binomial coe	, Dijkstra's Algorithm. efficient, Warshall's and F	loyd's Algorithms, Travelling sales	person					
Module 5	Backtracking and Limitations of Algorithm	Term paper /Assignment	Problem Solving	06Ho urs					
Backtracking – n-Q Problems, [Blooms 'level s			ecision Trees, P , NP , and NP-Co	omplete					
List of Laboratory	Fasks:			WILL NCY					
element problem a	nd calculate the tir	e algorithmic designing tec ne efficiency (best, averag ; the algorithm.	chnique to solve Linear Search, find e & worst). .[2 hours : Application	ing max					

Experiment No. 2: Apply Brute force algorithmic designing technique to sort elements using selection algorithm and calculate time (Best, average & worst) efficiency. .[**2 hours : Application Level**]

Level 1: understanding and designing the algorithm.

Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 3: Apply divide and conquer algorithmic designing technique to sort elements using merge sort algorithm and calculate time (Best, average & worst) efficiency. [2 hours : Application Level]

Level 1: Understanding merge sort using divide and conquer and designing the algorithm. Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 4: Apply dynamic programming algorithmic designing technique to find binomial coefficient of a given number i.e nCr and calculate time (Best, average & worst) efficiency [2 hours : Application Level] Level 1: understanding dynamic problem, solve nCr problem and designing the algorithm. Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 5: Apply dynamic programming algorithmic designing technique to find All pair Shortest Path for a given graph using Warshall's and Floyd's algorithm **[2 hours : Application Level]**

Level 1: understanding and designing the algorithm. Level 2: Implementing the algorithm and finding its efficiency.

Experiment No.6: Apply dynamic programming algorithmic designing technique for Solving 0/1 knapsack problem and find its efficiency [2 hours : Application Level]

Level 1: understanding and designing the algorithm. Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 7 Apply greedy algorithmic designing technique for Solving MST and single source shortest path problem by using – Dijkstra's algorithm [**2 hours : Application Level**]

Level 1: understanding and designing the algorithm.

Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 8: Apply greedy algorithmic designing technique for constructing minimum spanning tree using prim's algorithm and Kruskal's algorithm **[2 hours : Application Level]**

Level 1: understanding and designing the algorithm.

Level 2: Implementing the algorithm and finding its efficiency.

Experiment No. 9: Apply backtracking algorithmic designing technique for solving queen's problems for 4 as inputs. [2 hours : Application Level]

Level 1: understanding and designing the algorithm. Level 2: Implementing the algorithm and finding its efficiency. Targeted Application & Tools that can be used:

Application Area is to Design and Analyzing the efficiency of Algorithms. Tools/Simulator used: GCC compiler.

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

- 5. Problem Solving: Design of Algorithms and implementation of programs.
- 6. Programming: Implementation of given scenario using C.

Text Book

1.Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, *"Introduction to*

Algorithms", PHI Learning Private Limited.

References

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

Topics relevant to development of "Foundation, skill Development, Employability": Asymptotic Notations, Order of growth, P,NP Problems.

Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Solving real time Problems & Data collection for an assignment.

Catalogue prepared by	Dr.A.Jayachandran, Mr. Sunil Kumar R.M, Mr.Mrutunjaya, Mrs Preethi, Mrs Prakruthi,Mrs Smitha patil
Recommended by	Mention the BOS Number and the Date of BOS
the Board of	
Studies on	
Date of Approval	Mention the Academic Council Meeting
by the Academic	No. & the date of the meeting:
Council	Ŭ

Course Code: CSE2008	Course Title: Programming in Java (Object Oriented Programming)		1	4	3
	Type of Course: Program Core Theory and Laboratory Integrated	L-P-C	REG	STRAR	Registrar
Version No.	1.0			(PANGALO

Course Pre- requisites	Basic knowledge of any structured programming: Data types, variables, constants, operators, conditional & control structures, Loops, arrays & function.						
Anti-requisites	NIL						
Course Description	This course introduces the core concepts of object-oriented programming by using Java. 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 Out Comes	On successful completion of the course the students shall be able to:1) Write programs using basic concepts in JAVA2) Apply the concept of arrays, strings, polymorphism & inheritance for building desktop3) Implement interface & packages for building secure applications4) Apply the concepts of error handling mechanism and multithreading.5) Apply the concepts of Collections to develop high performance applications.						
Content:							
Module 1	INTRODUCTION	Assignment	Programming	No. of Classes: 10			

Topics: Introduction to Object Oriented Programming, Java Evolution, and How Java differs from C++, Features of Java,

Java Environment: Installing JDK (JVM, JRE), Java Source File Structure, Compilation and Execution of Java Programs.

TOKENS: Data types, Variables, Operators, Control Statements, Command Line Arguments.

CLASSES, OBJECTS, AND METHODS: Defining a class, access specifiers, instantiating objects, reference variable, accessing class members and methods, constructors, method overloading, static members, static methods, inner class, Wrapper class, Autoboxing and Unboxing,

Arrays, Strings, inheritance	/loquie z		Assignment	Programming	No. o Classes	
------------------------------	-----------	--	------------	-------------	------------------	--

Topics:Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array.

Operation on String, Mutable & Immutable String, Creating Strings using StringBuffer or StringBuilder.

Defining a subclass, types of Inheritance, method overriding, super keyword, dynamic method invocation, dynamic polymorphism, usage of final abstract and this keyword.

	Modul	e 3	Interfaces, Packages and Exception Handling	Assignment	Programming	
--	-------	------------	---	------------	-------------	--

Topics:Defining interfaces, extending an interface, Implementing interfaces. Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining a Package, Library Packages, import packages.

Exception handling: Introduction to Exceptions, Difference between Exceptions & Errors, Types of Exception. Handling Exceptions: Use of try, catch, finally, throw, throws. User Defined Exceptions, Checked and Un-Checked Exceptions.

	MULTITHREADED			No. of	
Module 4	PROGRAMMING:	Assignment	Programming	Classes:	
	PROGRAMMING.			12	

Topics: Introduction to threads, life cycle of a thread, creating threads, extending the Thread Class, Implementing the "runnable" interface. Thread Priority, Thread synchronization, Inter communication of Threads

Module 5	Collections and Graphic Programming(AWT,Swings)	Assignment	Mini Project	No. of Classes:
				12

Introduction to Collections, Classification of Collection. Introduction to List, Map and Set Interface, Introduction to Applets.

Introduction to the abstract window toolkit (AWT), Frames, Event-driven programming: Mouse and Key Event handling. Introduction to Swings, JFC, Swing GUI Components and Layout Manager.

List of Laboratory Tasks:

Experiment N0 1: Programming assignment with class, objects and basic control structures. (Application: Build a basic menu driven application)

Level 1: Programming scenarios which use control structures to solve simple case scenarios (Eg: Check if a number is odd or even)

Level 2: Programming assignment which will build menu driven application by identifying the class and its relevant methods.

Experiment No. 2: Programming assignment using Arrays and Strings. (Application: Develop application on Matrices, build String based application like Telephone directory)

Level 1: Programming scenarios which build single dimensional and multidimensional array, apply the different methods to operate on strings.

Level 2: Programming assignment which will manipulate the data stored in matrices and identify the appropriate usage String methods.

Experiment No. 3: Programming assignment using Inheritance and Polymorphism

Level 1: Programming scenarios which use the concept the polymorphism for method overloading. Scenarios which apply the concept of inheritance (identifying parent, child class and its relationship)

Level 2: Programming assignment which build application which have same functions in different forms

Experiment No. 4: Programming assignment using Exception Handling

Level 1: Programming assignment on building applications using built in Exceptions.

Level 2: Programming assignment on building application using user defined Exceptions.

Experiment No. 5: Programming assignment using Multithreading. (Eg: Building an application which performs different arithmetic operations and sharing the resources using threads)

Level 1: Programming scenarios to build a thread, assign priority and use the thread methods to perform operations

Level 2: Programming scenarios for building synchronized applications.

Experiment No. 8: Programming assignment using Collections

Level 1: Programming Scenarios to apply and use the Collection framework (List, SET, Map, Interface)

Experiment No. 9: Programming assignment to build GUI Applications.

Level 1: Programming Scenarios to build GUI for a given scenario using AWT and Swings concepts.

Targeted Application & Tools that can be used:

- Platform independent Application Development
- Secure Application Development
- Data Mining
- **Operating Systems.**
- **Database Management Systems**
- Banking software
- **Automobiles**
- Mobile Applications

Tools: JDK (Java Development Tool kit), Integrated Development Environment (IDE), Apache NetBeans, Eclipse.

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

After completion of each module a programming based Assignment/Assessment will be conducted. A scenario will be given to the student to be developed as a Java Application.

On completion of Module 5, student will be asked to develop a Mini Project using the GUI functionalities.

Text Book

1) Cay S Horstmann and Cary Gornell, "CORE JAVA volume I-Fundamentals", Pearson.

2) Cay S Horstmann and Cary Gornell, "CORE JAVA volume II-Advanced Features", Pearson.

References

1)Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill Education.

2)James W. Cooper, "Java TM Design Patterns – A Tutorial", Addison-Wesley Publishers.

Topics relevant to	development of "Employability": Real time application development using OOPs concept.
•	• "HPROFESSIONAL ETHICS": Naming and coding convention for Project Development
Catalogue prepared by	Ms. Vinitha Dominic
Recommended by the Board of Studies on	BOS NO: 11 th. BOS held on 23/4/21
Date of Approval by the Academic Council	Academic Council Meeting No. 14, Dated 21/5/21

Course Code: CSE 2009	Course Title: Compute	-		L- P- C	3	0	3
Version No.	1.0		,				
Course Pre-	Digital Design						
requisites	Basic concepts of nun	nher systems logic	gates hasic arithmet	ic operatio	nnc		
Anti-requisites	NIL		gates, basic antimet		,115		
Course Description	This course introduces the to intermediate level. T between computer hard assembly-level instruction concepts of computer te	his theory based cou dware and software. on set architectures.	rse emphasizes on und It equips the students It helps the students to	derstanding with the i o interpret	the ntu	e inte ition	ractior behind
Course	On successful completio	n of the course the st	udents shall be able to	:			
Outcomes	1] Describe the basic components of a computer, their interconnections, and instruction set						
	-						
	architecture		•	·			
	architecture 2] Apply appropriate tec	hniques to carry out	selected arithmetic ope	·			
Course Content:	architecture	hniques to carry out	selected arithmetic ope	·			
	architecture 2] Apply appropriate tec	hniques to carry out	selected arithmetic ope	rations			lasses
Course Content: Module 1 Topics:	architecture 2] Apply appropriate tec 3] Explain the organizati Basic Structure of computers	hniques to carry out on of memory and pr Assignment	selected arithmetic ope ocessor sub-system Data Analysis tas	erations k		9 C	asses
Course Content: Module 1 Topics:	architecture 2] Apply appropriate tec 3] Explain the organizati Basic Structure of	hniques to carry out on of memory and pr Assignment	selected arithmetic ope ocessor sub-system Data Analysis tas	erations k		9 C	asses
Course Content: Module 1 Topics:	architecture 2] Apply appropriate tec 3] Explain the organizati Basic Structure of computers	hniques to carry out on of memory and pr Assignment	selected arithmetic ope ocessor sub-system Data Analysis tas	erations k		9 C	asses
Course Content: Module 1 Topics:	architecture 2] Apply appropriate tec 3] Explain the organizati Basic Structure of computers Basic Operational concep	hniques to carry out on of memory and pr Assignment	selected arithmetic ope ocessor sub-system Data Analysis tas	k k ation of Cc		9 C	asses

Input/output Design: Accessing I/O Devices, I/O communication, Interrupts, DMA.

Module 3				
	Arithmetic and Memory unit	Case Study	Data analysis task	9 Classes
point operations.	Basic Concepts, Interna	•	ultiplication, Integer Division, mory chips, Read Only Memo	_
Module 4	BPU and Pipelining	Assignment	Analysis, Data Collection	10 Classes
Instruction, Multiple	Bus Organization.		on, Control sequence, Execution	of a Complete
	of pipelining, 5 stage inst		5.	
AMD, Motorola, N Memory circuit de Fabrication engine Tools: Simplescal EasyCPU fo RTLsim a d	Vidia, Samsung, Micron sign and verification en	Technology, western gineers, Physical syste y of computer archite a MIPs like CPU	emory chip fabrication vendo Digital etc. Targeted job profi em design engineer, System pr	les include
	anmont:			
Project work/Assi	giinent.			
Mini Project: • Model a vi	-		mory hierarchy having a layer icies	ed cache with
Mini Project: • Model a vi branch pre	irtual computer system edictors and cache repla			ed cache with
Mini Project: • Model a vi branch pre Term Assignments	irtual computer system edictors and cache repla	icement/insertion pol		0

RISC architectures including DEC Alpha, ARC, AMD 29k, Atmel AVR, Intel i860, Blackfin, i960, Motorola 88000, MIPS, PA-RISC, Power, SPARC, SuperH, and ARM too.

• A short survey of the recent trends in the Cache memory design

Study and analyze few important present day cache memory design issues like the levels used, the mapping technique employed, read and write policies, coherency scenarios etc.

Text Book

- 1. "Computer Organization"- Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Fifth Edition, McGraw-Hill Higher Education, 20016 reprint.
- 2. "Computer Organization and Design The Hardware/Software Interface" David A. Patterson & John L. Hennessy, Fifth Edition, Morgan Kaufmann, Elsevier Publications, 2017.

References

1. "Computer Organization & Architecture – Designing for Performance" - William Stallings, 9th Edition, Prentice Hall, Pearson Education Inc., 2015

Topics relevant to development of "FOUNDATION SKILLS": Generation of Computers, CISC and RISC processors, Bus Arbitration.

Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Collaboration and Data collection for Term assignments and Case Studies.

Catalogue prepared by	Prof. Tapas Guha, Dr. K.G. Mohan, Prof. Srivinay
Recommended by the Board of Studies on	BOS NO: 12 th BOS, held on XX/XX/XX
Date of Approval by the Academic Council	Academic Council Meeting No. 14, Dated XX/XX/XX

Course Code:	Course Title: Operating Systems		3	0	3
CSE2010	Type of Course: Program Core and Theory Only	L- P- C			
Version No.	1.0				
Course Pre- requisites	 [1] Programming fundamentals: Pseudocode, Data Type Control Structures, Functions, Loops, Arrays, Structures [2] C programming syntax and semantics [3] Data Structures: pointers, stacks, queues, linked lists 		rators, S	Selectio	'n
Anti-requisites	NIL				
Course Description	The purpose of this course is to enable the students to under systems and to develop the basic concepts of process management. The course is both conceptual and ar Managing the Process and Memory and needs fair knowledg C programming and data structures. The course develops the skills on allocating and managing resources. The course also and systems programming abilities through assignments.	gement, Sy nalytical in ge of progr e critical th	nchroni nature amming ninking a	zation a towards fundation indenal	nd Julie Jentals, V Vtical Register

Comes	 1] Describe the fun 2] Solve problems of 3] Apply different t 	pletion of the course the s damental concepts of Op on various CPU Scheduling echniques on to a various memory management tec	erating Systems. g Algorithms. s synchronization problems.	
Course Content:				
Module 1	Introduction	Assignment	Programming/Data Collection	9 Hours
management acti	ivities handled by the	ne OS, Computing envir	rating System Structure, Operations ronments, Operating System Service loaders, linkers], Overview of OS	es, User and
Module 2	Process Management	Coding Assignment/Case Study	Pseudocode/Programming	9 Hours
Multithreading N	Iodels, Process Sch		ss Communication, Introduction to to to the second se	
Module 3	Process Synchronization and Deadlocks	Coding Assignment/Case Study	Pseudocode/Programming	9 Hours
Topics:		son's Solution Synchro	nization hardware, Mutex locks, S	
Monitors, Classic	al Problems of Syr dling deadlock: Dead Memory	nchronization. Introduc dlock Prevention- Dead Assignment/Case	tion to Deadlocks, Deadlock Chara lock Avoidance- Deadlock detection Programming/Simulation/Data	acterization,
Monitors, Classic Methods for hand from Deadlock. Module 4 Topics: Introduction, Swa Structure of the P	al Problems of Syr dling deadlock: Dead Memory Management apping, Contiguous Page Table – Deman tion:	Assignment/Case Study Study Study Study Study Study Study Study Study	tion to Deadlocks, Deadlock Chara lock Avoidance- Deadlock detection	9 Hours 9 Hours 9 Action - Shing - Shing.

- 1. 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.
- 2. 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

1>	Develop programs to demonstrate the below concepts.
	Process creation using fork() system call in Linux OS.
	IPC using POSIX shared memory API.
	Process synchronization using POSIX API.
	Monitors usage in JAVA/C#.
	Process creation using CreateProcess() system call in Windows OS.
-	

- 2> Develop your own CLI/Shell for Linux OS[like a mini BASH].
- 3> Download the Linux/ Fuchsia Kernel and compile and run.
- 4> Using POSIX Semaphores solve the below synchronization problem.

There are 3 processes [P1, P2, P3] having 3 statements S1, S2, S3. The requirement is that irrespective of the order of execution of the processes the statements should execute in the order S1, S2, and S3.

- 5> Using POSIX Semaphores demonstrate the scenario where in deadlock happens because of incorrect use of the semaphores.
- 6> Write a C#/Java program to implement the algorithm you studied to solve the Dining Philosopher problem using Monitors.
- 7> Simulation of memory management techniques.
- 8> Simulating synchronization issues in banking system transactions and traffic management.
- 9> Installation of Windows 10, Linux.

Text Book

1. Silberschatz A, Galvin P B and Gagne G, "Operating System Concepts", 9th edition Wiley, 2013.

References

- 1. Operating Systems | Internals and Design Principles | Ninth Edition | By Pearson Paperback 1 March 2018. by William Stallings (Author)
- 2. https://www.os-book.com/OS9/

Topics relevant to development of "Foundation Skill" and "Skill Development": Processes, Threads, CPU Scheduling, Synchronization, Memory Management.

Topics relevant to "Environment and Sustainability": Concepts of Multithreading, Deadlocks.

Catalogue prepared by	Mr Sunilkumar Teggihalli, Mr Asif Mohamed H B, Mrs Sneha S Bagalkot, Mr Rupam Bhagawati.			
Recommended by the Board of Studies on	BOS NO: 11 th. BOS to be held	anne sucru		
Date of Approval by the Academic Council	Academic Council Meeting No. 14 to be held	REGISTRAR		

Course Code: CSE2012		oase Management Sy ogram CoreTheory– ed	vstems	L-P-C	2	4	4	
Version No.	1.0							
Course Pre- requisites	Data Structures and Selection methods.	Algorithms – Diffe	rent ways of	organizin	ig the	e data	and	
Anti-requisites	NIL							
Course Description	and implementation of course covers therein how to organize, ma students to learn and The associated labor structured query 1 the exercises will focu- and secure database		This introductions [RDBMS]. the information of and database to implement nation techno is for creating s	tory appl More em a efficien e designs database blogy ap sophistica	icatic phasi tly. If e des plica ited, i	on-orio s is s t help sign tions.	ented et on s the using All	
Course Out Comes	 Describe the core Illustrate the d Normalization. Demonstrate queries Describe the conditional conditions 	etion of the course the concepts of relational esign principles for ry evaluation and quer cepts of Transaction n prcial relational databa	database man Database de ry optimization nanagement.	agement esign, El	syster R M		and	
Course Content:								
Module 1	Introduction to databases and Relational Algebra	Assignment	Programming	g task	8 (Class	es	
Schemas, and In design using ER- Relational Algeb	Database: Characteri stances, Data Model Relational mapping, ra: Relational algebra ons: JOIN and DIVIS	lling using Entities a Query By Example(Q operators, relational of	nd Relationshi (BE). operations from	ips, Rela	ationa ry, bi	l data		
Module 2	Schema Refinement	Assignment	Problem So	olving		ISSC IV	131	

Module 3	Query Processing And Optimization	Assignment	Programming Task	4 Classes
Query Processing a for executing query	nd Optimization: Qu operations.	ery interpretation, E	quivalence of expres	ssions, Algorithm
Module 4	Transaction Management.	Assignment	Problem Solving	6Classes
2	s-characterizing scheors.	1 1	<i>c</i>	2
•	e given requirements; . [Movie Databases]	valid attributes and d	ata types and Perform	n DDL operations
Level 1: Perform of and DELETE on St	alid DML operations	Manipulation Langua	ge commands like IN	SERT, UPDATE
Level 1: Create ta	To implement differe bles on Banking da d Other Constraints.	91	. ,	IULL, UNIQUE,
5	fferent types of data a s as per the given sce		5	n the requirement
WHERE clause. [Jour FE
Level 1: Illustrate	the working of SELE	CT, FROM and WHI	ERE clause on Banki	ng Database.

Level 2: Implement SQL queries for Data Retrieval for a given Database using SQL clauses as per the given scenario.[Music Databases]

Experiment No. 5: To Retrieve Data from Database using different types of operators. [4 Classes]

Level 1: Demonstrate the working of relational, logical, pattern matching, BETWEEN, IS NULL, IN and NOT IN Special Operators on Banking Database.

Level 2: Implement SQL queries for Data Retrieval on a given Database using different types of operators.

Experiment No. 6: To study and implement aggregating Data using Group by, HAVING and sort data using Order By Clauses. [4 Classes]

Level 1: Implement the conjugate of GROUP BY, ORDER BY and aggregate functions on Banking Database.

Level 2: Implement SQL queries for Data Retrieval on a given Database using appropriate clauses and aggregate functions.[Library databases]

Experiment No. 7: To study and implement different types of Set and Join Operations [4 **Classes**]

Level 1: Demonstrate different types of Set Operations (UNION,UNION

ALL,INTERSECT,MINUS) and Join Operations (INNER JOINS,OUTER JOINS,CROSS JOIN,NATURAL JOIN).Use Bank Database.

Level 2: Use Set and Join operations to retrieve the data from two or more relations as per the given scenario..[Library databases]

Experiment No. 8: To Retrieve Data from a given Database using Nested queries, Correlated queries. [4 Classes]

Level 1: Implement Data Retrieval using Nested and Correlated queries on a given Database.[Airline Database]

Level 2: Analyze the difference between nested query, correlated query choose the appropriate one as per the Mini Project domain

Experiment No. 9: To study and implement Views, Procedures, Functions and Triggers in SQL [4 Classes]

Level 1: Implement SQL Views, Procedures, Functions and Triggers in SQL on Employee database. Level 2: Analyze the requirement and construct views, Procedures, Functions and Triggers-Mini Project Domain.

Targeted Application & Tools that can be used:

Application Area: Relational database systems for Business, Scientific and Engineering Applications.

Tools/Simulator used: Mysql.

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

- 1. Problem Solving: Constructing ER-Diagrams for a given real time requirements, Normalizing the databases, querying the databases using relational algebra.
- 2. Programming: Implementation of given scenario using SQL.
- 3. Mini project: Build a real time database application using suitable frontend tool. Indicative areas include; health care, education, industry, Library, Transport and supply chain, etc.

Text Book

1. Elmasri R and Navathe S B, "Fundamentals of Database System", 7th Edition, 2016 Pearson Publication.

References

- 4. Database systems, the complete book- 2nd edition- Hector Garcia Molina, Jeffery D Ullman, Jennifferwidom. Pearson publication.
- 5. Database System Concepts 7th Edition, 2019, AviSilberschatz · Henry F. Korth · S. Sudarshan. McGraw-Hill

Topics relevant to development of "FOUNDATION SKILLS": S - Skill Development: Relational database design using ER- Relational mapping, Query By Example (QBE). Implementation of given scenario using SQL.

Topics relevant to development of Employability: Administer, test and implement computer databases, creating sophisticated, interactive and secure database applications

Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS: Nil

	6. Dr.R.Mahalakshmi
	7. Mr. Mrutyunjaya M S.
Catalogue	8. Dr. Manujakshi B C.
prepared by	9. Ms. Napa lakshmi.
	10. Mr. James Mathew.
	11. Ms. Shaleen Bhatnagar.
Recommended	Mention the BOS Number and the Date of BOS
by the Board of	
Studies on	
Date of	Mention the Academic Council Meeting
Approval by the	No. & the date of the meeting:
Academic	
Council	
	auus

Course Code: CSE2018	Course Title: Theory of Computations	L- P- C	3 REC	STRAR	Registrar	
-------------------------	--------------------------------------	---------	-------	-------	-----------	--

	Type of Course:	Program Core, Theory on	y Course		
Version No.	1.0				
Course Pre- requisites			Union, Intersection,	Set Difference	e and
Anti-requisites	NIL				
Course Description	appreciate the s language classe required for the conceptual and Mathematical a and analytical s	Theory of Computation tudy of formal language as and the automata that e students to analysis as analytical in nature and computing. The cou- skills. The project work ammar and Turing Mach	and the correspond t recognizes. Analy nd to develop, the and needs fair h rse develops the cr c helps the students	lence betwee tical ability i course is bot knowledge o itical thinkin s to build an	n s h of g
Course Out Comes	 Describe Fin Distinguish b Construct Pu 	pletion of the course the stuc ite Automata for the giv petween Regular Gramma sh Down Automata for a machine for a Languag	en Language. ar andContextFree(given language.	Grammar	
Course Content:					
Module 1	Finite Automata	Case Study	Simulatio	on	12 Classes
Representation of concepts of Finit and Languages a Languages and	of automata, Lar te automata, DFA and DFA's, Regul NFA's. Equival	cory, Applications of nguage recognizers, Ex - definitions of DFA, D lar Languages, NFA- D ence of Deterministic as in Finite Automata.	ample for languag eterministic Accept efinition of a Nond	e Recognize ers Transitio eterministic	rs. Basic n Graphs Accepter,
Module 2	Regular Expressions & Context Free Grammar	Assignment	Programmi	ng	6 Classes



- ·
I opics:
1

Formal Definition of a Regular Expression, Languages Associated with Regular Expressions, Closure Properties of Regular Languages, Pumping Lemma, Context Free Grammars-Examples of Context-Free Languages, Leftmost and Rightmost Derivations, Derivation Trees, Ambiguity in Grammars and Languages, Chomsky Normal Form, Greibach Normal Form.

Module 3	Push Down Automata	Assignment	Simulation	7 Classes
----------	-----------------------	------------	------------	--------------

Topics:

Definition of a Pushdown Automaton, Language Accepted by a Pushdown Automaton, Pushdown Automata for Context-Free Languages, and Context-Free Grammars for Pushdown Automata, Nondeterministic Pushdown Automata and Deterministic Pushdown Automata.

Module 4	Turing Machine	Assignment	Programming/Simulation	7 Classes
Topics				

Topics:

Definition of a Turing Machine, Turing Machines as Language Accepters, Example Languages to construct Turing machine, Turing Machines as Transducers ,example Transducers

Targeted Application & Tools that can be used:

Targeted Application:

[1]. Text Processing

- [2]. Compilers
- [3]. Text Editors
- [4]. Robotics Applications
- [5]. Artificial Intelligence

Tools:

JFLAP (Java Formal Language and Automata Package) Software simulation tool. It's interactive educational software written in Java to experiment topics in automata theory.
 Turing machine Online simulators.

Project work/Assignment:

 Simulate and verify the string acceptance and rejection using deterministic finite automata / Push down automata / Turing machine for any given regular language or a non-regular language in JFLAP software simulation tool. 2. Write a program to convert non-deterministic finite automata to deterministic finite automata.

3. Implement the given context free grammar and verify the string parsing. Text Book

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

References

- 1. Aho, Ullman and Hopcroft, "Theory of Computation", Pearson India 3rd Edition 2008.
- 2. Michael Sipser, "Theory of Computation", Cengage India 3rd Ed, 2014.

Topics relevant to Development of "Foundation Skills": Language Recognizers, Basic Concepts of Finite Automata.

Catalogue prepared by	Dr. Manujakshi B C , Ms. Thasni T, Ms. Manjula H M, Ms. Megha D Bengaluru, Ms. Dipali K Dakhole, Ms. Sheethal Aji Mani, Ms. Nikita, Ms. Shwetha P C
Recommended by the Board of Studies on	BOS NO: 11 th. BOS held on 23/4/21
Date of Approval by the Academic Council	Academic Council Meeting No. 14, Dated 21/5/21

Course Code: CSE2011	Course Title: Data Communications and Computer Networks				
	Type of Course: Program Core Theory–Laboratory integrated	L-P-C	2	2	3
Version No.	1.0				
Course Pre- requisites	NIL		_		
Anti-requisites	NIL		Jan	ule	

REGISTRAR

Course Description Course Out Comes	 The objective of this course is to provide the knowledge in data communications and computer networks, its organization and its implementation, and gaining practical experience in installation, monitoring, and troubleshooting of LAN systems The associated laboratory is designed to implement and simulate various networks using cisco packet tracer, NS2. All the lab exercises will focus on the fundamentals of creating multiple networks, topologies and analyzing the network traffic. On successful completion of the course the students shall be able to: Explain the concepts of Computer Networks and Working Principles of Application Layer and Transport Layer (Comprehension) Apply the Knowledge of IP Addressing and Routing Mechanism in Computer Networks. (Application) Discuss the functionalities of Data Link Layer (Comprehension) Explain the Basic Concepts of Data communication. (Comprehension) 						
Course Content:							
Module 1	Overview, Application and Transport Layers.	Assignment	Problem Solving	13 Classes			
The Web and HTTI Introduction and T	P, DNS—The Internet's I ransport-Layer Services,	, OSI Reference Model, To Directory Service, Socket Connection-less Transpo s of Congestion Control, T	Programming: Creating rt: UDP, Principles of	Network Applications.			
Module 2	Network Layer	Assignment	Problem Solving	12 Classes			
Addressing, IPv6, IPv Algorithms: The Link	Overview of Network Layer, Forwarding and Routing, The Data and Control Planes. The Internet Protocol (IP): IPv4, Addressing, IPv6, IPv4 Datagram Format, IPv4 Addressing, Network Address Translation (NAT), IPv6. Introduction Routing Algorithms: The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Intra-AS Routing in the Internet, OSPF Routing Among the ISPs: BGP, Introduction to BGP. ICMP: The Internet Control Message Protocol.						
Module 3	Data Link Layer	Assignment	Problem Solving	10 Classes			
Checks, Check sumn	ning Methods, Cyclic Red nk-Layer Addressing an	J ovided by the Link Layer, En undancy Check (CRC), Mul d ARP, Ethernet, Link-L	Itiple Access Links and Plant a	rotocols. Switched Local			

		sical Layer with Data mmunication	Assignment	Problem Solving	07 Classes
Sine Wave, Phase, W Impairment, Data F Bandwidth, Through	Vavelength Rate Limit nput, Laten	n, Time and Freque s: Noiseless Chanr ncy (Delay), Bandwi	ncy Domains, Composite nel, Nyquist Bit Rate, N dth-Delay Product, Paral	alog and Digital Signals, I Signals, Bandwidth, Digit oisy Channel: Shannon (Iel/Serial Transmission, N me-Division Multiplexing.	al Signals, Transmission Capacity, Performance
Targeted Applica	ations &	Tools that can	be used: Cisco Packe	et Tracer, Wireshark, a	and NS2.
Case Study/Assig proposed for thi	•		alyze a network from	n any organization/#	Assignment
	-		propriate devices an network using NS2.	d implement various	network concepts
		D #0 1 1			
T1. James F. Kurose,				lition, Tata McGraw-Hill, 2	
References R1. William Stallings	uzan, "Dat	ta Communications	and Networking", 6 th Ec		7.
T1. James F. Kurose, T2. Behrouz A. Foro References R1. William Stallings	uzan, "Dat s: "Data an n and Bruc ces and E-k sources (Li	ta Communications ad Computer Comm te S. Davie: Comput books: brary Resources)	and Networking", 6 th Ec nunication", 10th Edition er Networks – A System	lition, Tata McGraw-Hill, : , Pearson Education, 201	7.
T1. James F. Kurose, T2. Behrouz A. Foro References R1. William Stallings R2. Larry L. Petersor Web Based Resourc Digital Learning Res	uzan, "Dat s: "Data an n and Bruc ces and E-k sources (Li	ta Communications ad Computer Comm te S. Davie: Comput books: brary Resources) naticsglobal.com/lo	and Networking", 6 th Ec punication", 10th Edition er Networks – A System ogin athinam mar Srivastava ndhuri	lition, Tata McGraw-Hill, : , Pearson Education, 201	7.

Recommended by the Board of Studies on	BOS NO: 12th BOS, held on 04/08/2021
Date of Approval by the Academic Council	Academic Council Meeting No. 16, Dated 23/10/2021

Course Code: CSE 2014	Course Title: Software En Type of Course: School Co	• •	lv]	L- P- C	3	0	3
Version No.	1.0	ine [meory on	14.1				
Course Pre-	NIL						
requisites							
Anti-requisites	NIL						
Course Description	The objective of this course i process and principles. The course covers software r	equirement eng	ineering proces	ses, syster		_	-
	implementation and testing a The course covers software c				aintenan	re	
Course Out Comes	On successful completion of 1] Describe the Software Eng 2] Identify the requirement application(Comprehension) 3] Understand the Agile Prince	this course the s ineering princip ents, analysis	students shall be les, ethics and p and appropria	e able to: process mo	odels(Kno	wledge	-
	4] Apply an appropriate plan software(Application)			maintena	nce prin	ciples in	volved in
	Introduction to						
	Software Engineering						
Module 1	and Process Models	Quiz				0	9 Hours
	(Knowledge level)						
Introduction: Need	for Software Engineering, P	rofessional Soft	ware Developm	nent, Soft	ware En	gineerir	g Ethics,
	g Practice-Essence of Practice,						
Models: Waterfall N	lodel – Classical Waterfall Mod	el, Iterative Wa	terfall Model, Ev	olutionary	/ model-9	Spiral, P	rototype.
	Software Requirements,		Developmen				
Module 2	Analysis and Design	Assignment	documents fo	or a giver	1	1	1 Hours
	(Comprehension level)		scenario				
•	neering: Eliciting requireme fication (SRS), Requirement An				•		
	am and Swim lane diagram. C	CASE support in	Software Life C	ycle, Char	acteristic	s of CA	SE Tools,
Architecture of a CA				с	0	V.	
Design: Design conce	epts, Architectural design, Con	nponent based o	design, User inte I	erface desi	gn.	1.111	/
Module 3	Agile Principles & Devops	Quiz			REG	ISTRAR	9 Hours Registrar
	(Knowledge level)					1	

ANGALOS

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	Software Testing and Maintenance (Application Level)	Assignment	Apply the testing concepts using Programing	12 Hours
Software Testing-		, Test Strateg	ies - White Box Testing, Black	box Testing.
Automation Tools	for Testing.			
•		•	y assurance, SQA Tasks, Goals	and Metrics,
-	ation management- SCM pro			
		Maintenance	, Software Reverse Engineeri	ng, Software
Maintenance Proc				
Targeted Applicat	ion & Tools that can be use	d: Selenium, G	itHub, CASE Tools	
Project work/Assi	gnment: Mention the Type	of Project /As	signment proposed for this cours	se
1] Identification	of Software Process Models	for a given sce	enario	
2] Development	of SRS documents for a give	n scenario		
3] Apply the whit	e box and black box testing	concepts using	g Programing	
4] Installing Seler	nium/GitHub software and e	exploring the fu	unctionality	
Text Book				
1] Roger S. Pressmar	n, "Software Engineering – A P	ractitioner's App	proach", VII Edition, McGraw-Hill, 20	17.
2] Bob Hughes, Mike	e Cotterell, Rajib Mall, "Softwa	re Project Mana	gement", VI Edition, McGraw-Hill, 2(018.
References 1] Rajib Mall, "Funda	amentals of Software Engineer	ing", VI Edition,	PHI learning private limited, 2015.	
2] Ian Sommerville	e, "Software Engineering", I	K Edition, Pears	on Education Asia, 2011.	
3] Agile Software [Development Principles, Pat	terns and Prac	tices.1 st Edition, Wiley, 2002	
Catalogue prepared by	Dr. S. Pravinth Raja, Associat Ms. Sweet Subhashree, Assis			
Recommended by	BOS NO: 12th BOS, held			
the Board of	$\left \begin{array}{c} 1005 \text{ NO. 12} \text{ III } 1005, \text{ IIII } 1005 \right $	011 04/06/202		
Studies on				
Date of Approval	Academic Council Meetin	σ No. 16 Date	d 23/10/2021	
by the Academic		5 110. 10, Date	a 25, 10,2021	
Council				
counten				

Course Code:	Course Title: Theory of Computations	L- P- C	3	0	3
CSE 2018			V	anne	NCY UM
Version No.	0.9		0		E CE
Course Pre- requisites	NIL		REGI	STRAR HA	Registrar

Anti-requisites	NIL			
Types of Skills	Foundation Skills, Analytical, Logical and Mathematical Thinking			
Course Caters	Metatheory of Con	nnuting		
to	Weatherly of Con	iiputing		
Course Description	The purpose of Theory of Computation Course is to enable the students to appreciate the study of formal language and the correspondence between language classes and the automata that recognizes. Analytical ability is required for the students to analyze and develop. The course is both conceptual and analytical in nature and needs fair knowledge of Mathematical and computing. The course develops the critical thinking and analytical skills. The simulation using JFLAP makes the student to visualize the automata construction and string parsing. The project work helps the students to build any context free grammar and Turing Machine for the Language.			
Course Out Comes	 On successful completion of the course the students shall be able to: [1] Understand basic concepts of Automata and its types. (Knowledge) [2] Construct Finite Automata with its Simulation. (Application) [3] Distinguish between Regular Grammar and Context Free Grammar. (Comprehensive) [4] Design Push Down Automata. (Application) [5] Implement Turing machine for a Language. (Application) 			
Course Content:				
Module 1	Introduction to Automata Theory	Assignment	Data Collection	6 Hours
			Automata Theory, Basic Demple for Language Recognizers.	-
Module 2	Finite Automata	Assignment	Simulation	12 Hours
Topics:			am	STENCY UNITED
-		-	DFA, Deterministic Accepters 7 NFA- Definition of a Nondete	ransition

Accepters, Red		Equivalence of D of States in Finite	eterministic and Nondeterminis Automata. (Ap	stic Finite plication)	
Module 3	Regular Expressions & Context Free Grammar	Assignment	Programming	8 Hours	
Topics:					
		· • •	mma, Context Free Grammars-Ex rivations, Derivation Trees, Am (Comp	-	
Module 4	Push Down Automata	Assignment	Simulation	7 Hours	
	Turing			6	
				U	
	Machine Turing Machine, Tu	Assignment	Programming/Simulation anguage Accepters, Example Lar	Hours	
Topics: Definition of a construct Turin	Machine Turing Machine, Tu	uring Machines as La	anguage Accepters, Example Lar	Hours	
Topics: Definition of a construct Turin	Machine Turing Machine, Tu Ing Machine.	uring Machines as La	anguage Accepters, Example Lar	Hours	
Topics: Definition of a construct Turin Targeted App	Machine Turing Machine, Tu og Machine. Ilication & Tools that cation: ssing rs pplications	uring Machines as La	anguage Accepters, Example Lar	Hours	
Topics: Definition of a construct Turin Targeted Appl Targeted Appli [1] Text Proce [2] Compilers [3] Text Editor [4] Robotics A	Machine Turing Machine, Tu og Machine. Ilication & Tools that cation: ssing rs pplications	uring Machines as La	anguage Accepters, Example Lar	Hours	
Topics: Definition of a construct Turin Targeted Appl Targeted Appli [1] Text Proce [2] Compilers [3] Text Editor [4] Robotics A [5] Artificial In Tools: [1] JFLAP (Jav	Machine Machine, Tu Machine, T	and Automata Packa	anguage Accepters, Example Lar	Hours aguages to plication	

WGALOS

Project work/Assignment:

- 4. Simulate and verify the string acceptance and rejection using deterministic finite automata / Push down automata / Turing machine for any given regular language or a non-regular language in JFLAP software simulation tool.
- 5. Write a program to convert non-deterministic finite automata to deterministic finite automata.
- 6. Write a Java program to verify the given context free grammar is valid not.
- 7. Write a Java program to validate the given input (check it is valid or not) using Regular Expression.
 - i) IP Address
 - ii) Aadhaar number

Text Book

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

References

- 1. Aho, Ullman and Hopcroft, "Theory of Computation", Pearson India 3rd Edition, 2008.
- 2. Michael Sipser, "Theory of Computation", Cengage India 3rd Edition, 2014.

Topics relevant to Development of Foundation Skills: Language Recognizers, Basic Concepts of Finite Automata.

Catalogue	1. Dr. Manujakshi B C
prepared by	2. Ms. Dipali K Dakhole
prepared by	1
	3. Dr. Gowthul Alam M M
Recommended	BOS NO: 13 th BOS, held on 08/12/2021
by the Board	
of Studies on	
Date of	Academic Council Meeting No. 17, Dated 11/12/2021
Approval by	auuse wer were
the Academic	
Council	REG STRAR

Catalog	Catalogue reviewed in DAC meeting held on 28.01.2022 and subject to approval
Reviewed	in BOS
Details	

	Course Title: Discrete Ma	thematical Structures				
Course Code: MAT2004	Type of Course: Program	Core	L- P- C	3	0	3
Version No.	1.0					
Course Pre- requisites	Nil					
Anti-requisites	Nil					
Course Description	The course provides insights into the fundamental aspects of mathematical logic and predicate calculus. The course delves deeply into the concepts of algebraic structures, lattices and Boolean algebras which are widely used in computer science and engineering. It also highlights the principles of counting techniques and their applications.					
Course Objective	The objective of the course is Skill Development of student by using Participative Learning techniques.					
Course Outcomes	 On successful completion of the course the students shall be able to CO-1: Explain logical sentences through predicates, quantifiers and logical connectives. CO-2: Comprehend the basic principles of set theory and different types of relations. CO-3: Elucidate the concepts of lattices and Boolean algebra. CO-4: Deploy the counting techniques to tackle combinatorial problems. 					
Course Content:						
Module 1	Mathematical Logic and Predicate Calculus				12 Se	essions
		alences, normal forms, infer is, the statement function, i		-		•
Module 2	Algebraic Structures				10 Se	essions
		their properties & representati ns, primitive recursive function		tion by m	atrix, clo	osure
Module 3	Lattices and Boolean Algebra			0	11 8	essions
				~REG	STRAR	Registrar

Distributive la	g, Posset, Lattices & Algebraic stru ttices, complement of an elemen			-
and unique co	mplement theorem.			
Module 4	Principles of Counting Techniques			12 Sessions
	inder theorem, Pigeonhole prine rmutations and combinations, rec		nole principle, mathemati	cal induction,
Discrete mathe data structure computer secu	ications & Tools that can be us ematics provides the mathemates, algorithms, database theority, and operating systems. S-Excel / Mathematica / Maple	tical foundations for man pry, automata theory,		-
Project work/	Assignment: Mention the Type	of Project /Assignment	t proposed for this cours	<u></u>
Assignment 2: Assignment 3: Text Book	Logical equivalences and pred Equivalence relations and lat Recurrence relations. H. Rosen, "Discrete Mathemati	tices.	7th Edition, McGraw-Hil	l, 2011.
Scienco 2. Grimal Pearso	oks: lay, J.P. and Manohar.R, "Disc e", 30th Reprint, Tata McGraw di R.P., "Discrete and Combin n Education, New Delhi, 2007. sanna S, "Discrete Mathematic	Hill, New Delhi, 2011. atorial Mathematics: A	n Applied Introduction"	, 4th Edition,
Edition 5. Liu, C 4 th Edit	n Bernard, Busby Robert C and J. Pearson, India, 2015. L. Mohapatra, D P.," Elements ion, McGraw Hill, New Delhi, J d Johnsonbaugh, Discrete Math	s of Discrete Mathemat 2015.	ics a Computer oriented	
	oe L, Kandel Abraham, Baker sts and Mathematicians", 2 nd E			puter
1. <u>https://ope</u> 2. https://ope 3. https://dir Web Resource		/textbooks/394 /textbooks/237 e/20.500.12854/45249	REGIS	TRAR CY UN
•	crete.openmathbooks.org/p w.pdfdrive.com/discrete-mathematics	•		RAR Registrar

3. https://www.cis.upenn	.edu/~jean/discmath-root-b.pdf			
Video Lectures				
1. https://www.youtube.c	com/watch?v=i3CpxxFedIA			
2. https://www.youtube.c	com/watch?v=FMh8qNV3PHk			
3. https://archive.nptel.ac	3. https://archive.nptel.ac.in/courses/111/107/111107058/			
Catalogue prepared by	Dr. M. Rajeshwari			
Recommended by the Board of Studies on	8 th BOS on 23 rd July, 2022			
Date of Approval by the Academic Council	18 th AC on 3 rd August 2022			

Course Code:	Course Title: Cloud Computi	ng					
CSE2013	Type of Course: Theory			L- P- C	3	0	3
Version No.	1.0						
Course Pre-	[1] Data Communication	and Computer N	letworks (C	CSE2011))		
requisites							
Anti-requisites	NIL						
Course Description	This course provides a ha capabilities across the var as a Service (IaaS), Platf (SaaS). It dives into all o to plan for developing ap	rious Cloud servic orm as a Service of the details that oplications on the	ce models in (PaaS), and a student cloud and	ncluding d Softwa needs to	Infra re as knov	astru 5 a Se w in 6	cture ervice order
	using applications or serv						
Course Objective	This course is designed SKILLS using EXPERIE	l to improve th	ne learner		LOY	ABI	LITY
Course Objective	This course is designed	l to improve th NTIAL LEARNI	he learner ING techni	ques.	LOY	ABI	LITY
	This course is designed SKILLS using EXPERIE	I to improve the NTIAL LEARNI NTIAL LEARNI the course the studen nce of Cloud compu	ne learner ING techni nts shall be a iting technol	ques. ble to: ogies			LITY
	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt	I to improve th NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique	ne learner ING techni nts shall be a uting technol es to virtualiz	ques. ble to: ogies ze infrastr			
	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt 8) Discuss Cloud mechanism	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q	ne learner ING techni nts shall be a uting technol es to virtualiz QoS paramet	ques. ble to: ogies ze infrastr ers			LITY
Course Outcomes	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q	ne learner ING techni nts shall be a uting technol es to virtualiz QoS paramet	ques. ble to: ogies ze infrastr ers			LITY
	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt 8) Discuss Cloud mechanism	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q	ne learner ING techni nts shall be a uting technol es to virtualiz QoS paramet	ques. ble to: ogies ze infrastr ers			
Course Outcomes	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt 8) Discuss Cloud mechanism	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q	ne learner ING techni nts shall be a uting technol es to virtualiz QoS paramet	ques. ble to: ogies ze infrastr ers ices	uctur		
Course Outcomes Course Content: Module 1	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt 8) Discuss Cloud mechanism 9) Develop applications usin	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q ng Cloud services an Assignment	ne learner ING techni Ints shall be a uting technol es to virtualiz OS paramet nd VM instan	ques. ble to: ogies ze infrastr ers ices	uctur Nc	es o. of asses:	10
Course Outcomes Course Content: Module 1 Topics: Evolution of clo	This course is designed SKILLS using EXPERIE Upon successful completion of 6) Understand the significa 7) Identify appropriate Virt 8) Discuss Cloud mechanisr 9) Develop applications usin	I to improve the NTIAL LEARNI the course the studen nce of Cloud compu- ualization technique ns to optimize the Q ng Cloud services an Assignment	ne learner ING techni Ints shall be a uting technol es to virtualiz OS paramet nd VM instan	ques. ble to: ogies ze infrastr ers icces	uctur Nc	es o. of asses:	10

Topics: Basics of Virtualization - Types of Virtualizations, Taxonomy of Virtualization Techniques, Implementation Levels of Virtualization.

Module 3	Cloud QoS and Management		Assignment		Theory		No. of
would 5			Assignment		meory		Classes:10
Topics: Cloud Infra	structure Mechanisms.	SLAs	Specialized	Cloud	Mechanisms.	Cloud	Management

Mechanisms, Cloud Security Mechanisms

Module 4	Application development in Cloud	Assignment	Case Study	No. of Classes:10
----------	-------------------------------------	------------	------------	----------------------

Topics: Programming Models for Cloud Computing - Software Development in Cloud - Service creation environments to develop cloud-based applications. Development environments for service development (Demonstration using AWS Cloud); Dockers and Containers.

Targeted Application & Tools that can be used:

Targeted Applications:

Developing applications on Cloud Platforms via Virtual machines

Cloud Tools:

- CloudSim
- VMWare
- Amazon EC2
- Google Compute Engine
- Microsoft Azure

Project work/Assignment:

- 1. Automation of performance analysis of students through the Cloud
- 2. Chatbots development using Cloud resources
- 3. Blog creation using Cloud computing

Analysis of Case Studies: When deciding to adopt cloud computing architecture, decide if the cloud is right for your requirements (for the application identified).

Suggested List of Hands-on Activities:

SI. No	Title
1	Install Virtualbox/VMware Workstation with different flavors of Linux or Windows OS on top of windows 11
2	Install a C compiler in the virtual machine created using a virtual box and execute Simple Programs
3	Install Google App Engine (GAE). Create a "hello world" application and other simple web applications using python/java
4	Use GAE launcher to launch the web applications.
5	Simulate a cloud scenario using CloudSim and run a scheduling algorithm
6	Find a procedure to transfer the files from one virtual machine to another virtual machine Registra

7	Find a procedure to launch a virtual machine using Openstack
8	Demonstrate Migration, Cloning, and Snapshots within and across VMs
1	 Book(s) Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education, 2013 edition. John Rittinghouse and James Ransome, "Cloud Computing, Implementation, Management and Security", CRC Press, 2010 edition.
Refe	ences
	 Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, "Cloud Computing Concepts, Technology & Architecture", PHI publisher 2013 edition. Anthony T Velte, Toby J Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw-Hill, 2010
	edition.
	 Bavid E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing: Concepts and Technologies". CRC Press, 2021.
Wet	 3. David E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. 4. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing:
_	 David E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing: Concepts and Technologies". CRC Press, 2021.
_	 3. David E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. 4. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing: Concepts and Technologies". CRC Press, 2021. Resources and Research Articles links: I. IEEE Transactions on Cloud Computing- https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6245519
2	 3. David E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. 4. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing: Concepts and Technologies". CRC Press, 2021. Resources and Research Articles links: I. IEEE Transactions on Cloud Computing- https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6245519 International Journal of Cloud Computing-
2	 3. David E.Y. Sarna, "Implementing and Developing Cloud Applications", CRC Press, 2018 edition. 4. Manvi, Sunilkumar, and Gopal K. Shyam. "Cloud Computing: Concepts and Technologies". CRC Press, 2021. Resources and Research Articles links: I. IEEE Transactions on Cloud Computing- https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6245519 International Journal of Cloud Computing- https://www.inderscience.com/jhome.php?jcode=ijcc 3. CloudSim Resources- https://javadoc.io/doc/org.cloudsimplus/cloudsim-

	Mr. G Nagarajan
Recommended by the Board of Studies on	BOS NO: 19th BOS, held on 04/08/2022
Date of Approval by the Academic Council	Academic Council Meeting No. 18, Dated 03/8/2022.

Course Code: CSE2007	Course Title: I	Design and Analysis	of Algorithms		3	0	3
	Type of Course: Program Core & Theory only			L- P- C			
Version No.	2.1						
Course Pre- requisites	CSE2001, Data	Structure and Algorith	ns				
Anti-requisites	NIL						
Course Description	algorithms to such as divid	diate course enable solve problems. T e-and-conquer, dyn ns. The students sha	This course covers namic programmir	s typical ng and g	design reedy n	metho nethod	ds to
Course Objectives		designed to improve LVING Methodologies		LOYABII	LITY SK	XILLS b	y using
Course Outcomes	1] Identify the e 2] Employ divid 3] Illustrate dyn 4] Solve a probl	ompletion of the cours efficiency of a given alg e and conquer approa namic programming ap em using the greedy n	orithm. [Comprehen ch to solve a problem proach to solve a give nethod. [Application]	sion] I. [Applica en probler	tion] n. [Appli	_	
		techniques to solve a sion1					classes.
Course Content:	5] Discuss the [Comprehen						classes.
Course Content: Module 1			Problem Solvi			Se	06 essions
Module 1 Topics: Algorithm Design ar Growth and Notatio	[Comprehen Introduction to Algorithms ad efficiency, mea ns. Recurrences	Assignment suring of running time Masters method.	Problem Solvi of algorithms. Insertio	ng	d merge		06 essions
Module 1 Topics: Algorithm Design ar Growth and Notatio	[Comprehen Introduction to Algorithms ad efficiency, mea ns. Recurrences aratively evaluate	Assignment	Problem Solvi of algorithms. Insertio	ng	d merge	sort, Asy	06 essions
Module 1 Topics: Algorithm Design ar Growth and Notatic	[Comprehen Introduction to Algorithms ad efficiency, mea ns. Recurrences	Assignment suring of running time Masters method.	Problem Solvi of algorithms. Insertio	ng on sort an	Solving	sort, Asy	06 essions

Assignment: Des			and Conquer technique for a given	
Module 3	Greedy Algorithms	Assignment	Programming/ Problem Solving	0 Session
Topics:		Duchlass Minimal Co.	naine Turn Duinde Alexaithus a	ad Kasalaak
		-	anning Tree: Prim's Algorithm a	nd Kruskar
Algorithm, Single	e-source Shortest	Path: Dijkstra's Algorithm	. Huffman Codes.	
Assignment: Des	sign and Develop a	solution to a given scena	ario using greedy method.	
Module 4	Dynamic Programming	Assignment	Programming/ Problem Solving	0 Session
-	a given scenario, att	v Search Trees, Chain Matrix empt the three design parac	ligms learned so far and argue the bes	t approach t
solve the problem	Complexity	Assignment	Deserver in Constant Colore	09 Hou
	Classes and	8	Programming/ Problem Solving	
lexity classes: P,		plete Problems. Backtrac	king: n-Queens. Branch and bound:	Travelling
lexity classes: P, Salesman Proble Assignment: Apple Targeted Applica Application Area used by all appli	NP, and NP-Com em. y backtracking algor ation & Tools that	ithmic designing technique can be used: Analyzing the efficiency of	king: n-Queens. Branch and bound: for solving queen's problems for 4, 8 a of Algorithms. This fundamental co	nd 16 inputs
Salesman Proble Assignment: Apple Targeted Applica Application Area used by all appli Professionally U Project work/As	NP, and NP-Com em. y backtracking algor ation & Tools that a is to Design and cation developers sed Software: GC signment:	ithmic designing technique can be used: Analyzing the efficiency of C compiler.	for solving queen's problems for 4, 8 a	nd 16 inputs
lexity classes: P, Salesman Proble Assignment: Apply Targeted Application Application Area used by all appli Professionally U Project work/As 1. Problem	NP, and NP-Com em. y backtracking algor ation & Tools that a is to Design and cation developers sed Software: GC signment: Solving: Design o	ithmic designing technique can be used: Analyzing the efficiency of	for solving queen's problems for 4, 8 a of Algorithms. This fundamental co mentation of programs.	nd 16 inputs
lexity classes: P, Salesman Proble Assignment: Apply Targeted Application Application Area used by all appli Professionally U Project work/As 1. Problem 2. Program Text Book: T1. Thomas H. Press, 202	NP, and NP-Com em. y backtracking algor ation & Tools that a is to Design and cation developers sed Software: GC signment: Solving: Design o uming: Implement Cormen, Charles E.I 2.	ithmic designing technique can be used: Analyzing the efficiency of C compiler. f Algorithms and implem ation of given scenario u	for solving queen's problems for 4, 8 a of Algorithms. This fundamental co mentation of programs. sing Java.	nd 16 inputs

R3. AV Aho, J Hop	pcroft, JD Ullman, 'The Design and Analysis of Algorithms', Addison-Wesley, 1974.
Catalogue	Dr Sandeep Albert Mathias, Dr Murali Parameswaran
prepared by	
Recommended by	BOS NO: 12th BOS, held on 04/08/2021
the Board of	
Studies on	
Date of Approval	Academic Council Meeting No. 16, Dated 23/10/2021
by the Academic	
Council	

Course Code: CSE 2021	Course Title:Data Minir TypeofCourse:Discipline Theory	e Elective in Big Da	ta Basket	L-P-C	3	0	3
Version No.	1.1	1.1					
Course Pre-	MAT1001 – Linear Alge	MAT1001 – Linear Algebra and Calculus					
requisites							
Anti-requisites	NIL						
Course	This course introdu	ices an extensi	ve study on	data pr	e-proc	cessing	and
Description	classification algorith	ms.Thiscourse w	/ill help the stu	udents in	select	ing suit	able
	data mining algorith	nms to solve th	e real time p	roblems,	and	to disc	over
	frequent item sets by	association rule	algorithm. Th	e coursee	empha	sizes or	n the
	recent trends in spat	ial mining. It inte	eracts the stud	ents to s	tudy t	he diffe	erent
	Clustering algorithms	5.					
Course Objective	-	This course is designed to improve the learners' EMPLOYABILITY SKILLS by usir PROBLEMSOLVING Methodologies.					using
Course Out Comes	On successful completion [1] Describe the basic co				ledge]		
	[2] Discuss different prep	rocessing technique		s. orehension]		
	[3] Discover frequent iter	m sets by using Asso	-	ithms. pplication]			
	[4] Apply different Classifie	cation algorithms in	-	[Application	n]		
	[5] Apply the variouscluste	ering techniques.[Ap	oplication]				
					Q	alulle	
Course Content:					0	A A	NUTUNIC
Module 1	Introduction to Data Mining	Assignment	Data Co	ollection	REGI	6 Ses	sions *

Topics:Introduction to Data mining: Definition, KDD, Challenges, Data Mining Tasks - Data Mining Goals- Stages of the Data Mining Process–Data Mining Techniques– Applications – Major Issues in Data mining. Module 2 7 Sessions Data Preprocessing Quiz Problem Solving Topics: Types of data – Data Quality – Data Pre-processing Techniques – Similarity and Dissimilarity measures. Data Mining -Module 3 Assignment Problem Solving 7 Sessions Frequent Patterns Topics: Motivation and terminology: Basic idea - Item sets – Generating frequent item sets and rules efficiently – Apriori Algorithm – FP Growth. Assignment: Apply the Apriori algorithms for finding the frequent Item set in the given TDB. Module 4 Classification 8 Sessions Assignment **Problem Solving** Topics:Basic concepts – Decision tree Induction – Bayes classification methods – Rule based classification – Classification by Back Propagation – Lazy learners. Assignment: 1) Find the Gini Index value of the attributes. 2) Classify the given model using Decision tree algorithm. Cluster Module 5 AnalysisMethods and Assignment Problem Solving 8 Sessions Pattern Mining Topics:Cluster Analysis-Partitioning methods – Hierarchical methods – Basics of Density based method – Pattern mining: A Road Map – Spatial Mining. Assignment: 1) Cluster the objects using Cluster algorithms. 2) Problem for Cluster validation. 3) Apply the Process of data mining in the Employee database. Assignment:



Assignments

- 1. From the dataset given, find the Entropy, Gain value of the attributes and also draw the decision tree using entropy for the given dataset.
- 2. Transactional Data Base, D given below which contains set of items find the frequent item set using the Apriori Algorithm and generate the Association Rules. Minimum Support count is 2%. Minimum confidence is 60%.

T _{id}	ltems
10	1, 3, 4
20	2, 3, 5
30	1, 2, 3, 5
40	2, 5

Text Book:

T1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques",

Morgan Kaufmann Publishers, Third Edition, 2012.

References:

R1. Tan P. N, Steinbach M and Kumar V, "Introduction to Data Mining", Pearson Education, 2016.

R2. G K Gupta, "Introduction to Data Mining with Case Studies", Third Edition, PHI, 2014.

R3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill.

Weblinks:

https://onlinecourses.swayam2.ac.in/cec20 cs12/preview

Textbook of Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber and Jian Pei, Morgan Kaufmann Publishers, 2012

https://puniversity.informaticsglobal.com:2284/ehost/detail/detail?vid=7&sid=e2d7362a-fd30-49a9-8f03-

93e963521dbd%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=377411&db=nlebk

(or)

http://182.72.188.195/cgi-bin/koha/opac-

detail.pl?biblionumber=4001&query_desc=ti%2Cwrdl%3A%20Data%20Mining%3A%20Concepts%20and%20Techniqu_es

Topics relevant to development of "EMPLOYABILITY SKILL":Data Mining Techniques,FP Growth.

		0
Catalogue prepared	Dr. GowthulAlam M M	
by		asunde NCY UNI
Recommended by	BOS NO: 12th BOS, held on 04/08/2021	
the Board of Studies		REGISTRAR
on		BANGM OF

Date of Approval by	Academic Council Meeting No. 16, Dated 23/10/2021
the Academic	
Council	

Course Code: CSE2027	Course Title: Fu	undamentals of Data Ana :: Theory only	lytics	L- P- C	3	0	3
Version No.	1.0						
Course Pre- requisites	NIL						
Anti-requisites	NIL						
Course Description	Fundamentals of Data Analytics is designed for inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, and supports in decision-making. The course begins by covering Data extraction, pre-processing, and transformation. It delivers the basic statistics and taught in an intuitive way to analysis the data. This course will help the students to apply the knowledge on data analysis to a wide range of applications.						
Course Out Comes	 On successful completion of the course the students shall be able to: 1) Explain different types of data and variables. 2) Interpret data using appropriate statistical methods. 3) Apply the Data Analysis techniques by MAT Lab 4) Demonstrate the collection, processing and analysis of data for any given application and Illustrate various charts using visualization methods. 5) Apply Regression models to analysis of data. 						
Course Content:		·					
Module 1	Introduction to Data Analysis	Assignment	Data Collecti	on , data an	alysis	8	3 Hours
	Topics: Introducing Data, overview of data analysis: Data in the Real World, Data vs. Information, The						
	Many "Vs" of Data, Structured Data and Unstructured Data, Types of Data, Data Analysis Defined, Types of					•••••	
	ral Tendency of Data, Scales of Data, Sources of Data, Data preparation: Cleaning the data, ables, Data Transformations.						
Module 2	Statistical functions	Assignment	Data analysis	5	REG	ISTRAR	Hours

Topics: Sampling Techniques: Fundamental Definitions, Important sampling distributions concept of standard error, Descriptive Statistics, Inferential Statistics (T test, Z test,), Probability Uses In Business and Calculating Probability from a Contingency Tables.

	Introduction to MAT Lab	Project based MAT Lab	MAT LAB	9 Hours
within Data, Custom	nizing Graphics wi	•	orting Data From Multiples Files, Anal raphics Objects, Images and 3-D Surfa	
Importing Unstructu		1		
Module 4	Data Collection, Processing and Analysis	Project MAT Lab	Data Collection, visualization and data analysis	8 Hours
Collection of Data th	nrough Schedule) D)ifference between Questio	v Method, Collection of Data through Q nnaires and Schedules, Some Other Me Survey and Experiment Processing	thods of Data
Module 5	Data Visualization and Charting Prediction	Project MAT Lab	Data analysis with optimization	12 Hours
-	verview, Classi	Interpretation and report v fication, Regression, Regression, Simple Nc	Building a prediction model,	Applying a
prediction Mode	•			
Targeted Applicati Application Area a Decision making ir MAT Lab	are n business, healt	h care, financial sector,		
Targeted Applicati Application Area a Decision making ir MAT Lab	are n business, healt	h care, financial sector,	Medical diagnosis etc ssignment proposed for this course	2
Targeted Applicati Application Area a Decision making ir MAT Lab Project work/Assig 1. Collect student 2. Identify the pro analyses using visu 3. Collect the dat regression.	are n business, healt gnment: Mentio marks of test1 a oblem in any of ualization. ta related to a	h care, financial sector, I n the Type of Project /A nd apply inferential and the business and make griculture production a	descriptive statistics. one objective, collect the relevand sales and predict the values	nt data and
Targeted Applicati Application Area a Decision making ir MAT Lab Project work/Assig 1. Collect student 2. Identify the pro analyses using visu 3. Collect the dat regression.	are n business, healt gnment: Mentio marks of test1 a oblem in any of ualization. ta related to a	h care, financial sector, n the Type of Project /A nd apply inferential and the business and make	descriptive statistics. one objective, collect the relevand sales and predict the values	nt data an

1. Paul McFedries , "Excel Data Analysis-visual blue print", Wiley 4 th Edition September 2019. 2. Gerald Knight, "Analyzing Business Data with Excel", O'Reilly; 1 st Edition,13 January 2006. 3. https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm 4. Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021	Exploratory Data Analysis and Data Mining Paperback", Import, 22 July 2014. 2. William Menke And Joshua Menke, "Environmental Data Analysis with MAT Lab", Elsevier, 2012. References 1. Paul McFedries , "Excel Data Analysis-visual blue print", Wiley 4 th Edition September 2019. 2. Gerald Knight, "Analyzing Business Data with Excel", O'Reilly; 1 st Edition, 13 January 2006. 3. https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm 4. Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of studies on Academic Council Meeting No. 16, Dated 23/10/2021		
1. Paul McFedries , "Excel Data Analysis-visual blue print", Wiley 4 th Edition September 2019. 2. Gerald Knight, "Analyzing Business Data with Excel", O'Reilly; 1 st Edition,13 January 2006. 3. https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm 4. Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Council Meeting No. 16, Dated 23/10/2021	 Paul McFedries , "Excel Data Analysis-visual blue print", Wiley 4th Edition September 2019. Gerald Knight, "Analyzing Business Data with Excel", O'Reilly; 1st Edition,13 January 2006. <u>https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm</u> Hansa Lysander,"Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by Recommended by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Council Meeting No. 16, Dated 23/10/2021	2.	Exploratory Data Analysis and Data Mining Paperback", Import, 22 July 2014. William Menke And Joshua Menke,"Environmental Data Analysis with MAT Lab",
 Gerald Knight, "Analyzing Business Data with Excel",O'Reilly; 1st Edition,13 January 2006. <u>https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm</u> Hansa Lysander,"Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue prepared by Recommended by the Bos NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	 Gerald Knight, "Analyzing Business Data with Excel", O'Reilly; 1st Edition, 13 January 2006. <u>https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm</u> Hansa Lysander," Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue prepared by Recommended by the Bos NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	References	
 <u>https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm</u> Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by Recommended by the Board of Studies on Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	 <u>https://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm</u> Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue prepared by Recommended by BOS NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	1. Pau	l McFedries , "Excel Data Analysis-visual blue print", Wiley 4 th Edition September 2019.
4. Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue prepared by Recommended by the Board of Studies on Date of Approval by the Academic	4. Hansa Lysander, "Data Analysis and business modelling using Microsoft Excel", PHI, 2017. Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Meeting No. 16, Dated 23/10/2021	2. Ger	ald Knight, "Analyzing Business Data with Excel",O'Reilly; 1 st Edition,13 January 2006.
Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Council Meeting No. 16, Dated 23/10/2021	Topics relevant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization techniques. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Council Meeting No. 16, Dated 23/10/2021	3. <u>httr</u>	os://people.highline.edu/mgirvin/AllClasses/348/348/AllFilesBI348Analytics.htm
techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by Recommended by the Board of Studies on Date of Approval by the Academic Council Meeting No. 16, Dated 23/10/2021	techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021	4. Har	usa Lysander,"Data Analysis and business modelling using Microsoft Excel", PHI, 2017.
techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by Recommended by the Board of Studies on Date of Approval by the Academic Council Meeting No. 16, Dated 23/10/2021	techniques. Topics relevant to "HUMAN VALUES &PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021		
Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS": Data collection for project based assignments. Catalogue prepared by Dr. A Jayachandaran and Dr. R Vignesh Recommended by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Date of Approval by the Academic	•	ant to development of "FOUNDATION SKILLS": Statistical Concepts for data, visualization
assignments. Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Academic Council Meeting No. 16, Dated 23/10/2021 by the Academic	assignments. Dr. A Jayachandaran and Dr. R Vignesh prepared by Dr. A Jayachandaran and Dr. R Vignesh Recommended by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021	•	
Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021	Catalogue Dr. A Jayachandaran and Dr. R Vignesh prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of BOS NO: 12th BOS, held on 04/08/2021 Studies on Academic Council Meeting No. 16, Dated 23/10/2021	•	
prepared by BOS NO: 12th BOS, held on 04/08/2021 Recommended by the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	prepared by BOS NO: 12th BOS, held on 04/08/2021 the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	<u> </u>	
Recommended by the Board of Studies on BOS NO: 12th BOS, held on 04/08/2021 Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	Recommended by the Board of BOS NO: 12th BOS, held on 04/08/2021 Studies on Academic Council Meeting No. 16, Dated 23/10/2021 by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	-	Dr. A Jayachandaran and Dr. R Vignesh
the Board of Studies on Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	the Board of Studies on Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021		
Studies on Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021	Studies on Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021		
Date of Approval Academic Council Meeting No. 16, Dated 23/10/2021 by the Academic Council Meeting No. 16, Dated 23/10/2021	Date of Approval by the Academic Academic Council Meeting No. 16, Dated 23/10/2021		
by the Academic	by the Academic	Studies on	
			\mathbf{c}
	Council	by the Acade	mic
Council		Council	

Course Code: CSE 2066	Course Title: Computer Graphics	L-P-C	3	0	3
Version No.	1.0				
Course Pre- requisites	CSE 1002 - Innovation Project -Arduino using C				
Anti-requisites	NIL				
Course Description	The purpose of this introductory course is to discuss the basics of graphics and visualization in computer science, enabling students to appreciate how the computer system displays graphics and visual effects on a display device. This equipe includes Theoretical elements, and addresses basic knowledge of high school geometry and			nputer cludes	

	Linear Algebra. The course uses assi	gnments to develop vis	sualization skills of
	the students. The key topics covered in	n this course include alg	orithms for drawing
	basic primitives, transformations, viewing and clipping for both 2D and 3D objects		
	along with Bezier curves and Surfaces.		
Course Objective	The objective of the course is to develop skill for students on learning algorithms on transformation / Viewing/ Clipping on 2Dd and 3D objects by using Participative Learning techniques.		
Course Out Comes	On successful completion of the course the students shall be able to:		
	CO 1: Illustrate algorithms for drawing basic primitives like Point, Line and Polygon.		
	CO 2: Illustrate algorithms for performing 2D Geometric Transformations, viewing and clipping.		
	CO 3: Illustrate algorithms for performing 3D Geometric Transformations,		
	clipping.		
	CO 4: Demonstrate plane Bezier curves and Bezier surfaces.		
Course Content:			
Module 1	Overview: Basics of Computer Graphics:	Assignment	No. of Classes : 15

Topics: An Introduction Graphics System : Computer Graphics and Its Types, Application of computer graphics, Graphics Systems : Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors and Work Stations, Input Devices, Graphics tools and software, Introduction to Visual Studio 17.0 and OpenGL.

Mathematics for Computer Graphics, Introduction to linear algebra, Matrix, Matrix Equations, Linear equation, Quadratic equation, Calculus, differential geometry. Line drawing algorithms (DDA, Bresenham's), circle generation algorithms (Bresenham's). Basics of 2D and 3D objects.

Assignment: Numerical problems based on Matrix equations, Linear equation, Quadratic equation, Calculus, differential geometry.

Module 2	2D Geometric Transformations, viewing and clipping:	Assignment	No. of Classes : 12
----------	--	------------	---------------------

2DGeometric Transformations: Basics of translation, scaling and rotation. Matrix representations and homogeneous coordinates for translation, scaling and rotation. 2D Composite transformations, General pivot point rotation and scaling, OpenGL geometric transformations functions.

Basics of 2D viewing and Clipping: Basics of viewing and Clipping, 2D viewing pipeline, Viewing Transformation systems, Types of clipping: point, Line and polygon clipping, 2D line clipping algorithms: cohen-sutherland line clipping, Liang-Barsky line clipping algorithm, polygon fill area clipping. Sutherland-Hodgeman polygon clipping algorithm, OpenGL 2D viewing and clipping functions.

Module 3	3D Geometric Transformations, clipping:	Assignment	No. of Classes : 9
----------	--	------------	--------------------

3DGeometric Transformations: 3D translation, rotation, scaling, composite 3D transformations, OpenGL 3D geometric transformations functions.

Basics of 3D Viewing and Clipping: 3D viewing concepts, 3D viewing coordinate parameters, Transformation from world to viewing coordinates, Projection transformation, orthogonal projections, perspective projections, Three dimensional line and polygon clipping.

Assignment: Numerical problems based on 2D and 3D transformations.

Module 4	Plane curves and surfaces	Assignment	No. of Classes : 9

Plane Curves: Plane Curves representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Parametric Representation of a Parabola, Parametric Representation of a Hyperbola, A Procedure for using Conic Sections, The General Conic Equation,

Basics of Surfaces Curve: Representation of Space Curves, Cubic Splines, Bezier Curves, Parametric Cubic Curves, Quadric Surfaces, Bezier Surfaces.

Targeted Application & Tools that can be used:

Application Area: Game design and Animation

Tools/Simulator/Software used: Visual Studio 17.0

Text Book:

T1: Donald D. Hearn, M. Pauline Baker and Warren Carither, Computer Graphics with OpenGL, Pearson Education, 4th Edition, 2021

Reference Books:

- R1. John F Hughes, Andries van Dam, Steven K. Feiner, James D. Foley, Morga, Computer Graphics: Principles and Practice, Pearson Education India, Third Edition, 2013
- R2. John Kessenich, Graham Sellers, Dave Shreiner, OpenGL Programming guide, Addison-Wesley Ninth Edition, 2016
- R3. Edward Angel and Dave shreiner, Interactive Computer Graphics, A top down approach with shader based OpenGL, Pearson Education, 6th Edition, 2018

Catalogue prepared by	Prof. Uday Kumar Singh
Recommended by the	BOS NO: 13 th BOS, held on 08/12/2021
Board of Studies on	
	Aller TONCY UNITS

Date of Approval by	Academic Council Meeting No. 17, Dated 11/12/2021
the Academic	
Council	

Course Code: CSE2067	Course Title: Web Type of Course: P Theory & Inte			L- P- C	2	2	3
Version No.	1.0						
Course Pre- requisites	NIL						
Anti-requisites	NIL						
Course Description	scripting langua The associated	the course is to prov ages that are used for laboratory provides itical thinking and an	r creating web-	based ap	plicatio	ons.	cepts
Course Objective	This course is desig <u>LEARNING</u> techniqu	ned to improve the lear Jes.	ners' <u>EMPLOYABI</u>	LITY SKILL	<u>5</u> by usir	g <u>EXPE</u>	RIENTIAL
Course Outcomes	CO1: Implement (Application levent) CO2: Apply varion (Application levent)	bus constructs to enl el) er-side scripting lang	ion using client	t-side sci arance c	ripting of a wel	langua osite.	-
Course Content:		· · · ·					
Module 1	Introduction to XHTML	Quizzes and Assignments	Quizzes on of XHTML, s applications	imple	eatures	10	Classes
Topics:	1	1				I	
Basics: Web, W	WW, Web browse	rs, Web servers, Inte	ernet.				
Document Struc		of HTML and X Iarkup, Images, Hyj ML and XHTML.			oles, E		

Module 2	Advanced CSS	Quizzes and assignments	Comprehension based Quizzes and assignments; Application of CSS in designing webpages	12 Classes			
Advanced CSS:	Layout, Normal Flo	w, Positioning Elen	nents, Floating Elements, Constr	ucting			
Multicolumn.							
			n, CSS Frameworks				
XML: Basics, de	monstration of app	plications using XM	L				
PHP – Quizzes and Application of PHP in web 14 Module 3 Application assignments designing 14							
	Level	assignments	designing				
Topics:							
Classes and Obj	jects, Object, Classe , Database APIs, M	es and Objects in Pl	Files Array, Reading/Writing File IP, Object Oriented Design, Wor atabase. Accessing MySQL in PH	rking with			
Experiment No.	1: Demonstration of	XHTML features					
		XHTML Tags (Level web pages for an c	1) Inline Book store (Level 2).				
Level 2: Design Experiment No Level 1: Design electronic shop Level 2: Create cascaded style s Experiment No Level 1: Write a last name, age, MySQL. Read th Level 2: Using P authors, edition database. Experiment No Build a website	and develop static . 2: Application of a document using ping. and save XML doc sheet. . 3: Application of PHP program to re- permanent address the same informatio PHP develop a web n, and publisher and . 4: Building a web for organizing an li	web pages for an or CSS in web designi XHTML and CSS to ument for students PHP in web design ead the personal integration s, and pin code entegration n from the database page that accepts be d store information site. nternational Confer	nline Book store (Level 2). ng create a catalog of items for onl ' information and display the sa	me using rst name, vated in I. umber, title, ge in MySQL			
Level 2: Design Experiment No Level 1: Design electronic shop Level 2: Create cascaded style s Experiment No Level 1: Write a last name, age, MySQL. Read th Level 2: Using P authors, edition database. Experiment No Build a website to collect the au	and develop static • 2: Application of a document using ping. and save XML doc sheet. • 3: Application of PHP program to re- permanent address the same information PHP develop a web n, and publisher and • 4: Building a web for organizing an lu- uthor's details and	web pages for an or CSS in web designi XHTML and CSS to ument for students PHP in web design ead the personal integration s, and pin code entegration of from the database page that accepts be d store information site. nternational Confer- upload a file.	nline Book store (Level 2). ng create a catalog of items for onl information and display the sa ing. formation of a person such as fir ered by the user into a table cre is and display it on the front enc book information such as ISBN n submitted through the web page	me using rst name, vated in I. umber, title, ge in MySQL			
Level 2: Design Experiment No Level 1: Design electronic shop Level 2: Create cascaded style s Experiment No Level 1: Write a last name, age, MySQL. Read th Level 2: Using P authors, edition database. Experiment No Build a website to collect the au	and develop static . 2: Application of a document using ping. and save XML doc sheet. . 3: Application of PHP program to re- permanent address the same information PHP develop a web n, and publisher and . 4: Building a web for organizing an li- uthor's details and ation & Tools that ca	web pages for an or CSS in web designi XHTML and CSS to ument for students PHP in web design ead the personal integration s, and pin code entegration age that accepts be d store information site. nternational Confer- upload a file.	nline Book store (Level 2). ng create a catalog of items for onl information and display the sa ing. formation of a person such as fir ered by the user into a table cre is and display it on the front enc book information such as ISBN n submitted through the web page	me using rst name, vated in I. umber, title, ge in MySQL			
Level 2: Design Experiment No Level 1: Design electronic shop Level 2: Create cascaded style s Experiment No Level 1: Write a last name, age, MySQL. Read th Level 2: Using P authors, edition database. Experiment No Build a website to collect the au Targeted Applica Xampp web serv	and develop static . 2: Application of a document using ping. and save XML doc sheet. . 3: Application of a PHP program to re- permanent address the same informatio PHP develop a web n, and publisher and for organizing an In- uthor's details and ation & Tools that ca- per to be used to den	web pages for an or CSS in web designi XHTML and CSS to ument for students PHP in web design ead the personal integration s, and pin code entegration age that accepts be d store information site. nternational Confer- upload a file.	nline Book store (Level 2). ng create a catalog of items for onl information and display the sa ing. formation of a person such as fir ered by the user into a table cre is and display it on the front enc book information such as ISBN n submitted through the web page	me using rst name, vated in I. umber, title, ge in MySQL			
Level 2: Design Experiment No Level 1: Design electronic shop Level 2: Create cascaded style s Experiment No Level 1: Write a last name, age, MySQL. Read th Level 2: Using P authors, edition database. Experiment No Build a website to collect the au Targeted Applica Xampp web serv Project work/As	and develop static . 2: Application of a document using ping. and save XML doc sheet. . 3: Application of PHP program to re- permanent address the same informatio PHP develop a web n, and publisher and . 4: Building a web for organizing an li- uthor's details and ation & Tools that can rer to be used to den signment: a given after comple	web pages for an or CSS in web designing XHTML and CSS to ument for students PHP in web designing and the personal integration s, and pin code entegration s, and pin code entegration	nline Book store (Level 2). ng create a catalog of items for onl information and display the sa ing. formation of a person such as fir ered by the user into a table cre is and display it on the front enc book information such as ISBN n submitted through the web page	me using rst name, vated in J. umber, title, ge in MySQL nust be able			

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": Web, WWW, Web browsers, Web servers, Internet. Topics related to development of "EMPLOYABILITY": CSS, PHP.

Topics related to dev	Topics related to development of "HUMAN VALUES AND PROFESSIONAL ETHICS": Web designing for healthcare.						
Catalogue	Dr. Shankar K. Ghosh, Jobin Thomas.						
prepared by							
Recommended by	BOS NO: 12th BOS, held on 04/08/2021						
the Board of							
Studies on							
Date of Approval	Academic Council Meeting No. 16, Dated 23/10/2021						
by the Academic							
Council							

Course Code: CSE3001	Course Title: Introduction to Artificial Intelligence and Machine Learning Type of Course:1]Program Core 2] Laboratory integrated	L-P-C	2	2	3
Version No.	1.0				
Course Pre- requisites	CSE1003 Innovation Project - Raspberry Pi	Using Py	thon		
Anti-requisites	NIL				
Course Description	This course introduces the basic concepts of artificial intelli- basic concepts and techniques of Machine Learning (ML), a is an important set of techniques and algorithms used for problems. The objective of this course is to discuss machine Python. Topics include: Working with Collections and Data Frames; F algorithms; Optimization techniques – Gradient Descent alg Linear Regression; Ensemble Learning – Random Forest, Bu Gradient Boosting; Grid Search for optimal parameters; Clus Time-Series data : Auto-Regressive Integrated Moving Avera	subset of solving se learning r Regression orithm, Gr oosting teo stering algo	Artificial veral bus nodel dev algoritim adient De chniques orithmen	Intelligen siness and velopmer ns; Classi scent or AdaBo orecast	ice (AI), d social nt using fication simple ost and ng with

	: Association Rule I Naïve Bayesian mo		tering, Text Analytics – Sentiment C	assification using
Course Out Comes	 To develop a terms of inte Produce mac Apply ensem machine lear Demonstrate 	basic understanding c lligent agents. (KNOW hine learning models ble learning, optimizat ning algorithms. e different types of clus series forecasting tech	for predictive analytics. (Applic tion and hyper parameter tuning (Application)	cation) techniques for ication)
Course Content:				
Module 1	Introduction to Artificial Intelligence and Knowledge based systems	Assignment	Theory	6Hours(6L)
Structure of Intellig approaches and is	gent agent and its fun	ctions, Agents and Envirepresentation, Knowledge	History and Applications; Agents: ronment; Introduction to Knowledg ge-based agent and its Structure, H	e representation,
				16
Module 2	Machine Learning Algorithms	Assignment	Programming activity	16 Hours(8L,8 P)
Topics: Introduction to the One-hot encoding, measures for Regr measures of node i Cohen's Kappa S	Learning Algorithms Machine Learning (M , Simple Linear Regress ression models. Classi impurity, model evalu Statistic, Multi-class	L) Framework, types of N sion, Multiple Linear Re fication models – Decisi ation metrics for classifie	AL, types of variables/features used gression, Model Evaluation, Validat on Tree algorithms using Entropy a cation algorithms, ass Imbalance problem. Naïve B	Hours(8L,8 P) in ML algorithms, ion and Accuracy and Gini Index as
Topics: Introduction to the One-hot encoding, measures for Regr measures of node i Cohen's Kappa S	Learning Algorithms Machine Learning (M , Simple Linear Regress ression models. Classi impurity, model evalu Statistic, Multi-class	L) Framework, types of N sion, Multiple Linear Re fication models – Decisi ation metrics for classific classification and Cla	AL, types of variables/features used gression, Model Evaluation, Validat on Tree algorithms using Entropy a cation algorithms, ass Imbalance problem. Naïve B	Hours(8L,8 P) in ML algorithms, ion and Accuracy and Gini Index as

Boosting(AdaBoost), Hyper parameter Tuning for nearest neighbor learning using Grid Search. Introduction to Regularization with Advanced Regression models- LASSO and Ridge Regression an introduction.

	Clustering and			10
Module 4	Forecasting with	Assignment	Programming activity	Hours(6L,4
	Time-Series Data			P)

Topics:

Partitioned Clustering – K-means and Hierarchical Clustering techniques, cluster validity measures, Components of Time Series data, forecasting using moving average, exponential smoothing, calculating forecast accuracy, decomposing time series data, auto-regressive integrated moving average models(ARIMA). Association Rule Mining, Collaborative Filtering – User based and item based similarity

List of Laboratory Tasks:

Lab sheet -1

Level 1: A review of Python programming - Introduction to Python Stack for Data Science, Core Python Libraries for data analysis, Anaconda platform and its installation, Executing programs on Jupyter IDE/ Colab.

Level2: Programming exercises to revise variables, control statements and collections – lists, list comprehension

Lab sheet -2

Level 1 - Programming exercises on Tuples

Level 2- Nested data structures

Lab sheet -3

Level 1: Introduction to Numpy, Pandas,

Level 2: Scikit-learn and Visualization techniques.

Lab sheet -4

Level 1 - Dictionaries, dictionary comprehension.

Level 2 - Introduction to Data Frames using Pandas and working with frames

Lab sheet -5

Level 1- Regression Models Simple linear regression, outlier detection.

Level 2 - multiple linear regressions – model evaluation, multi-co linearity and handling multi-co linearity, outlier detection.

Lab sheet -6

Level 1- Decision Tree Classifiers - Decision Tree classifier using Gini Index- measuring test accuracy, displaying the tree, confusion matrix and ROC.

Level 2- Decision Tree Classifier using Entropy.

Lab sheet -7

Level 1 - Optimization Techniques Developing a Gradient Descent Algorithm for linear regression – using NumPy and using sklearn.

Level 2 - cohen_kappa_score.

Lab sheet -8

Level 1- Hyper parameter Tuning methods Hyper parameter tuning using Grid Search for Nearest
 Neighbor Classifiers and
 Level 2- Hyper parameter tuning using Grid Search for Decision Tree Classifiers.
 Lab sheet -9

Level 1 - Hyper parameter Tuning for Ensemble models Ensemble Learning – Random Forest – Building the model, Grid Search for optimal parameters,

Level 2 - Feature Importance. Ada Boost Classifiers and Gradient Boosting Classifiers

Lab sheet -10

Level 2 - Clustering – Kmeans – cluster centers and interpreting the clusters, finding the optimal number of clusters using Elbow Curve method.

Level 2 - Agglomerative Hierarchical Clustering – Compare the clusters formed by kmeans and Agglomerative Clustering

Lab sheet -1 1

Level 1 – Probability theory(Conditional Probability)

Level 2 - Naïve Bayes Model

Lab sheet -12

Level 1- Models forecasting Applications

Level 2 - Models for Forecasting Time Series data

Lab sheet -1 3

Level 1- Recommender Systems - Association Rule Mining using Apriori for frequent Itemset Generation. Level 2 - Recommender Systems – user based similarity

Targeted Application & Tools that can be used: Use of PowerPoint software for lecture slides and use of Google's Colab cloud service <u>https://www.tutorialspoint.com/google_colab/index.html</u> for executing and sharing of lab exercises.

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

5] Programming: Implementation of given scenario using Python and Colab.

6] Assignment: Learning courses for 4 Hours from the following link <u>https://learn.datacamp.com/courses?topics=Machine%20Learning</u>

Text Book

- 1. Andreas C Muller, Sarah Guido, "Introduction to Machine Learning with Python : A Guide for Data Scientists", Oreilly, First Edition, 2016
- 2. Stuart J. Russell and Peter Norvig, Artificial intelligence: A Modern Approach, 3rd edition, Upper Saddle River, Prentice Hall.

References

- 1. Tan P. N., Steinbach M & Kumar V. "Introduction to Data Mining", Pearson Education, 2016.
- 2. Giuseppe Bonaccorso, "Machine Learning Algorithms: A reference guide to popular algorithms from data science and machine learning", Packt Publishing, 2017.
- 3. Manaranjan Pradhan, U Dinesh Kumar, "Machine Learning Using Python", Wiley, First Edition 2019.

		ALUCA UNCY UNI
Catalogue prepared by	Dr. Aditya K Saxena and Dr. Sandeep	REGISTRAR

Recommended by the Board of Studies on	BOS NO: 12th BOS, held on 04/08/2021
Date of Approval by the Academic Council	Academic Council Meeting No. 16, Dated 23/10/2021

Course Code: CSE3082		Priented Analysis and I	Design with UML	L- P- C	3	0	3
	Type of Course: Program Core and Theory						
Version No.	1.0						
Course Pre- requisites	CSE 1001 Java Progra	amming					
Anti-requisites	NIL						
Course Description	to design a use case more capture the interdeper	-oriented analysis and de del, identify the classes a ndence among objects/ n axioms and the iterative	sign using the unifie nd their responsibil classes and designature of the proce	d process. S ities, use in gn an effic ess are emp	Stud ntera cien ohas	dents actior It sol Ized.	will be able n models to lution. The This course
Course objective	This course is desi using EXPERIENTIA	gned to improve tl AL LEARNING techi		(ILL DEV	ELC) DPIV	IENT "by
Course Outcomes	1]Describe the basics of 2]Identify the variou [Comprehension]	n of the course the stude object oriented system c s techniques for obj n axioms to create n process to deve	levelopment [Know ect-oriented ana appropriate UN	ledge] lysis techi ML diagra	ams	s. [
Course Content:	••••						
Module 1	Introduction to Object oriented	Assignment	Identify probler objects for an	0		8	

Topics:

Object Basics-Object Oriented System Development Life Cycle- Use case driven approach-Rumbaugh Object Model- Booch Methodology-Jacobson Methodology-Unified Approach, Static and Dynamic Modeling-Unified Modeling Language

Module 2	Object oriented analysis	Assignment	Identifica classes	ition of o using	candidate various	10 Classes
			approach	ies		

Topics:

Identifying use cases-Object Analysis-Classification: Theory-Approaches for Identifying Classes: Noun Phrase approach, Common Class pattern approach, Use case driven approach, Classes, Responsibilities and Collaborators- Identifying Object relationships: Associations, Super–sub class relationships, Aggregation. UML diagrams: Use case Diagram, Class diagram.

Module 3	Introduction t axiomatic design	to	Assignment	Apply axioms to create class diagram	10 Classes
----------	------------------------------------	----	------------	--------------------------------------	------------

Topics:

Object Oriented Design Axioms-Designing Classes -Class visibility -Redefining attributes -Designing methods and protocols -Packages and managing classes, UML Diagrams: Interaction diagram, Sequence diagram, Collaboration diagram, State-chart diagram, Activity diagram

Topics:

Access Layer- Object Storage Persistence - Object oriented Database System-Designing view layer classes -Macro level process -Micro level process- Prototyping the user interface UML diagrams: component diagram, Deployment diagram, Quality Assurance Tests-Testing Strategies.

Tools that can be used:

Tools:

- Microsoft visio, Rational software architect(RSA)
- ArgoUML, Rational Rose, StarUML, Umbrello

Project work/Assignment:

Term Assignments:

- identify Use Cases and develop the Use Case model
- Identity the conceptual classes and develop a UML Class diagram
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams
- Identify the business activities and develop an UML Activity diagram

Text Book

1. Ali Behrami, "Object Oriented Systems Development using Unified Modeling Language" McGraw Hill International Edition, July 2017.

References

1. Craig Larman, "Applying UML and Patterns", Pearson Education.

2.Grady Booch, "Object Oriented Analysis and Design with Applications", Addison-Wesly.

3.Simon Bennett, Steve McRobb, Ray Farmer, "Object Oriented Systems Analysis and Design using UML", McGrawHill Education

Topics related to development of "FOUNDATION": Object Basics-Object Oriented System Development Life Cycle- Use case driven approach-Rumbaugh Object Model- Booch Methodology-Jacobson Methodology-Unified Approach, Static and Dynamic Modeling-Unified Modeling Language

Topics related to development of "SKILL DEVELOPMENT": UML diagrams: Use case Diagram, Class diagram, Interaction diagram, Sequence diagram, Collaboration diagram, State-chart diagram, Activity diagram, component diagram, Deployment diagram using the tool StarUML software

Catalogue prepared by	Dr. Clara Kanmani A
Recommended by the Board of Studies on	BOS NO: 12th BOS, held on 04/08/2021
Date of Approval by the Academic Council	Academic Council Meeting No. 16, Dated 23/10/2021

Course Code: CSE 3078	Course Title: Cryptography and Network Security Type of Course: Program Core & Theory only	L- P- C	3 3 3
Version No.	1		REGISTRAR

Course Pre-	"Data Communications an	d Computer Netwo	rks".		
requisites	NIL				
Anti-requisites			<u> </u>		
			of cryptography and network secu	irity, focusing in	
	particular on the security a				
Course Description	Topics: The cryptographic	c tools such as sh	ared key encryption, public key	encryption, key	
course Description	exchange, and digital signature are explored. The use and utilization of the internet protocols				
	and applications such as SS	SL/ TLS, IPSEC, Kerb	eros, PGP, and S/ MIME, SET are re	eviewed. System	
	security issues such as viru	ises, intrusion and	firewalls are also explored.		
Course Objective	The objective of the cou	rse is SKILL DEVE	LOPMENT of student by using F	PARTICIPATIVE	
Course Objective	LEARNING techniques.				
	On successful completion				
	CO1 : Identifies the basic concept of Cryptography (Knowledge)				
		CO2: Express the different types of Cryptographic Algorithms. (Comprehension)			
Course Outcomes	CO3: Recognize the Public key Cryptographic Techniques for various applications.				
	(Comprehension)				
			during their implementation of n	etwork security	
	application developments	. (Application)			
Course Content:					
Module 1	Introduction to Cryptography	Assignment	Identify the Concepts	08 Sessions	
passive attacks, servi	ces: Authentication, Acces aesar, Mono alphabetic, Poly	s Control, Data (rity architecture, Security Attacks Confidentiality, Data Integrity, I ir and Hill Cipher, Introduction to E	Nonrepudiation,	
	Private Key				
Module 2	Cryptography and	Assignment	Analysis of requirement of complexity in cryptography	13 Sessions	
	Number Theory				
Encryption Standar primality testing and	rd, Modular Arithmetic	c, Prime numbe Logarithmic Pr	ard, Introduction to Galois Fie ers, Fermat's little theorem oblem, Euclidean and Extend corem	, brief about	
<u> </u>	Public Key Cryptography		Recognize the importance		
Module 3	and its Applications	Assignment	of various security concepts to achieve sufficient solutions	10 Sessions	
	1	1	REGISTR	1001 10	

Overview of Public Key Cryptography, RSA, Diffie - Helman Key exchange, Man in the middle attack, Cryptographic Hash functions, Secure Hash Algorithm, Message Authentication Codes – HMAC, Digital Signature, Discussion on real time practices of Cryptography.

Module 4	Network Security	Assignment	Implement the advanced network security algorithms in recent applications.	07 Sessions
----------	------------------	------------	---	-------------

Topics:

Network Security fundamentals, Network Security applications: Authentication: Kerberos, PKI, Network Security applications: e-mail security: PGP, MIME, Network Security applications: IP Security: IP Sec architecture, Network Security applications: Web Security.

Targeted Application & Tools that can be used:

Students get the knowledge about cryptography techniques followed, the algorithms used for encryption and decryptions & the techniques for authentication and confidentiality of messages.

Assignment:

Assignment 1: Solve the problems of basic encryption techniques.

Assignment 2: Solve and analyze the problems on symmetric and asymmetric encryption.

Textbooks:

1. William Stallings, "Cryptography and Network Security - Principles and Practices", Prentice Hall, 8th Edition,

2019.

2. Wade Trappe and Lawrence C Washington, "Introduction to Cryptography with Coding Theory", Pearson,

2020.

Reference Books:

1.Behrouz A Forouzan, Debdeep Mukhopadhyay, "Cryptography and Network Security", McGraw Hill, third edition, 2010.

2. R.Rajaram, "Network Security and Cryptography" SciTech Publication.3rd Edition, 2014.

3. AtulKahate, "Cryptography and Network Security", Tata McGraw-Hill, 2nd Edition, 2019.

4. BruceSchneier, "Applied Cryptography", John Wiley and Sons Inc. Second Edition, 2015.

Web references:

1.<u>https://onlinecourses.nptel.ac.in/noc22_cs90/preview</u>

2.e-pgpathshala UGC lecture series : E-Series and Self learning Materials.

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=fBYckQKJvP3a/8Vd3L08tQ==

3. http://182.72.188.195/cgi-bin/koha/opac-

detail.pl?biblionumber=10133&query_desc=kw%2Cwrdl%3A%20Cryptography%20and%20Network%20Security

4.http://182.72.188.195/cgi-bin/koha/opac-

detail.pl?biblionumber=5875&query_desc=kw%2Cwrdl%3A%20Cryptography%20and%20Network%20Security.

Topics relevant to "Skill Development": Symmetric and Asymmetric Encryption Algorithms and its problems.

Catalogue prepared by Dr.A. Vijayakumar	
---	--

Recommended by the	BOS NO: 12th BOS, held on 04/08/2021
Board of Studies on	
Date of Approval by	Academic Council Meeting No. 16, Dated 23/10/2021
the Academic Council	

Course Code: ECE2007	Course Title:Digital DesignType of Course:Program Core		L- P- C	2	2	3
	Theory & Integrated L	aboratory				
Version No. Course Pre- requisites	1.0 Basic concepts of number representation,	Boolean Algebra	, Arithmetic	and Logi	c Compi	itation.
Anti-requisites	NIL					
Course Description	The purpose of this course is to enable to logic circuits and Boolean algebra for circuits. The course emphasizes on mir cost digital circuit implementations. The electronic circuits. The course also cree Computer Architecture, Microprocess. The course enhances the Design, Implent tasks. The associated laboratory provides	cusing on both himization techni his course deals eates a foundatio ors, Microcontro hentation and Pro	combinatio ques for ma with analy n for futur ollers, and E gramming a	nal and s aking can sis and d e courses mbedded bilities th	sequenti onical a lesign of which i l System rough lat	al logic nd low- digital ncludes s etc.
<mark>Course</mark> Objective	The objective of the course is <u>SKILL</u> D <u>PARTICIPATIVE LEARNING</u> techni		<mark>[</mark> of the stuc	lent by us	sing	
Course	On successful completion of this course	e the students sha	all be able t	0:		
Outcomes	i. Discuss the concepts of number	per systems, Boo	olean algeb	ra and lo	gic gate	s.
	ii. Apply minimization techniqu	· ·	-			
	iii. Demonstrate the Combination		• •			
	iv. Illustrate the Sequential and					
	v. Implement various combinat					
<u> </u>	vi. Verify the performance of va	rious sequential	logic circu	its using	gates.	
Course Content:						
Module 1	Fundamentals of Number systems- Boolean algebra and digital logic	Application Assignment	Data Ana task	alysis	6 S	ession
Boolean algebra, Bo	ystems, Number base conversions, complex olean functions- canonical and standard for lizing Don't care conditions. Quine McClu	orms, Digital logi	c gates, Intr	oduction,	two, thr al Gates	ee, four
Module 2	Combinational Logic circuits:	Application Assignment	Program Task & Analysis	ming Data task	STRAR	Session Registrar
	·	•			1	ANGALOR

Topics:

Introduction to Combinational circuits, Analysis, Design procedure, Binary Adder and Subtractor, Magnitude comparator, Multiplexers-Demultiplexers, Decoders, Encoders and Priority Encoders, HDL Models of combinational circuits.

Module 3	Sequential and Programmable logic circuits:	Application Assignment	Programming Task & Data Analysis task	14 Session
----------	---	---------------------------	---	------------

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- ROMs, PLDs & PLAs. Implementation of Digital circuits.

List of Laboratory Tasks:

Experiment N0 1: Verify the Logic Gates truth table

Level 1: Verify basic logic gates on Digital Logic Trainer kit.

Level 2: Construct basic logic gates using universal gates and verify using Digital Logic Trainer kit.

Experiment No. 2: Verify the Boolean Function and Rules **Level 1:** Verify basic Boolean laws on Digital Logic Trainer kit.

Level 2: Construct a circuit to verify De Morgan's Theorem on Digital Logic Trainer kit.

Experiment No. 3: Construct and verify the HA/FA logic circuits **Level 1:** By using basic logic and XOR gates and Trainer Kit. **Level 2:** By using Universal logic gates and Trainer Kit

Experiment No. 4: Construct and verify the HS/FS logic circuits **Level 1:** By using basic logic and XOR gates and Trainer Kit **Level 2:** By using Universal logic gates and Trainer Kit

Experiment No. 5: Construct and verify the combinational logic circuit for given specifications.Level 1: Specifications given in the form of Truth table. Implement using basic gates.Level 2: Specification should be extracted from the given scenario. Implement using universal gates only.

Experiment No. 6: Study of SR and D Flip flopsLevel 1: Verify the operation of SR and D Flip-Flops on Digital Logic Trainer kitLevel 2: Construct and verify a SR Flip Flop using D Flip Flops.

Experiment No. 7: Study of JK Flip-flop and Toggle Flip-Flop.Level 1: Verify the operation of JK Flip-flop and Toggle Flip-Flop on Digital Logic Trainer kitLevel 2: Construct and verify a T Flip-Flop using JK Flip-Flop.

Experiment No. 8: Construct and verify the sequential logic circuit for given specificationsLevel 1: Specifications given in the form of Truth table.Level 2: Specification should be extracted from the given scenario.

Experiment No. 9: Write the HDL coding for basic combinational logic circuitsLevel 1: Gate level ModelingLevel 2: Behavioral Modeling

Experiment No. 10: Write the HDL coding for basic sequential logic circuitLevel 1: Gate level ModelingLevel 2: Behavioral Modeling

Targeted Application & Tools that can be used:

Application Area includes all modern electronic devices (cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, Home Automation, Communication systems). The students will be able to join a profession which involves basics to high level of digital circuit design and analysis.

Professionally Used Software: HDL (VHDL/ Verilog HDL)/ C++

Besides these software tools Digital IC Trainer kit and Integrated Circuits (ICs) can be used to perform circuit testing and analysis.

Project work/Assignment:

1. Case Studies: At the end of the course students will be given a real-world scenario for any application like security system/digital clock/ 7segment disply. Students will be submitting a report which will include Truth table, Design, Circuit Diagrams, implementation and Results.

2. Book/Article review: At the end of each module a book reference or an article topic will be given to each student. They need to visit the library and write a report on their understanding about the assigned article in an appropriate format. <u>Presidency University Library Link</u>.

3. 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.

4.Assignment 1: Raj is an engineering student. In his mini project, he has to design a circuit which has three inputs A, B, Cin and Two outputs. The circuit performing the summations of all input and produce sum and carry output. But Raj has only 3 into 8 line Decoder IC. Give the truth table and circuit diagram for his project with available Decoder: **5.Assignment 2:** A student wants to design a digital logic switching function which is described by the following Boolean Function in SoP, $F(A,B,C,D)=\sum(1,3,4,11,12,13,14,15)$. But he has provided with only 8x1 MUX. Guide the student to design the switching function using MUX only

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., "I	Modern Digital Electronics", McGraw Hill Education (India), 4th Edition
R2. Roth, Charles Edition	s H., Jr and Kinney Larry L., "Fundamentals of logic Design", Cengage Learning, 7th
(studymater1.eBook1: Ma2.{[PDF] Dig3.eBook2:FloLOGIC DES4.NPTEL Cou5.Digital Logi	 ano, M. Morris and Ciletti Michael D., "Digital Design", Pearson Education. gital Design By M. Morris Mano, Michael D Ciletti Book Free Download oyd "DIGITAL LOGIC DESIGN" fourth edition- ePub, eBook- [PDF] DIGITAL SIGN FOURTH EDITION FLOYD abri.engenderhealth.org. urse- <u>NPTEL :: Electrical Engineering - NOC:Digital Electronic Circuits</u> ic Design PPT <u>Slide 1 (iare.ac.in)</u> l: <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
Communica Mechatronic 2. An encodir Bhadra;Tan Internationa 3. A. Matrosov Generation, 10.1109/EW	and W. Hong-Ying, "The Application of Digital Electronics in Networking ation," 2016 Eighth International Conference on Measuring Technology and cs Automation (ICMTMA), 2016, pp. 684-687, doi: 10.1109/ICMTMA.2016.168. ng technique for design and optimization of combinational logic circuit Dipayan vir Ahmed Tarique;Sultan Uddin Ahmed;Md. Shahjahan;Kazuyuki Murase 2010 13th al Conference on Computer and Information Technology (ICCIT) va and V. Provkin, "Applying Incompletely Specified Boolean Functions for Patch Circuit " 2021 IEEE East-West Design & Test Symposium (EWDTS), 2021, pp. 1-4, doi: VDTS52692.2021.9581029.
Topics related to deve Counters and Register	elopment of "FOUNDATION SKILLS": Adders, Multiplexers, Decoders / Encoders; Flip-Flops, rs.
Catalogue prepared by	Dr. G. Muthupandi
Recommended by the Board of Studies on	BOS NO: 19th BOS, held on 04/08/2022
	Academic Council Meeting No. 18, Dated 03/8/2022.

			(
Course Code: CSE2020	Course Title: Blockchain Technology and Applications Type of Course: Program Core	L-P-C	3	Bunne 3
Version No.	1.0		KEO	Registrar

Course Pre- requisites	Fundamentals of Blockch	ain Technology		
Anti-requisites	NIL			
Course Description	specific focus on indust chain management, ag	trial applications like Blo riculture industry, Healt schain technology, Stude	troduction to Blockchain tec ockchain in Financial system, hcare sectors and Insurance ents will learn how these syst	trade/supply system. With
Course Objectives	This course is designed learning techniques	to improve the learner	s employability skills by using	g experiential
Course Out Comes	 Understand the Explain the me (Comprehensic Explore the use 	e concepts of Blockchair thods for verification ar on). e the Ethereum program	rse the students shall be able n technology (Knowledge). Id validation of Bitcoin transa nming (Application). Dus domain (Comprehension)	ctions
Course Content:	4. mustrate the re			
Module 1	Introduction to Blockchain	Quiz	Knowledge based quiz on Cryptographic Hash Functions	No. of Classes:8
-	nent Services, Transaction		ot and Cold Storage, Online Hash Functions, Hash Pointe	
Module 2	Bitcoin	Assignment	Bitcoin mining pools	No. of Classes:10
	Bitcoin netw The task of Bitcoin miner	ork, Limitations and imp	ergy consumption, Mining po	blocks, The
Module 3	Ethereum	Create a smart contract using solidity language	Components of Ethereum Ecosystem	No. of Classes:10
		of Ethereum Ecosystem	– Ethereum Programming La	
Runtime Byte	Code, Blocks and Blockch Blockchains in		porting Protocols – Solidity L	
Module 4	Biockchains in Business	Case Study	Conduct a case study on how BaaS is adopted in industries.	No. of Classes:10
Topics: Blockcha		kchain in Manufacturing re- Blockchain in Financ	- Blockchain in Automobiles	

Targeted Applicat	on & Tools that can be used:
	Remix online & Ganache
• Solidity p	rogramming language
Project work/Assi	gnment:
1 . Calculate the	'number of ethers' for the transaction of gas limit for the scenario in which the sender
	imit to 50,000 and a gas price to 20 gwei.
0	ne Ethereum Merkley Tree for the given list of Transactions.
-	y report of various types of Blockchain and its real time use cases.
c. create surve	
References: 1. Imran Bashir	, "Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart
contracts exp Weblinks: Udemy: <u>h</u> NPTEL on	<pre>invision in the product of the</pre>
contracts exp Weblinks: Udemy: <u>h</u> NPTEL on Textbook(s): 1. Bellaj Badr, F	blained", 2nd Edition, Packt Publishing Ltd, March 2018. ttps://www.udemy.com/course/build-your-blockchain-az/
contracts exp Weblinks: Udemy: <u>h</u> NPTEL on Textbook(s): 1. Bellaj Badr, F decentralized	plained", 2nd Edition, Packt Publishing Ltd, March 2018. <u>ttps://www.udemy.com/course/build-your-blockchain-az/</u> line course : <u>https://nptel.ac.in/courses/106/104/106104220/#</u> .ichard Horrocks, Xun (Brian) Wu, "Blockchain By Example: A developer's guide to creating
contracts exp Weblinks: Udemy: <u>h</u> NPTEL on Textbook(s): 1. Bellaj Badr, F decentralized	blained", 2nd Edition, Packt Publishing Ltd, March 2018. <u>ttps://www.udemy.com/course/build-your-blockchain-az/</u> line course : <u>https://nptel.ac.in/courses/106/104/106104220/#</u> Sichard Horrocks, Xun (Brian) Wu, "Blockchain By Example: A developer's guide to creating d applications using Bitcoin, Ethereum, and Hyperledger", Packt Publishing Limited, 2018.
contracts exp Weblinks: Udemy: <u>h</u> NPTEL on Textbook(s): 1. Bellaj Badr, F decentralized <u>https://www.google</u> Catalogue prepared by	olained", 2nd Edition, Packt Publishing Ltd, March 2018. <u>ttps://www.udemy.com/course/build-your-blockchain-az/</u> line course : <u>https://nptel.ac.in/courses/106/104/106104220/#</u> Lichard Horrocks, Xun (Brian) Wu, "Blockchain By Example: A developer's guide to creating d applications using Bitcoin, Ethereum, and Hyperledger", Packt Publishing Limited, 2018. <u>e.co.in/books/edition/Blockchain By Example/ci59DwAAQBAJ?hl=en&gbpv=1</u>

Course Code: PG COURSE: CSE 2024	Course Title: NoSQL Databases Type of Course: Program Core Theory and Laboratory Integrated	L-P-C	2	2	3
Version No.	1.0		Laur	Le ave	/
Course Pre- requisites	CSE2074-DBMS	d	EGISTRAF	Regis	trarty
Anti-requisites	NIL			* BANGAL	

Course			ls, such as Key-Value, Document, C		
Description	and Object-Oriented database models. Advantages and disadvantages of the different data architecture patterns will be discussed. Hands-on experience with a representative sample of open- source NoSQL databases will be provided. The rapid and efficient processing of data sets with a focus on performance, reliability, and agility will be covered.				
	on performance, renability, a				
Course Objectives	This course is designed to methodologies.	improve the learners	s' employability skills by using pr	oblem solving	
Course Out Comes	[Knowledge] 2. Comprehend different type	damentals, characteris	ts shall be able to: stics, and main benefits of NoS through case studies. [Comprehens ontent, and try queries on them. [Co	sion]	
Course Content					
Module 1	NoSQL Database Architectures	Assignment	Knowledge	No. of Classes:6	
	ions: Concurrency and Integratic ctions, Achieving horizontal scalabi		rgence and its main features, BAS	SE for reliable	
Module 2	Document data model	Assignment	Analysis	No. of Classes: 6	
	ristics of Document Data Model, tency, Update Consistency, Read C	-	CRUD Operation, Querying, Indexin Consistency, Capped Collection.	g, Replication	
Module 3	Document Data Model Hands on: Mongo DB / Casandra	Assignment	Programming (Embedded Lab)	No. of Classes:7	
	erform CRUD (create, read, upd , Replication and Sharding.	ate and delete) Opera	ations, Aggregations, Data Models,	Transactions,	
Module 4	Basics of Columnar and Graph Data Models	Assignment	Comprehend	No. of Classes: 7	
Vector-Wise, Col Graph Data Moc algorithm- Web	umn-store internals and, Inserts/u lel: Comparison of Relational and	pdates/deletes, Indexi Graph Modeling, Pro hain, page rank comp	torage, Column-store Architectures ing, Adaptive Indexing and Database perty Graph Model Graph Analytics putation, Topic specific page rank	s: C-Store and e Cracking. s: Link analysis	
Learn MongoD	B/Casandra by doing the followi	ng	0		
• Master	the art of queries, CRUD, schema	design, and data aggre	egation	B SCY UM	
Underst	tand scalability using sharding and	replication	REGISTRAR	Contraction of the second seco	
	ode, build real-world projects and	learn hands-on with Cl	loud Labs	Registrar	
List of Lab Experi	ments			WGALOC	

Lab Experiments are to be conducted on the following topics

Topic 1: Install MongoDB

Topic 2: Do lab experiment to perform CRUD (create, read, update and delete).

Topic 2: Demonstrate Aggregations in NoSQL with a real-life application.

Topic 3: Demonstrate different aspect of transactions in NoSQL by taking suitable problem.

Topic 5: Show making indexes in NoSQL with a suitable application.

Topic 6: Illustrate security features of NoSQL with a suitable problem.

Topic 6: Explain Sharding concept practically through a suitable example.

Targeted Applications (few are as given below):

1.Content Management systems are pretty common. All the comments on posts on social media are contained in a separate database. In MongoDB, a model has been designed to store such comments and is known as "MetaData and Asset Management".

2.MongoDB is widely used for storing product information and details by finance and e-commerce companies. You can even store the product catalogue of your brand in it.

3. MongoDB can also be used to store and model machine-generated data. For this, you can learn the "Storing Log data" document. This is known as operational intelligence.

List of MongoDB Tools

- MongoDB Compass.
- Mongo Management Studio.
- MongoJS Query Analyzer.
- Nucleon Database Master.
- NoSQLBooster.
- Studio 3T.
- MongoDB Spark Connector.
- MongoDB Charts.

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

Project Works:

 Create a database that stores road cars. Cars have a manufacturer, a type. Each car has a maximum performance and a maximum torque value. Do the following: Test Cassandras replication schema and Consistency models.
 Shopping Mall case study using cassendra, where we have many customers ordering items from the mal land we have suppliers who deliver them their ordered items.

Text Books

 Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications, 1st Edition, 2019
 https://bigdata.ir.com/up.content/uploads/2017/04/NoSQL Distilled pdf

https://bigdata-ir.com/wp-content/uploads/2017/04/NoSQL-Distilled.pdf

2. Bradshaw & Chodorow. *MongoDB: The Definitive Guide: Powerful and Scalable Data Storage*, 3rd ed., O'Reilly, 2019

https://www.oreilly.com/library/view/mongodb-the-definitive/9781491954454/

anne REGISTRAR

References

- 1. Pivert. *NoSQL Data Models: Trends and Challenges*, 1st ed. Wiley, 2018 https://www.perlego.com/book/995563/nosql-data-models-trends-and-challenges-pdf
- Amit Phaltankar, Juned Ahsan, Michael Harrison, Liviu Nedov, MongoDB Fundamentals A hands-on guide to using MongoDB and Atlas in the real world: 1st edition, Packt publications, 2020 <u>https://www.perlego.com/book/2059687/mongodb-fundamentals-a-handson-guide-to-using-mongodb-and-atlas-in-the-real-world-pdf</u>

More than 25% of changes are made from the earlier version. Changes are highlighted in bold.

Topics relevant to development of "Employability": Better understanding of handling Un-structured data.

Topics relevant to "PROFESSIONAL ETHICS": Usage of un-structured data in more ethical manner.

Catalogue prepared by	Dr. Naga Raju Mysore, Dr.Senthilkumar
Recommended by the Board of Studies on	BOS NO: 16 th. BOS held on 25/07/22
Date of Approval by the Academic Council	Academic Council Meeting No. 8, Dated 03/08/22

Course Code: CSE3034	Course Title: BIG DATA SECURITY AND PRIVACY Type of Course: Elective in Big Data Basket Theory	L- P- C	3	0	3
Version No.	1.0				
Course Pre- requisites	CSE219 Big Data Analytics				
Anti-requisites	NIL				
Course Description	The purpose of this course is to sensitize security in Big Data ediscover cryptographic principles, mechanisms to manage access course teaches the principles and practices of big data for improvior of computing systems. Big data is being applied in areas whe advantage to be had, and consequently, attacks and failures have delves into a set of techniques for defending big data techniques (the privacy aspect) and against malicious attacks (the security aspect)	ontrols in Big E ng the privacy re there is gi become a se against bread	Data s and t reat c rious	ystem he se comm conce	n. This curity ercial ern. It
Course Objective	This course is designed to develop learners Employability Skills by la for Hadoop ecosystem components – Pig, Hive, Oozie, Flume.	earning Kerbei REG		15/	gistrar *

Course	On successful completion of t	his course the studen	its shall be able to:		
Outcomes	 On successful completion of this course the students shall be able to: Define cryptographic principles and mechanisms to manage access controls in Big Data system.[Knowledge] Explain security risks and challenges for Big Data system.[Knowledge] Recognize all security related issues in big data systems .[Comprehension] Apply Kerberos configuration for Hadoop ecosystem components.[Application] 				
Course Content:					
Module 1	Big Data Privacy, Ethics And Security	Assignment/Qui z	Big data security- organizational security	08 classes	
Ownership – Ethica	al Guidelines – Big Data Secu ata security-organizational se	urity – Organization	ata Privacy is self regulating al Security. communication protocols	? – Ethics –	
Module 2	Security, Compliance, Auditing, And Protection	Assignment	for each of the Hadoop ecosystem components	08 classes	
Challenge – Resear	rch Questions in Cloud Secu nunication protocols for eac	rity – Open Problem		ual Property	
Module 3	Hadoop Security Design, Hadoop Ecosystem Security	Case study	Kerberos configuration for ecosystem tools	08 classes	
Configuration. Con Sqoop.	-	op ecosystem comp	peros Security Implementation onents – Pig, Hive, Oozie, Flun		
Module 4	Data Security & Event Logging	Case study	Event monitoring in Hadoop cluster	08 classes	
Setting up audit log	p with Enterprise Security S gging in hadoop cluster monitoring in Hadoop clust		Sensitive Data in Hadoop – SII	EM system –	
Assignment:					
a group of students		ry resources and wri	an article topic will be given to an te a report on their understand <u><</u> .		
	roup presentation, where th ate the working and discuss		tiven a topic. They will have to the same.	RAR	
				* BANGALORE	

Text Book(s):	
1. Sudeesh N	larayanan, "Securing Hadoop", Packt Publishing, 2013.
2. Ben Spive	y, Joey Echeverria, "Hadoop Security Protecting Your Big Data Problem", O'Reilly Media,
2015.	
Reference(s):	
Reference Book(s):	
1. Mark Va	an Rijmenam, "Think Bigger: Developing a Successful Big Data Strategy for Your Business",
Amazon, 1	edition, 2014.
2. Frank C	hlhorst John Wiley & Sons, "Big Data Analytics: Turning Big Data into Big Money", John
Wiley & So	ons, 2013.
3. Sherif S	akr, "Large Scale and Big Data: Processing and Management", CRC Press, 2014.
	e-books, notes, ppts, video lectures etc.):
	or Securing Big Data Environments:
e-book	(http://www.ibmbigdatahub.com/whitepaper/top-tips-securing-big-data-environments-
ebook)	
,	/w.dataguise.com/?q=securing-hadoop-discovering-and-securing-sensitive-datahadoop-
data-store	
	for Hadoop
•	w.cloudera.com/content/cloudera/en/solutions/enterprisesolutions/security-for-
hadoop.ht	
	or Hadoop https://launchpad.net/ecryptfs.
	nino - https://github.com/intel-hadoop/project-rhino .
J. HOJECTA	
Weblinks:	
Weblinks.	
https://puniversity	.informaticsglobal.com:2229/login.aspx?direct=true&db=nlebk&AN=1223875&site=ehos
t-live&ebv=EB&pp	
	IG-bb_viii
https://puniversity.in	nformaticsglobal.com:2229/login.aspx?direct=true&db=nlebk&AN=2706929&site=ehost-live
Topics related to d	evelopment of "FOUNDATION": Steps to secure big data ,Classifying Data.
Topics related to d	evelopment of "EMPLOYABILITY": Configuring Kerberos for Hadoop ecosystem
	Hive, Oozie, Flume
Catalogue	Ms Pavithra.N , Dr.Senthilkumar
prepared by	
Recommended by	BOS NO: 16 th. BOS held on 25/07/22
the Board of	
Studies on	
Date of Approval	Academic Council Meeting No. 8, Dated 03/08/22
by the Academic	
Council	

Course Code: Course Title:	- INUT UNIN
PECIST	C.P.
CSE2022 Domain Specific Predictive Analytics L- P- C	Registrar
Type of Course: Program Core and Theory only	* ANGALORE

Version No.	1.0				
Course Pre- requisites	Fundamentals of Data Analytics				
Anti-requisites	NIL				
Course Description	The objective of the course is to emphasize that performing prediction on every domain belonging to industry/firm is measured as effective management. The student would learn that prediction helps the firms to effectively manage human power and other resources, which leads to good productivity. After successful completion of the course the student will understand application of predictive analytics. Few applications are as follows: customer churn management in the telecommunication sector, evaluation of customer lifetime value used in retail industry, sentiment analysis on product reviews to understand the customers opinion, news analytics, and social media analytics.				
Course Objective	The objective of the course is to introduce theoretical foundations, algorithms, methodologies for analysing data in various domains such as Retail, Finance, Risk and Healthcare.				
Course Outcomes	 On successful completion of the course the students shall be able to: Recognize challenges in dealing with data sets in domains such as finance, risk and healthcare. Identify real-world applications of machine learning in domains such as finance, risk and healthcare. Identify and apply appropriate algorithms for analyzing the data for variety of problems in finance, risk and healthcare. 				
Course Content:					
Module 1	Retail Analytics	Assignment	Programming/Data analysis task	8 Sessions	
Topics:	1		1	I	
Understanding C	ustomer: Profiling and	l Segmentation, Mod	lelling Churn. Modelling		

Lifetime Value, Modelling Risk, Market Basket Analysis.

Assignment: Determine which product is very likely to be purchased out of given set of products using Market basket analysis technique.

ule

Module 2	Risk Analytics	Assignment	Programming/Data analysis task	8 Sessions
Topics:	- ·		·	·
Risk Managem	nent and Operational He	edging: An Overview,	, Supply Chain Risk	
Management,	A Bayesian Framework	for Supply Chain Ris	sk Management, Cred	lit Scoring
and Bankruptc	v Prediction		-	-
	,			
Assignment	To apply appropriate	Machina Jearning	algorithms to under	stand Bankrunter
0	ro appry appropriate	Wideline fearining	argorithms to under	stand Dankruptey
Prediction.				
Module 3	Financial Data Analytics	Assignment	Data analysis	10 Sessions
Financial New	vs analytics: Framewo	ork, techniques, and	metrics, News ever	nts impact marke
sentiment Rela	ating news analytics to s	stock returns Financia	al Time Series and Th	eir Characteristics
	ncial Time Series mode	-		
	Icial Time Series mode	15.		
Assignment: 7	To under various Marko	ov chain models.		
Madula 4	Healthcare Data	1 Accionment	Data analyzia	10 Secsions
Module 4	Analytics	Assignment	Data analysis	10 Sessions
Introduction to	Healthcare Data Analy	tics, Electronic Healt	th Records, Privacy-P	reserving
Data Publishin	g Methods in Healthcar	e, Clinical Decision S	Support Systems, Soci	al Media Analytics
	Tracking of Infectious			2
	lage Processing and			
-		-		-
	Extraction and Named		2	ics for Healthcare
Tracking of In	fectious Disease Outbre	aks, Readmission risl	k Prediction.	
	ation & Tools that can b			
	s Analytical Applications	1		
	nedia Data Analysis ve Analytics			
	amework tools like map re	duce. Hive. Hbase. Scoop	. Spark.	
		<u> </u>	, op and	
Project work/A Quiz/ Seminars/	'Assignment			
Project work/A Quiz/ Seminars/ Text Book				Ô.
Project work/A Quiz/ Seminars/ Text Book Olivia Parr Rud	"Data Mining Cookbook:	Modeling Data for Marl	keting, Risk, and Custor	mer Relationship
Project work/A Quiz/ Seminars/ Text Book Olivia Parr Rud Management",	"Data Mining Cookbook:			mer Relationship

	Il Analysis of Financial Data in R", Springer, 2014. Inell Feit "R for Marketing Research and Analytics", Springer, 2015
Catalogue prepared by	Mr. Raghavendra M Devadas, Dr.Senthilkumar
Recommended by the Board of Studies on	(BOS NO: SOCSE1st. BOS held on 22 / 12 / 2022)
Date of Approval by the Academic Council	(Academic Council Meeting No.20.3, Dated 15/02/23)

Course Code: CSE3031	Course Title: Web Intellige Type of Course: Integrated	-	ics	L- P- C	2	2	3
Version No.	1				•		-
Course Pre- requisites	CSE2021- Data Mining						
Anti-requisites							
Course Description	This course is an introduction an in-depth review of marketi explanation or review of sta concepts will be mentioned f course will give you the ma platforms within your organize bottom line.	ing principles and atistical analysis rom time to time stery of analytic	concepts. Nor i principles, thou in the lectures s to a sufficien	s it intend ugh some and readi t degree	ed to pro of thes ing mate to deplo	ovide an e princi rials. Ra y Web	in depth pals and ther, this Analytics
Course Objective	This course is designed to improve the learners' EMPLOYABILITY SKILLS by using PROBLEM SOLVING Methodologies.						
Course Out Comes	 On successful completion of t 1. A grounded unders related to the abov 2. How to deploy we business plan. 3. How Analysts impalines of business 4. Growth potentials 	standing of web ve. b intelligence to act the bottom	intelligence an p improve the line (their role	d busines outcome e) within	es of you various	ur mark	ceting or
Course Content:							
Module 1	INTRODUCTION TO INTELLIGENT WEB	Assignment	Data Collecti			June	Sessions
	INTELLIGENT WEB -Inside the s ent applications - Machine learr						

Module 2	LISTEN AND LOAD	Case studies / Case let	Case studies / Case let	6 Sessions
LISTEN AN			tatistics of Text - Analyzing Sen g data Technology and Trends.	
Module 3	CLUSTERING AND CLASSIFICATION	Quiz	Case studies / Case let	9 Session
need for classificati		n of emails and span	hms - Clustering issues in very n filtering - Classification with	
Module-5 PREDICT Sequence Memory and processed new .ist of Laboratory T	The Semantic Web - Limits of TNG (6 hours) Statistical Fore - Network Science – Data An s stories. Tasks: Laboratory Work: to a	of Logic - Description ecasting - Neural Ne alysis: Regression ar analyzing the web fo	mits, Dealing with Uncertainty and Resolution - Collective Re etworks - Predictive Analytics - nd Feature Selection - Case Stu or various functionalities give	asoning. Sparse Memories dy - set of retrieve n in the subject an
and technologies i		_	t also involves installation an	d working on tool
	Pro	ject work/Assignn	nent:	
Text Book 1. Gautam Shi 2. Haralambos References 1. Christopher D. Cambridge Universi Mark Gardener, "E W. N. Venables, D.	roff, "Intelligent Web - Search Marmanis, Dmitry Babenko, ' Manning, Prabhakar Raghava ity Press, 2019. Beginning R - The Statistical Pr	n, Smart Algorithms, f 'Algorithms of the In n, Hinrich Schütze, ", ogramming Langua m, "An Introduction	and Big Data", Oxford Universi Itelligent Web", Manning publi An Introduction to Information ge", John Wiley & Sons, Inc., 20 to R", 2013. R3 Web resource	Retrieval", 012.
Text Book 1. Gautam Shi 2. Haralambos References 1. Christopher D. Cambridge Universi Mark Gardener, "E W. N. Venables, D. ://www.coursetalk Topics relevant to o	roff, "Intelligent Web - Search Marmanis, Dmitry Babenko, ' Manning, Prabhakar Raghava ity Press, 2019. Beginning R - The Statistical Pr . M. Smith and the R Core Tea .com/coursera/web-intelliger	n, Smart Algorithms, f "Algorithms of the In n, Hinrich Schütze, ", ogramming Languag m, "An Introduction nce-and-big-data Cou pment":	and Big Data", Oxford Universintelligent Web", Manning publi An Introduction to Information ge", John Wiley & Sons, Inc., 20 to R", 2013. R3 Web resource Jurse code Course Title L T	Retrieval", 012.
2. Haralambos References 1. Christopher D. Cambridge Universi Mark Gardener, "E W. N. Venables, D. W. N. Venables, D. (//www.coursetalk) Topics relevant to content to c	roff, "Intelligent Web - Search Marmanis, Dmitry Babenko, ' Manning, Prabhakar Raghava ity Press, 2019. Beginning R - The Statistical Pr . M. Smith and the R Core Tea .com/coursera/web-intelliger	n, Smart Algorithms, f "Algorithms of the In n, Hinrich Schütze, ", ogramming Languag m, "An Introduction nce-and-big-data Cou pment":	and Big Data", Oxford Universintelligent Web", Manning publi An Introduction to Information ge", John Wiley & Sons, Inc., 20 to R", 2013. R3 Web resource Jurse code Course Title L T	Retrieval", 012.
Text Book 1. Gautam Shi 2. Haralambos References 1. Christopher D. Cambridge Universi Mark Gardener, "E W. N. Venables, D. ://www.coursetalk Topics relevant to o	roff, "Intelligent Web - Search Marmanis, Dmitry Babenko, ' Manning, Prabhakar Raghava ity Press, 2019. Beginning R - The Statistical Pr . M. Smith and the R Core Tea .com/coursera/web-intelliger development of "Skill Develo	n, Smart Algorithms, f "Algorithms of the In n, Hinrich Schütze, ", ogramming Languag m, "An Introduction ice-and-big-data Cou pment": iment and sustain	and Big Data", Oxford Universi Itelligent Web", Manning publi An Introduction to Information ge", John Wiley & Sons, Inc., 20 to R", 2013. R3 Web resource Jurse code Course Title L T	Retrieval", 012.

Course Code: CSE3032	Course Title: Streaming Data Analy			L- P- C	2	2	3
	Type of Course: Progr Theory and Lab Integ			L- P- C			
Version No.	1.0						
Course Pre- requisites	CSE3002 - Big Data	Analytics					
Anti-requisites	NIL						
Course Description	The purpose of the course is to introduce theoretical foundations, algorithms, methodologies, and applications of streaming data. It also provides practical knowledge for handling and analyzing streaming data. The associated laboratory provides an opportunity to implement the concepts and enhance critical thinking and analytical skills. With good knowledge of the fundamentals of streaming analytics, the student can gain practical experience in implementing them, enabling the student to be an effective solution provider for applications that involve huge volume of streaming data.						
Course Objectives	This course is designed PROBLEM SOLVING	ed to improve the lear Methodologies.	ners' EMPLOY	ABILITY	SKIL	LS by	using
Course Outcomes	 Recognize the real-world part of the real-world part of	 On successful completion of the course the students shall be able to: Recognize the characteristics of data streams that make it useful to solve real-world problems. Identify and apply appropriate algorithms for analyzing the data streams for a variety of problems. Implement different algorithms for analyzing the data streams. 					
Course Content:							
Module 1	Introduction to Data Streams	Programming Assignment	Streaming m	nethods		8 Cl	asses
Introduc	tion to Data Stream	s: Data Stream Mo	dels, Researc	h Issues	in Da	ata Si	treams
Managem	ent Systems, Knowle	dge Discovery from I	Data Streams,	Basic St	reamin	g Me	thods:
Counting	the Number of Occur	rence of the Element	ts in a Stream	, Counti	ng the	Num	ber of
Distinct V	Values in a Stream, I	Bounds of Random	Variables, Po	oisson P	rocesse	es, S	Sliding
Windows							
						REGIST	KAR COR

Module 2	Decision Trees and Clustering from Data Streams	Programming Assignment	Streaming Data Collection and Analysis	10 Classes
Decision Trees a	nd Clustering from	Data Streams: Intr	oduction, The Very Fast D	Decision Tree
Algorithm, Exter	nsions to the Basic Alg	gorithm: Processing	Continuous Attributes, Fur	nctional Tree
Leaves, Clusterin	ng Examples: Partitio	ning Clustering, Hie	erarchical Clustering, Micr	o Clustering,
Grid Clustering.				
Module 3	Frequent Pattern	Programming	Streaming Data analysis	8 Classes
	Mining	Assignment	C I	
Frequent Patter	n Mining: Introducti	on to Frequent Item	set Mining: The FP-growt	h Algorithm,
Summarizing Iter	msets, Heavy Hitters	s, Mining Frequent	Itemsets from Data Streams	s: Landmark
Windows, Minin	ng Recent Frequent It	emsets, Frequent It	temsets at Multiple Time (Granularities,
Sequence Pattern	Mining			
1	C			
Module4			7 c	lasses
	ng Algorithms Evaluation	Issues Design of Eval	uation Experiments, Evaluation	
-		_	e Assessment, The 0-1 loss funct	
Methodology III Nor	n-Stationary Environments	, The Page-Hinkley Aigor		
List of Laborato	ory Tasks:			
-	oring stream processin			
Level 2: Exp	loring stream processi	ng engine STREAM		
2. Implementatio	n of decision tree algo	orithms		
1	ementation of VFDT of	0		
Level 2: Impl	ementation of CVFD1	decision tree algori	thm	
3. Implementatio	n of partitioning cluste	ering on stream.		
Level 1: Impl	ementation of partition	ning clustering The I	0	
Level 2: Impl	ementation of Single I	Pass k-Means partition	oning Clustering Algorithm	0
4 Implementatio	on of micro clustering	on stream		ame
-	-	Clustering algorithm	n Initialization phase	REGISTRAR
Level 1: Impl	cilicitation of fractar	Clustering algorithm	in minualization phase	140

5. Level 1: Implementation of The ODAC Global Algorithm.Level 2: Implementation of The ODAC: The Test Split Algorithm

6. Level 1 Implementation of the Apriori algorithm to find frequent itemsetsLevel 2: Implementation of the Apriori algorithm to find association rules

7. Level 1: Frequent Itemsets mining of data streams using LossyCounting algorithm Level 2: Reservoir Sampling for Sequential Pattern Mining over Data Streams.

Targeted Application & Tools that can be used:

- Apache Spark
- Social media Data Analysis

•

• Predictive Analytics

Project work/Assignment:

Students will be asked to develop a mini-project for streaming Data Analysis on streaming data.

Text Book

Joao Gama, "Knowledge Discovery from Data Streams", CRC Press, 2018.

References

David Luckham, "The Power of Events: An Introduction to Complex Event Processing in Distributed Enterprise Systems", Addison Wesley, 2016.

Charu C. Aggarwal, "Data Streams: Models And Algorithms", Kluwer Academic Publishers, 2017.

Weblinks:

http://www.liaad.up.pt/area/jgama/DataStreamsCRC.pdf

Topics relevant to development of "Employability": Streaming data analysis of twitter data using Apache Spark. Topics relevant to "HUMAN VALUES & PROFESSIONAL ETHICS"": Naming and coding convention for Project Development.

Catalogue prepared by	Ms. Ila Chandrakar, Dr.Senthilkumar	
Recommended by the Board of Studies on	(BOS NO: SOCSE1st. BOS held on 22 / 12 / 2022)	
Date of Approval by the Academic Council	(Academic Council Meeting No.20.3, Dated 15/02/23)	
Academic Council		

			anne with
Course Code: CSE3150	Course Title: Front-end Full Stack Development	L- P- C	2 REGISTEAR

Version No.	1.0					
Course Pre-	Nil					
requisites						
Anti-requisites	NIL					
Course Description	development, wi technologies and implement front shall be able to	th emphasis on emp d architectures tha -end. On successful pursue a career in	udents to perform front- loyability skills. The cou t enables the student t completion of this cour- full-stack development. g skills as part of this co	rse covers key o design and se, the student The students		
Course Objectives		signed to improve the NG Methodologies.	e learners' EMPLOYABILIT	Y SKILLS by using		
Course Outcomes	 On successful completion of the course the students shall be able to: 1] Describe the fundamentals of DevOps and Front-end full stack development. [Comprehension] 2] Illustrate development of a responsive web. [Application] 3] Apply concepts of Angular.js to develop a web front-end. [Application] 4] Apply concepts of Angular.js to develop a web front-end. [Application] 					
Course Content:						
Module 1	Fundamentals of DevOps and Web Development	Project	Programming	04 Sessions		
Lifecycle, Workflow & I	Principles; DevOps To ontrol. HTML5 – Synta ts, Text, Transform	ols Overview – Jenkins ax, Attributes, Events, N	Web Forms 2.0, Web Storage,			
Module 2	Responsive web design	Project	Programming	03 Sessions		
Introduction	ive Web Design; Java		TML DOM, objects, classes, A rack of entry-exit information			
Module 3	Fundamentals of Angular.js	Project	Programming	08 Sessions		
concepts with TypeSc applications; Compone Angular Routing; Obs Requests; Authentication Deploying an Angular Angular Apps (Jasmine	ript; Angular Funda ents & Databinding ervables; Handling F on & Route Protectio App; Angular Anima	mentals; Angular CLI in Depth; Angular Dir orms in Angular Apps on; Dynamic Componer ations; Adding Offline	A; Introduction to TypeScrip ; Introduction to TypeScript rectives; Using Services & I ;; Output transformation usin hts; Angular Modules & Opti Capabilities with Service Wo	t; Debugging Angular Dependency Injection; g Pires: Making Http mizing Angular Apps;		

Module 4	Fundamentals of React.js	Project	Programming	15 Sessions
Salvation; Two Distin NPM; JSX Walkthroug	; Reactive Programn ct Ways of Initializin gh; React Testing.	ng a React Class;	ponents; Render Method; Virtus States & Life Cycles; Compone es/events (like bookmyshow).	
<u> </u>	**		es/events (like bookmyshow).	
Targeted Applicatio	n & Tools that can I	be used:		
Application Area is t	o Design and Analy	vzing the efficie	ncy of Algorithms. This funda	mental course is used
by all application de				
by an application ac	velopers.			
Professionally Used	Softwara: GCC car	mnilor		
Professionally Used	Software: GCC cor	npner.		
Project work/Assign	mont			
Project work/Assign				
			plementation of programs.	
2. Programmir	ng: Implementation	of given scena	rio using Java.	
Text Book:				
	, "Front-end Fundame	entals" Leannub	2015	
			sential Guide to the Everyday Ski	ills Expected of a Modern
	Developer", APress, 2		sential Guide to the Everyday Ski	
References:				
	lavascrint · The Defin	<i>itive Guide"</i> 7th F	dition. 7th ed. O'Reilly Media; 20	20
_			ive Web Design with HTML5 and	
Publishing, 201		alesta. hespons		
		crint & lauery · Ir	nteractive Front-End Web Develop	ment "· Wiley· 2014
			•	<i>inclut: , whey, 2014.</i>
	"React is Book Lea		<i>crint Library"</i> 1 edition Scratch-	River Tigris LLC 2016
R4. Greg Sidelnikov	ı, "React.js Book_ Lea 	ππης κεάτι σάνα.	<i>script Library</i> ", 1 edition, Scratch-	River Tigris LLC 2016
R4. Greg Sidelnikov R5. Web Reference	::	-		
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u>	: outube.com/watch?v		<u>list=PLd3UqWTnYXOkTSBCBNyy</u>	-
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared	: outube.com/watch?v			
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by	coutube.com/watch?v Dr. Jayakumar V, D	v=JGNTYXkVCVY8 Dr. M Chandrashe	klist=PLd3UqWTnYXOkTSBCBNyyl khar, Dr. Murali Parameswaran	-
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by Recommended by	: outube.com/watch?v	v=JGNTYXkVCVY8 Dr. M Chandrashe	klist=PLd3UqWTnYXOkTSBCBNyyl khar, Dr. Murali Parameswaran	
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by Recommended by the Board of Studies	coutube.com/watch?v Dr. Jayakumar V, D	v=JGNTYXkVCVY8 Dr. M Chandrashe	klist=PLd3UqWTnYXOkTSBCBNyyl khar, Dr. Murali Parameswaran	
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by Recommended by the Board of Studies on	coutube.com/watch?v Dr. Jayakumar V, D (BOS NO: SOCSE1	v=JGNTYXkVCVY8 Dr. M Chandrashe BOS held on 2	khar, Dr. Murali Parameswaran	-
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by Recommended by the Board of Studies on Date of Approval by	coutube.com/watch?v Dr. Jayakumar V, D (BOS NO: SOCSE1	v=JGNTYXkVCVY8 Dr. M Chandrashe BOS held on 2	klist=PLd3UqWTnYXOkTSBCBNyyl khar, Dr. Murali Parameswaran	
R4. Greg Sidelnikov R5. Web Reference <u>https://www.y</u> Catalogue prepared by Recommended by the Board of Studies on	coutube.com/watch?v Dr. Jayakumar V, D (BOS NO: SOCSE1	v=JGNTYXkVCVY8 Dr. M Chandrashe BOS held on 2	khar, Dr. Murali Parameswaran	-

Course Code: CSE3151	Course Title: Java Full Stack Development	L- P- C	2	2	3
Version No.	1.0				
Course Pre- requisites	Nil		REG	ISTRAR 2	Registrat
Anti-requisites	CSE3152 .NET Full Stack Development			at a	
			1		CANGALOC

Course Description	This advanced level course enables students to perform full stack development using Java, with emphasis on employability skills. The key technologies used for Full Stack development is based on either Java technology or .NET technology. In this course, the focus is on using Java, and the related technologies/tools like Java EE, Java Persistence, Hibernate, Maven, Spring Core, etc. On successful completion of this course, the student shall be able to pursue a career in full-stack development. The students shall develop strong problem-solving skills as part of this course. This course is designed to improve the learners' EMPLOYABILITY SKILLS by using					
Course Objectives		LVING Methodologies.	learners' EMPLOYABILITY SKILI	S by using		
Course Outcomes	 Practice the u Show web ap Solve simple Apply conception 	ts of Spring to develop a Fu	elopment [Application]	oplication]		
Course Content:		· · · · ·	· ·			
Module 1	Introduction	Project	Programming	03 Sessions		
Topics:						
Module 2	Java EE Web Applications	Project	New Features of Java. Unit Testing to Programming	05 Sessions		
with JSP; JSP Star Session, Cookies; F Integrating JDBC w	ndard Tag Libra Request Redirec vith MVC App	ry - Core & Function Tag	g HTML form Data with JSP; State N gs; Servlet API Fundamentals; Serv MVC App with Servlets & JSP; Com es of a department.	/letContext,		
Module 3	Java Persistence using JPA and Hibernate	Project	Programming	06 Sessions		
Topics: Fundamentals of Java Persistence with Hibernate; JPA for Object/Relational Mapping, Querying, Caching, Performance and Concurrency; First & Second Level Caching, Batch Fetching, Optimistic Locking & Versioning; Entity Relationships, Inheritance Mapping & Polymorphic Queries; Querying database using JPQL and Criteria API (JPA) Assignment: Design and develop a website that can actively keep track of entry-exit information of a housing society						
Module 4	Spring Core	Project	Programming	10 Sessions		
Database Web App Security; Developing	with Spring and H g Spring REST AI			c; Building a		

Module 5	Automation tools	Project	Programming	06 Sessions	
pom.xml and Direc Functional/BDD Tes Configuration, Locat	tory Structure, N ting using Seleniu ing WebElements, ate the use of autor	Aulti-Module Project Creat um, Selenium Fundamental Driver Commands, WebElen nation tools in the developm	entals, Software Setup - Com ion, Scopes, Dependency M s and IDE, Selenium WebDr ment Commands ent of a small software project	anagement, Profiles; iver, Installation and	
Application Area i used by all applica	•		f Algorithms. This fundame	ental course is	
Professionally Used Software: Eclipse, NetBeans, Hibernate, Selenium, Maven, GIT.					
Project work/Assi	gnment:				
	• •	f Algorithms and implem ation of given scenario us			
Text Book:	a "Front and Fun	damontals" Looppub 2015			
References	ig, riont-enu run	damentals", Leanpub, 2015			
R1. Soni, Ravi Kar Using Angu	larJS with Spring R	ESTful.", Apress, 2017.	Build a Full-Featured Web App	-	
Catalogue prepared by		Dr. M Chandrashekhar, Dr.	ode.js and MongoDB.", Apress Murali Parameswaran	, 2015	
Recommended by the Board of Studies on	(BOS NO: SOCS	E1. BOS held on 22 / 12	/ 2022)		
Date of Approval by the Academic Council	(Academic Cou	ncil Meeting No.20.3 , Da	ted 15 /02 /23)		

Course Code: CSE3152	Course Title: .NET Full Stack Development	L- P- C	2	2	3
Version No.	1.0				
Course Pre- requisites	Nil				
Anti-requisites	CSE3151 Java Full Stack Development		ſ		
			REG	ISTRAR	Registrar

Course Description Course Objectives	development technologies technology or and the relate Core, etc. On to pursue a c strong proble This course is	using .NET, with emph used for Full Stack d r .NET technology. In the ed technologies/tools li successful completion of career in full-stack deve m-solving skills as part of	les students to perform full hasis on employability skills. Th evelopment is based on either his course, the focus is on using ke C#, ASP.NET, Entity Frame of this course, the student shall be elopment. The students shall de of this course. learners' EMPLOYABILITY SKILL	e key Java .NET ework e able velop
Course Outcomes	1] Practice the u 2] Show web ap 3]Solve simple v	plications using Entity Fram web applications that use SC	nall application [Application]	
Course Content:				
Module 1	C# Programming for Full Stack Development	Project	Programming	10 Sessions
collections, Working flow and events, M Anonymous Methoc Asynchronous progra	with variables, op /orking with class ls and Anonymous amming and threa ns, Working with F	perators, and expressions, De ses and methods, OOP cor s Types, Extension methods,		ing program , Delegates, es/Methods,
Module 2	Entity Framework Core 2.0	Project	Programming	06 Sessions
EDM; Working W Operations; Perfor	/ith Stored Pro mance Optimiza	••		
Module 3	ASP.NET	Project	Programming	06 Sessions
SQL, Working With	Data In Asp.Net,	Razor View Engine, State M	are and Request pipeline, Review of SC anagement In Asp. Net MVC & Layou	L using MS
Assignment: Develo	op a web application	on to mark entry/exit of gues Project	ts in a building. Programming	Ressions

Topics:

Introduction To Models, Validations In Asp.Net MVC, Authentication and Authorization In Asp.Net MVC, Advanced Asp. Net MVC - Ajax Action Link In MVC, Advanced Asp.Net MVC - Ajax Forms In MVC, Microsoft Testing Framework – Unit Testing the .NET Application

Assignment: Develop a software tool to do inventory management in a warehouse.

Targeted Application & Tools that can be used:

Application Area is to Design and Analyzing the efficiency of Algorithms. This fundamental course is used by all application developers.

Professionally Used Software: Visual Studio

Project work/Assignment:

- 1. Problem Solving: Design of Algorithms and implementation of programs.
- 2. Programming: Implementation of given scenario using .NET.

Text Book:

- T1. Fender, Young, "Front-end Fundamentals", Leanpub, 2015
- T2. Valerio De Sanctis, "ASP.NET Core 5 and Angular: Full-stack web development with .NET 5 and Angular 11", 4th Edition, Packt, 2021.

References

- R1. Benjamin Perkins, Jon D. Reid, "Beginning C# and .NET", Wiley, 2021 Reid, 2021.
- R2. Piotr Gankiewicz, "Full Stack .NET Web Development", Packt Publishing, 2017.
- R3. Tamir Dresher, Amir Zuker, Shay Friedman, *"Hands-On Full-Stack Web Development with ASP.NET Core"*, Packt Publishing, 2018.
- R4. Dustin Metzgar, "Exploring .NET core with microservices, ASP.NET core, and Entity Framework Core", Manning, 2017.

2017.	
Catalogue	Dr. Komalavalli C, Dr. Jayakumar V, Dr. Murali Parameswaran
prepared by	
Recommended by	(BOS NO: SOCSE1. BOS held on 22 / 12 / 2022)
the Board of	
Studies on	
Date of Approval	(Academic Council Meeting No.20.3 , Dated 15 /02 /23)
by the Academic	
Council	

REGISTRAR