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 2019-2023

B. Tech. (Information Science and Technology)

2019-2023

Regulations No: PU/AC-20.3/SOCSE01/IST/2019-23
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

February – 2023

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Bachelor of Technology Degree
Program Regulations and Curriculum, 2019-2023

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 2019-2023**.

(b) These Regulations are subject to, and, pursuant to the Academic Regulations, 2019

(c) These Regulations (with amendments) shall be applicable to the ongoing Bachelor of Technology Degree Programs of the 2019-2023 batch and to all other Bachelor of Technology Degree Programs which may be introduced in future.

(d) These Regulations (with amendments) shall supersede all the earlier Bachelor of Technology Degree Program Regulations and Curriculum**,** along with all the amendments thereto.

(e) These Regulations (with amendments) shall come into force from the Academic Session 2019-20.

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;

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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 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 2019-2023;*

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" means 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 2019-2023** 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 2019-2023:**

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1.3.1. Bachelor of Technology in Civil Engineering, abbreviated as B.Tech (Civil Engineering);

1.3.2. Bachelor of Technology in Computer Science and Engineering, abbreviated as B.Tech (Computer Science and Engineering);

1.3.3. Bachelor of Technology in Electronics and Communication Engineering, abbreviated as B.Tech (Electronics and Communication Engineering);

1.3.4. Bachelor of Technology in Electrical and Electronics Engineering, abbreviated as B.Tech (Electrical and Electronics Engineering);

1.3.5. Bachelor of Technology in Mechanical Engineering, abbreviated as B.Tech (Mechanical Engineering);

1.3.6. Bachelor of Technology in Petroleum Engineering, abbreviated as B.Tech (Petroleum Engineering);

1.3.7. Bachelor of Technology in Computer Engineering, abbreviated as B.Tech. (Computer Engineering);

1.3.8. Bachelor of Technology in Computer and Communication Engineering, abbreviated as B.Tech. (Computer and Communication Engineering).

1.3.9. Bachelor of Technology in Information Science and Engineering, abbreviated as B.Tech. (Information Science and Engineering); and,

1.3.10. Bachelor of Technology in Information Science and Technology, abbreviated as B.Tech. (Information Science and Technology).

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 favor 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.Tech) Degree Programs in pursuant of the provisions in Section 6.0 of the Academic Regulations, 2019 of the University.

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.

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2. PART A: PROGRAM SPECIFIC 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 below:

Table 2.1

B. Tech Degree Programs and respective Parent Departments

B.Tech Program (Branch/ a)	***Parent Department***
B.Tech (Civil Engineering)	Department of Civil Engineering
B.Tech (Computer Science and Engineering)	Department of Computer Science and Engineering
B.Tech (Electronics and Communication Engineering)	Department of Electronics and Communication Engineering
B.Tech (Electrical and Electronics Engineering)	Department of Electrical and Electronics Engineering
B.Tech (Mechanical Engineering)	Department of Mechanical Engineering
B.Tech (Petroleum Engineering)	Department of Petroleum Engineering
B.Tech (Computer Engineering)	Department of Computer Science and Engineering
B.Tech (Computer and Communication Engineering)	Department of Computer Science and Engineering
B.Tech (Information Science and Engineering)	Department of Computer Science and Engineering

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B.Tech (Information Science and Technology)	Department of Computer Science and Engineering

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 Program are listed in the following Sub-Clauses:

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

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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 2nd year (3rd Semester) of the B.Tech Degree program shall be open to the candidates who are holders of a 3-year Diploma in Engineering (or equivalent qualification as recognized by the University), who have secured not less than forty five percentage (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 2019-2023, minus the number of Credits prescribed for the 1st Year (total number of Credits 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) is "N" Credits, and, if the total credits prescribed in the 1st Year (total credits of the 1st and 2nd Semesters) of the Program concerned is "M" Credits, then the *Minimum Credit Requirements* for the award of the B.Tech in Computer Science and Engineering 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 non-refundable Application Fee (as prescribed by the University from time to time) to the University no later than July 10 of the concerned year for admission to the 2nd Year (3rd Semester) B.Tech Program commencing on August 1 on the year concerned.

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 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 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 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.

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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 Hand-out.

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 in 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.

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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 (4^{th}) year of the B.Tech Program. Students may register for Professional Practice – II in either the 7^{th} Semester or the 8^{th} Semester of the B.Tech Program, in accordance with the following guidelines:

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 fulfills 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.

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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 and 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 concerned Departmental Academic Committee (DAC). As per the Academic Regulations, the 'S' grade is awarded for "satisfactory completion" of the Course and '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 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.

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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 Section 8.5 to 8.8 of 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 Credit Structure (L – T – 0)/(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 the Table 2.11.1 below:

Table 2.11.1 Method of Assessment for 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 Practical Courses that have only the Practical Credit Structure (0 – 0 – P), or Practical Courses with a Credit Structure (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 is detailed in the Table 2.11.2 below:

Table 2.11.2 Method of Assessment for Practical Courses with Credit Structures 0–0–P and L–0–P

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
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-

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Clauses 2.11.1, 2.11.2 and 2.11.3 are not suitable/ relevant for the assessing the performance in the concerned Course, the BOS shall recommend the appropriate method of assessment for approval of the Academic Council.

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 Text Book(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 Examination, 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 Open 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, the Open 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 such 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 Semester immediately following the completion of the SWAYAM-NPTEL Course(s).

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

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	O
2	From 80% to 89%	A+
3	From 70% to 79%	A
4	From 60% to 69%	B+
5	From 50% to 59%	B
6	From 40% to 49%	C

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2.13.10. A student may submit a request for credit transfer from SWAYAM-NPTEL Courses before the last instruction day of the seventh (7^{th}) Semester of the B. Tech. program as specified in the Academic Calendar. Requests for credit transfers shall not be permissible in the eighth (8^{th}) 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.

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3.PART B: PROGRAM CURRICULUM

BACHELOR OF TECHNOLOGY DEGREE PROGRAM IN INFORMATION SCIENCE AND TECHNOLOGY
B.TECH (INFORMATION SCIENCE AND TECHNOLOGY) 2019-2023

B.Tech in Information Science and Technology (IST) program offers a platform leading to specialization in Web and Internet Technology. The program brings together relevant knowledge and methods from information science, Web engineering, computer science and communications. The program exposes the students to latest web technologies such as Web 2.0, Semantic Web, Service Oriented Architecture, Cloud Computing, Web science, Big Data Computing, to name a few. Overall, the graduates of IST develop skills and knowledge necessary to analyze information problems and to apply current technology in providing solutions.

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 Information Science and Technology at Presidency University are as follows.

Program Educational Objectives (PEO)

After the completion of B.Tech. Program in Information Science and Technology from Presidency University, the graduates shall:

PEO1: Demonstrate success as a Computer Engineer with innovative skills, having moral and ethical values.

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

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

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Program Outcomes (PO)

Graduates of the B. Tech. Program in Information Science and Technology 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.

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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 Information Science and Technology the students shall:

PSO1: Apply the knowledge of Web engineering and Web technologies in designing and developing IT based solutions to solve real-world problems.

PSO2: Be acquainted with the latest trends in Web and Cloud development, thereby innovate new ideas and solutions to existing problems.

PSO3: Exhibit professional ethics, effective communication skills and excellent team work in their professional career.

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.

3.1 PROGRAM CURRICULUM

3.1.1 **Mandatory** Courses and Credits

The B.Tech (Information Science and Technology) Program structure (2019-2023) consists of 180 credits. The Program leads to specialization in Internet Technologies.

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.

TABLE 3.1.1
B.Tech (Information Science and Technology) 2019-2023: Mandatory Courses and Credits

S. No.	TYPE OF COURSES	NO. OF COURSES	CREDITS
1	Humanities (HS)	2	5

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2	Management Sciences (MS)	-	6
3	Basic Sciences (BS)	9	29
4	Engineering Sciences (ES)	7	21
5	Core (Professional) Course (CC)	28	76
6	Discipline (Professional) Elective (DE)	-	16
7	Open Elective (OE)	-	9
8	Professional Practice (PP)	2	13
9	Personal and Professional Skills (PPS)	4	4
10	Social Immersion Course (SIC)	1	1
TOTAL			**180**
The mandatory minimum credits required for the award of the B. Tech. (Information Science and Technology) Degree is 180 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 (Information Science and Technology) Program.

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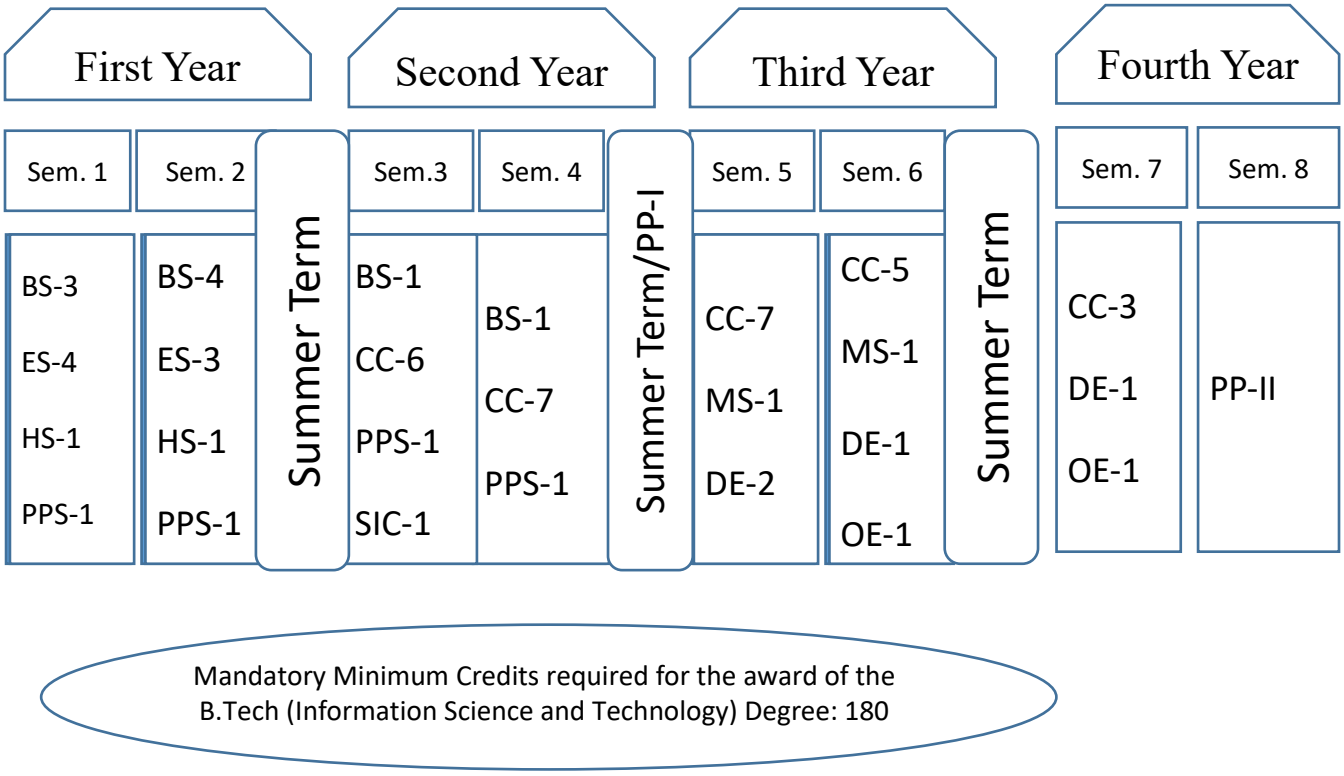
3.1.2 B.Tech (Information Science and Technology) Program Suggested Year Wise Structure



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 180 for B.Tech (Information Science and Technology) Program of four years duration.

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3.2 SUGGESTED PROGRAM STRUCTURE

I SEM - PHYSICS CYCLE (Aug-Dec)#									
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MAT105	Calculus and Linear Algebra	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	P	Env[4]
5	MEC 152	Engineering Graphics	2	0	4	4	6	P	-
6	ENG XXX	Humanities-I	2	1	0	3	3	F/E[3]	-
7	PHY 151	Engineering Physics Lab	0	0	2	1	2	F	-
8	MEC 151	Workshop Practice	0	0	2	1	2	P	-
9	PPS 105	Building Self Confidence	0	0	2	1	2	E	-
		TOTAL	**17**	**2**	**10**	**24**	**29**		

[1] Foundation Course
[2] Professional Skills
[3] Employability Skills
[4] Environmental Issues

I SEM - CHEMISTRY CYCLE (Aug-Dec)#									
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MAT105	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	P	-
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	P	-

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5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG XXX	Humanities-I	1	0	2	2	3	E	-
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	1	2	F	PE[5]/S[6]
		TOTAL	**19**	**1**	**10**	**25**	**30**		

[5] Professional Ethics
[6] Sustainability Issues

II SEM - CHEMISTRY CYCLE (Jan-May)*									
S. NO.	**COURSE CODE**	**COURSE NAME**	**CREDIT STRUCTURE**				**CONTACT HOURS**	**TYPE OF SKILL**	**COURSE ADDRESSES TO**
			L	**T**	**P**	**CREDITS**			
1	MAT106	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	P	-
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	P	-
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG XXX	Humanities-II	1	0	2	2	3	E	-
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	1	2	F	PE/S
		TOTAL	**19**	**1**	**10**	**25**	**30**		

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II SEM - PHYSICS CYCLE (Jan-May)#									
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MAT106	Calculus, Differential Equations and Complex Variables	3	1	0	4	4	F	-
2	PHY 101	Engineering Physics	4	0	0	4	4	F	-
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3	P	-
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3	P	Env
5	MEC 152	Engineering Graphics	2	0	4	4	6	P	-
6	ENG XXX	Humanities-II	2	1	0	3	3	F/E	-
7	PHY 151	Engineering Physics Lab	0	0	2	1	2	F	-
8	MEC 151	Workshop Practice	0	0	2	1	2	P	-
9	PPS 106	Effective Communication	0	0	2	1	2	E	-
		TOTAL	**17**	**2**	**10**	**24**	**29**		

Note: At the end of the 1st year (Common to all B.Tech. Program) the total credits offered is 49.

III SEMESTER									
S.No.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	C			
1	MAT107	Transform Techniques, Partial Differential Equations and Probability	3	1	0	4	4	F	-
2	CSE 201	Data Structures	3	0	0	3	3	P	

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3	CSE 202	Digital Design	3	0	0	3	3	F	-
4	CSE 203	Discrete Mathematics	3	1	0	4	4	F	-
5	CSE 204	Object Oriented Programming	1	0	4	3	5	P	-
6	CSE 223	Computer Architecture and Organization	3	0	0	3	3	P	-
7	CSE 251	Data Structures Lab	0	0	4	2	4	P	-
8	CSE 252	Digital Design Lab	0	0	2	1	2	F	-
9	PPS 107	Design Thinking And Team Building	0	0	2	1	2	E	PE
		TOTAL	**16**	**2**	**12**	**24**	**30**		

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

IV SEMESTER									
S.No	**COURSE CODE**	**COURSE NAME**	**CREDIT STRUCTURE**				**CONTACT HOURS**	**TYPE OF SKILL**	**COURSE ADDRESSES TO**
			L	**T**	**P**	**C**			
1	MAT108	Numerical Methods, Probability Distributions and Sampling Techniques	3	1	0	4	4	F	-
2	CSE 236	Principles of Data Communication and Computer Networks	3	0	0	3	3	P	-
3	CSE 210	Operating Systems	3	0	0	3	3	P	-
4	CSE 206	Microprocessors and Micro Controllers	3	0	0	3	3	P	-
5	CSE 207	Database Management Systems	3	0	0	3	3	P	-
6	CSE 208	Theory of Computation	3	1	0	4	4	P	-
7	CSE 253	Database Management Systems Lab	0	0	4	2	4	P	-
8	CSE 254	Microprocessors and Micro Controllers Lab	0	0	2	1	2	P	-
9	PPS 108	Being Corporate Ready	0	0	2	1	2	E	PE
		TOTAL	**18**	**1**	**10**	**24**	**28**		

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** Note: The students will undergo Professional Practice I during the summer break between the fourth and fifth

V SEMESTER									
S. No.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	C			
1	CSE 237	Advanced Computer Networks	3	0	0	3	3	P	-
2	CSE 227	Software Engineering and Project Management	3	0	0	3	3	P	PE
3	CSE 228	Principles of Artificial Intelligence	3	0	0	3	3	P	-
4	CSE 212	Analysis of Algorithm	3	0	0	3	3	P/E	-
5	CSE 262	Network Simulation Lab	0	0	4	1	4	P	-
6	CSEXXX	Discipline Elective – I	3	0	3	3	3	P/E	-
7	CSEXXX	Discipline Elective-II	3	0	0	3	3	P/E	-
8	MGT 112	Engineering Economics	3	0	0	3	3	E	P
9	CSE 255	Analysis of Algorithm Lab	0	0	2	1	2	P/E	
9	PIP 101	Professional Practice - I **				5		P/E	PE
		TOTAL	**16**	**0**	**11**	**28**	**27**		

semester and the credits earned will be accounted in the fifth semester.

VI SEMESTER									
S. No.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	C			
1	CSE 219	Big Data Analytics	1	0	4	3	5	P/E	-
2	CSE 265	Service Oriented Architecture	3	0	0	3	3	P	-
3	CSE 233	Cloud Computing and Services	3	0	0	3	3	P/E	-
4	CSE 264	Web Technologies	1	0	4	3	5	P	-

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5	XXX XXX	Open Elective – I	3	0	0	3	3	P/E	-
6	MGT 113	Digital Entrepreneurship	3	0	0	3	3	P/E	-
7	SIC 501	Social Immersion Course	-	-	-	1	-	P	G/Env/S
		TOTAL	**14**	**0**	**8**	**19**	**22**		
[7] Gender Issues									

VII SEMESTER									
S.No.	**COURSE CODE**	**COURSE NAME**	**CREDIT STRUCTURE**				**CONTACT HOURS**	**TYPE OF SKILL**	**COURSE ADDRESSES TO**
			L	**T**	P	C			
1	CSE 235	Introduction to Deep Learning	3	0	0	3	3	P	-
2	CSE 266	Semantic Web	2	0	2	3	4	P	-
3	CSE 220	Internet of Things	1	0	4	3	5	P/E	-
4	CSEXXX	Discipline Elective – III	3	0	0	3	3	P/E	-
5	CSEXXX	Discipline Elective – IV	1	0	4	3	5	P/E	
6	CSE 232	Information Retrieval and Organization	3	0	0	3	3	P	
7	XXX XXX	Open Elective – II	3	0	0	3	3	P/E	-
		TOTAL	**16**	**0**	**10**	**21**	**26**		

VIII SEMESTER			
S.No.	**COURSE CODE**	**COURSE NAME**	**Credits**
1.	PIP 102*	Professional Practice- II	15

* The Course PIP102 (15 Credits) will remain unchanged for the students who have gone abroad for pursuing higher education via international MoU with Presidency University.

S.No.	**COURSE CODE**	**COURSE NAME**	**Credits**

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1.	XXX XXX	Open Elective –III	3
2.	CSE XXX*	Discipline Elective – V	2
3.	CSE XXX*	Discipline Elective – VI	2
4.	PIP 103	Professional Practice- II	8
		TOTAL	**15**

*for other Students, PIP102(15 credits) is proposed to be replaced with the courses as listed in the Table above.

TABLE — 3.2.1

LIST OF COURSES IN HUMANITIES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	ENG 103	Technical Written Communication	2	1	0	3	3	F/E	-
2	ENG 104	Technical Spoken Communication	1	0	2	2	3	E	-

TABLE — 3.2.2

LIST OF MANAGEMENT SCIENCES COURSES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MGT 112	Engineering Economics	3	0	0	3	3	E	-
2	MGT 113	Digital Entrepreneurship	3	0	0	3	3	E	-

TABLE 3.2.3

DISCIPLINE ELECTIVES

S.NO	COURSE CODE	COURSE NAME	L	T	P	C	CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
1	CSE 302	Programming in C# and .NET framework	1	0	4	3	5	E	

2	CSE 303	Information Theory and Coding	3	0	0	3	3	P	-
3	CSE 304	Mobile Communications	3	0	0	3	3	P	-
4	CSE 305	Parallel Computing	3	0	0	3	3	P	-
5	CSE 309	Virtualization	3	0	0	3	3	P	-
6	CSE 310	Mobile Applications Development	1	0	4	3	5	E	-
7	CSE 312	Game Theory	3	0	0	3	3	-	-
8	CSE 313	Storage Area Networks	3	0	0	3	3	P	-
9	CSE 314	Software Architecture	3	0	0	3	3	P	-
10	CSE 317	Programming in Python	1	0	0	4	5	P/E	-
11	CSE319	Machine Learning	1	0	0	4	5	P/E	-
12	CSE 320	Graphics Programming	3	0	0	3	3	P	-
13	CSE 321	Robotic Process Automation	3	0	0	3	3	P/E	-
14	CSE 322	Agile Technologies	3	0	0	3	3	P	-
15	CSE 323	Programming in JAVA	1	0	4	3	5	E	-
16	CSE 325	Bio Informatics	3	0	0	3	3	-	-
17	CSE 326	Evolutionary Computing	3	0	0	3	3	-	-
18	CSE 327	Web Data Mining	3	0	0	3	3	E	-
19	CSE 336	Digital Image Processing	3	0	0	3	3	P	-
20	CSE 368	Distributed Systems	3	0	0	3	3	P	-
21	CSE399	Programming in GO	3	0	0	3	3	P	
22	NAS 3001	NASSCOM Powered DGNEXT	3	0	0	3	3	-	
23	CSE390	Front End Full Stack Development	0	0	4	**2**	4	EM	-
24	CSE391	JAVA Full Stack Development	0	0	4	**2**	4	EM	
25	CSE392	.NET Full Stack Development	0	0	4	**2**	5	EM	

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27	CSE357	ETHICS IN ENGINEERING PRACTICE	2	0	0	2	2	-	-
28	CSE359	DATASCIENCE FOR ENGINEERS	2	0	0	2	2	-	-
29	CSE360	INTRODCUTION TO SOFT COMPUTING	2	0	0	2	2	-	-
30	CSE358	INFORMATION SECURITY-5- SECURE SYSTEM ENGINEERING	2	0	0	2	2	-	-

TABLE — 3.2.1

LIST OF COURSES IN HUMANITIES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	ENG 103	Technical Written Communication	2	1	0	3	3	1/3	-
2	ENG 104	Technical Spoken Communication	1	0	2	2	3	3	-

[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills [6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement.

TABLE — 3.2.2

LIST OF MANAGEMENT SCIENCES COURSES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MGT 112	Engineering Economics	3	0	0	3	3	3	-

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TABLE — 3.2.2									
LIST OF MANAGEMENT SCIENCES COURSES									
S. NO.	**COURSE CODE**	**COURSE NAME**	**CREDIT STRUCTURE**				**CONTACT HOURS**	**TYPE OF SKILL**	**COURSE ADDRESSES TO**
			L	**T**	**P**	**CREDITS**			
2	MGT 113	Digital Entrepreneurship	3	0	0	3	3	3	-
[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills [6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement									

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TABLE 3. 2.3
DISCIPLINE ELECTIVE

S. No.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	EEE 301	Microcontroller Applications	3	0	0	3	3	2/3	_
2	EEE 302	Electrical Machine Design	3	0	0	3	3	2/3	_
3	EEE 303	Electrical Equipment Testing and Commissioning	3	0	0	3	3	2/3	_
4	EEE 304	Introduction to Electrical Drives	3	0	0	3	3	2/3	6
5	EEE 306	FACTs Controllers in Power Transmission & Distribution	3	0	0	3	3	2/3	_
6	EEE 307	Power Quality in Electrical Systems	3	0	0	3	3	2/3	7
7	EEE 308	Real Time Embedded System Design	3	0	0	3	3	2/3	_
8	EEE 309	Battery Technology	3	0	0	3	3	2/3	_
9	EEE 310	Electric Power Generation	3	0	0	3	3	2/3	6
10	EEE 311	Utilization of Electrical Energy	3	0	0	3	3	2/3	6
11	EEE 312	Power system operation and control	3	0	0	3	3	2/3	6
12	EEE 313	High voltage engineering	3	0	0	3	3	2/3	_
13	EEE 314	Energy management systems and SCADA	3	0	0	3	3	2/3	6
14	EEE 315	Advanced control systems	3	0	0	3	3	2/3	—
15	EEE 316	Power semiconductor devices	3	0	0	3	3	2/3	—
16	EEE 317	PWM Converters	3	0	0	3	3	3/2	—
17	EEE 318	Distributed generation and Microgrid	3	0	0	3	3	3/2	6/7
18	EEE 319	Electric Vehicles	3	0	0	3	3	2/3	6/7
19	EEE 320	Finite Element Analysis for Electrical Machines	3	0	0	3	3	2/3	—
20	EEE 321	Switched Mode Power Conversion	3	0	0	3	3	2/3	—
21	EEE 322	PLC's for automation	3	0	0	3	3	2/3	—
22	EEE 323	Introduction to Micro Electro Mechanical Systems	3	0	0	3	3	2/3	—
23	EEE 324	Special Electrical Machines and their Applications	3	0	0	3	3	2/3	—
24	EEE 325	Sensors, Transducers and their applications	3	0	0	3	3	2/3	—

[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills

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[6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement.

TABLE — 3.2.4

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	CIV 380	Geographical Information Systems	3	0	0	3	3	2/3	7/6
2	CIV 280	Environmental Impact Assessment	3	0	0	3	3	2	7/6
3	CIV 281	Sustainable Materials and Green Buildings	3	0	0	3	3	2	7/6
4	CIV 381	Construction Project Management	3	0	0	3	3	2/3	8
5	CIV 282	Hazardous Waste Treatment	3	0	0	3	3	2/3	7/6/8
6	CIV 283	Elements of Construction Management	3	0	0	3	3	2	8
7	CIV 382	System Design for Environment and Sustainability	3	0	0	3	3	2/4	7/6/8
8	CIV 383	Infrastructure Systems for Smart Cities	3	0	0	3	3	2/4	7/6/8

[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills
[6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement.

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	CSE 395	Image Processing	3	0	0	3	3	2	-
2	CSE 296	Data Structures Using C	3	0	0	3	3	2	-
3	CSE 396	Software Testing and Quality Assurance	3	0	0	3	3	2/3	-
4	CSE 297	Social Network Analytics	3	0	0	3	3	2/3	-

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5	CSE 397	Digital and Mobile Forensics	3	0	0	3	3	2	-
6	CSE 298	Database Management Systems	3	0	0	3	3	2	-
7	CSE 398	Multimedia and Animation	3	0	0	3	3	2	-
8	CSE 299	Data Analytics Using R	3	0	0	3	3	2/3	-
9	CSE 399	Data Visualisation	3	0	0	3	3	2/3	-
10	CSE 501	Technical Training	0	0	6	3	3	2/3	-

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	EEE 221	Energy Audit	3	0	0	3	3	2/3/4	3/2
2	EEE 222	Research Methodology	3	0	0	3	3	2	-
3	EEE 223	Introduction to Smart Grid Technology	3	0	0	3	3	2/3	6
4	EEE 103	Professional Ethics in Engineering	3	0	0	3	3	-	2
5	EEE 224	Soft Computing Techniques	3	0	0	3	3	2/3	-
6	EEE 104	Control Systems	3	0	0	3	3	2	-
7	EEE 225	Fundamentals of Robotics	3	0	0	3	3	2/3	-
8	EEE 105	Electrical Engineering Lab	2	0	2	3	4	2/3	-
9	EEE 226	Nanotechnology Fundamentals and Applications	3	0	0	3	3	2	-

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF ELECTRONICS AND COMMUNCATION ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	ECE 295	Artificial Neural Networks	3	0	0	3	3	5	-
2	ECE 296	Biomedical Instrumentation	3	0	0	3	3	10	-
3	ECE 297	IOT: Internet of Things	3	0	0	3	3	3	
4	ECE 298	Industrial Automation and Control	3	0	0	3	3	3	

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5	ECE 299	Computational Intelligence and Machine Learning	3	0	0	3	3	5	-

[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills [6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement.

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF MECHANICAL ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	MEC 102	Automotive Vehicles	3	0	0	3	3	3	-
2	MEC 103	Nanotechnology	3	0	0	3	3	-	-
3	MEC 328	Engineering Optimisation	3	0	0	3	3	-	-
4	MEC 329	Operations Research for Engineers	3	0	0	3	3	3	-
5	MEC 104	Operations Management	3	0	0	3	3	3	-
6	MEC 105	Work Study	3	0	0	3	3	3	-
7	MEC 106	Project Management	3	0	0	3	3	3	-
8	MEC 107	Organizational Behaviour	3	0	0	3	3	3	-
9	MEC 330	Renewable Energy Systems	3	0	0	3	3	-	7/6
10	MEC 331	Design of Automatic Control Systems	3	0	0	3	3	-	-

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF PETROLEUM ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	PET 231	Computational Methods in Chemical Engineering	3	0	0	3	3	2	-
2	PET 232	Computational Fluid Dynamics	3	0	0	3	3	2	-
3	PET 233	Petroleum Corrosion Technology	3	0	0	3	3	2/3	-
4	PET 234	Polymer Technology	3	0	0	3	3	2/3	-
5	PET 235	Oil and Gas Quality Management	3	0	0	3	3	2/3	-

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6	PET 236	Oil and Gas Transportation and Marketing	3	0	0	3	3	2/3	-
7	PET 237	Material Science and Engineering	3	0	0	3	3	2	-

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF BASIC SCIENCES AND HUMANITIES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	PSY 101	Social Psychology	3	0	0	3	3	2/3/4	8/6
2	ENG 105	Literature Appreciation	3	0	0	3	3	2/3	9/6
3	CHE 201	Composite Materials	3	0	0	3	3	2/3	7/6
4	CHE 202	Catalysis Technology	3	0	0	3	3	2/3	7/6
5	CHE 203	Surface Coating Technology and Corrosion Science	3	0	0	3	3	2/3/4	7/6
6	CHE 204	Bioenergy	3	0	0	3	3	2/3	7/6
7	CHE 205	Advanced Separation Technology	3	0	0	3	3	2/3	7/6
8	PHY 201	Elements of Nuclear Radiation and Technology	3	0	0	3	3	2/3	7/6
9	PHY 202	Amorphous Semiconductors for Technological Applications	3	0	0	3	3	2/3/4	-
10	PHY 203	Nano Structured Materials	3	0	0	3	3	2/3/4	-

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF L & D

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS	TYPE OF SKILL	COURSE ADDRESSES TO
			L	T	P	CREDITS			
1	PPS 401	Coding and Aptitude Training	3	0	0	3	3	2/3	

[1] Foundation Course; [2] Professional Skills; [3] Employability Skills; [4] Entrepreneurship skills; [5] Research skills [6]Sustainability Issues; [7] Environment Issues; [8] Professional Ethics; [9] Gender Equality, [10]Knowledge Enhancement.

Note: However these are only indicative. Depending upon the need and availability of expertise new electives can be offered.

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3.3 COURSE DESCRIPTION AND SYLLABUS

Course Name:	Calculus and Linear Algebra					
Course Code:	MAT 105	Credit Structure :	L	T	P	C
			3	1	0	4

Course Description: The objective of this course is to model engineering problems, understand the applications of continuous functions and obtain solutions of real world problems. Calculus is the backbone of any engineering applications and hence this course is an extension of senior secondary or PUC level. This course introduces the concept of successive differentiation, properties of polar curves, expansion of function involving one variable and evaluation of indeterminate forms. Further, the students are exposed to partial differentiation techniques, its applications, differentiation of vector and scalar functions along with their applications, reduction formulae and evaluation of integrals with standard limits, and solution of first order and first degree differential equations with their applications. Also, the course provides the knowledge of matrices and system of equations.

Textbooks:

1. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 10th edition, John Wiley, 2014.

Reference Books:

1. Glyn James, "*Advanced Modern Engineering Mathematics*", 4th edition, Pearson Education, 2015.
2. B.S. Grewal, *' Higher Engineering Mathematics*", 43rd edition, Khanna Publishers, 2014.

Course Name:	Engineering Physics					
Course Code:	PHY 101	Credit Structure :	L	T	P	C
			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.

Reference Books:

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**	**T**	**P**	**C**
			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.

Reference Books:

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**	**T**	**P**	**C**
			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.

Reference Books:

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

Course Name:	**Engineering Graphics**					
Course Code:	**MEC 152**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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

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Course Name:	**Technical Written Communication**

Course Code:	ENG 103	Credit Structure :	L	T	P	C
			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.

Reference Books:

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

Course Name:	Engineering Physics Lab					
Course Code:	PHY 151	Credit Structure :	L	T	P	C
			0	0	2	1

Course Description: This course includes the laboratory sessions on determination of the wave length of Laser, Rigidity modulus, dielectric constant, calculation of Numerical Aperture and energy band gab by four probe method, fermi energy of copper and acceleration due to gravity by simple pendulum. It also includes experiments on characteristics of Transistor, Zener Diode and LCR Series and Parallel Resonance Circuits.

Course Material: "*Engineering Physics Lab manual"* Presidency University.

Course Name:	Workshop Practice					
Course Code:	MEC 151	Credit Structure :	L	T	P	C
			0	0	2	1

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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:	**Building Self Confidence**					
Course Code:	**PPS 105**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

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:

1. Prakash Iyer, *"The Habit of Winning"*, 2nd Edition, Penguin Books Ltd., 2016.
2. Jack Canfield, *"The Success Principles"*, 8th Edition, HarperCollins Publishers India, 2015.
3. Shiv Khera, 3d Edition, "You Can Win", Bloomsbury India, 2014.

Course Name:	**Engineering Chemistry**					
Course Code:	**CHE 101**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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. Dr. K. Pushpalatha, "Engineering Chemistry", Revised Edition, Wiley.
2. Jain and Jain, "A text Book of Engineering Chemistry", S. Chand & Company Ltd. New Delhi, 2009, Reprint- 2016.

Reference Books:

1. Wiley, "Engineering Chemistry", Wiley.
2. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4th Edition, 1996.
3. M.G. Fontana, N. D. Greene, Corrosion Engineering, McGraw Hill Publications, New York, 3rd Edition, 1996.
4. Principles of Physical Chemistry B.R.Puri, L.R. Sharma & M.S. Pathania, S. Nagin Chand & Co., 41 Ed., 2004.
5. Kuriakose J.C. and Rajaram J. " Chemistry in Engineering and Technology" Vol I & II, Tata Mc Graw – Hill Publications Co Ltd, NewDelhi, First edition Reprint 2010.
6. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press.

Course Name:	**Elements of Electronics Engineering**					
Course Code:	**ECE 101**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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:

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

Reference Books:

1. Smarajit Ghosh, *"Fundamentals of Electrical and Electronics Engineering*", PHI.
2. D.P. Kothari, I. J. Nagrath, *"Basic Electronics",* McGraw Hill Education.

3. Rajendra Prasad, *"Fundamentals of Electronics Engineering",* Cengane Learning.

Course Name:	**Elements of Mechanical Engineering**					
Course Code:	**MEC 101**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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:

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

Reference Books:

1. Pravin Kumar, *"Basic Mechanical Engineering*," Pearson.
2. V. K. Manglik, *"Elements of Mechanical Engineering,"* PHI.
3. 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**	**T**	**P**	**C**
			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.

Reference Books:

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

Course Name:	**Technical Spoken Communication**					
Course Code:	**ENG 104**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**2**	**2**

Course Description: A course on Technical Spoken Communication aims at improving the target audience spoken skills in English. It is a theory cum practice course targeting to improve the I year B.Tech students' pronunciation, listening, narration , presentation and group discussion skills. Rules of pronunciation, syllable stress, traits of good listener, types of listening, barriers to listening, strategies for improving narration, presentation and group discussion skills will be delivered in the theory hours and practice and evaluation on the theories will be done in the practical hours.

Reference Books:

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:	**Computer Programming**					
Course Code:	**CSE 151**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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:

9.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**	**T**	**P**	**C**
			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 106**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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.

Reference Books:

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**	**T**	**P**	**C**
			0	**0**	**2**	**1**

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:	Transform Techniques, Partial Differential Equations and Probability					
Course Code:	**MAT 107**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**1**	**0**	**4**

Course Description: 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. 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. 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 topic covered include random variables, discrete and continuous probability distributions covering binomial, Poisson, geometric, exponential, uniform, normal distributions and their applications.

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. Advanced Engineering Mathematics, K .A. Stroud and Dexter Booth, Fifth Edition, Macmillan Education, UK.

2. B.S. Grewal, "*Higher Engineering Mathematics*", Khanna Publishers.

Course Name:	**Data Structures**					
Course Code:	**CSE 201**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: The purpose of this Course is to provide the students with solid foundations in data structures and algorithms. It focuses on logical structures of data, their physical representation, design of algorithms and techniques for program development and debugging. Emphasis is placed on the appropriate use and choice of standard data structures.

Topics include: ADT, lists, stacks, queues, trees, heaps, hash tables, and graphs.

Text Book(s):

Richard F Gilberg and Behrouz A Forouzan, *"Data Structures: A Pseudocode Approach with C", Cengage learning.*

Reference Book(s):

1. Robert L Kruse, Bruce P Leung and Clovis L Tondo, *"Data Structures and Program Design in C"*, Pearson.

2. Seymour Lipschutz, "*Data Structures with C(Schaum's Outline Series)"*, McGraw Hill Education.

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Course Name:	Digital Design					
Course Code:	CSE 202	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: This Course will provide the fundamental background needed to understand how digital systems work and how to design digital circuits. Students will gain experience with several digital systems, from simple logic circuits to programmable logic devices.

Topics include: Number systems and codes, Boolean algebra, logic circuits and minimization, Combinational and sequential logic circuits, Programmable Logic devices, State table and state diagrams, Counters and shift registers, Arithmetic operations and algorithms, fault diagnosis and tolerance.

Text Book(s):

1. Mano, M. Morris and Ciletti Michael D., *"Digital Design"*, Pearson Education.
2. Biswas N N ,*"Logic design Theory"*,Seagull Publishing.

Reference Book(s):

1. Jain, R. P., *"Modern Digital Electronics"*, McGraw Hill Education.
2. Roth, Charles H., Jr and Kinney Larry L., *"Fundamentals of logic Design"*, Cengage Learning.
3. Floyd T l ,*"Digital fundamentals"*,Pearson.

Course Name:	Discrete Mathematics					
Course Code:	CSE 203	Credit Structure :	L	T	P	C
			3	1	0	4

Course Description: Discrete Mathematics must be a core subject in computer Science as per ACM and IEEE. In contrast to calculus (for all engineering Courses), Discrete Mathematics is the back bone for Computer Science.

Topics include: Prepositional logic, Predicate logic, Sets, functions, sequences and sums, Basic and Advance counting techniques, Induction and Recursion, Fundamental Algorithms, the integers, Matrices and Relations

Text Book(s):

Kenneth H Rosen *"Discrete Mathematics and its Applications"*,McGraw Hill.

Reference Book(s):

1.S.EPP, *"Discrete Mathematics"*, Academic Press.

2. Thomas Kochy,*"Discrete Mathematics"*, Academic Press

3.3 COURSE DESCRIPTION AND SYLLABUS

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Course Name:	Engineering Mathematics – I

Course Code:	MAT 105	Credit Structure :	L	T	P	C
			3	1	0	4

Course Description:
The objective of this course is to model engineering problems, understand the applications of continuous functions and obtain solutions of real world problems. Calculus is the backbone of any engineering applications and hence this course is an extension of senior secondary or PUC level. This course introduces the concept of successive differentiation, properties of polar curves, expansion of function involving one variable and evaluation of indeterminate forms. Further, the students are exposed to partial differentiation techniques, its applications, differentiation of vector and scalar functions along with their applications, reduction formulae and evaluation of integrals with standard limits, and solution of first order and first degree differential equations with their applications. Also, the course provides the knowledge of matrices and system of equations.

Text Book(s):
Erwin Kreyszig, "*Advanced Engineering Mathematics"*, John Wiley-India Publishers.

Reference book(s):
1. Peter V. O'Neil, "*Advanced Engineering Mathematics"*, Cengage Learning.
2. B.S. Grewal, "*Higher Engineering Mathematics"*, Khanna Publishers.

Course Name:	Engineering Physics					
Course Code:	PHY 101	Credit Structure :	L	T	P	C
			4	0	0	4

Course Description:
The main objective of this course is to study the fundamentals of physics which develop the ability to identify, formulate and apply to engineering domain. This course covers the areas, namely, modern physics, applied physics, properties and material science. The course includes the 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. The concepts of lasers and its applications in the field of Optical fibers communication system and other areas are discussed. The electrical properties emphasizes on modern concepts such as free electron theory, electrical conductivity in metals, Fermi energy and its applications of contemporary and useful materials such as semiconductors, superconductors, dielectric and magnetic materials are discussed in detailed manner.

Textbook(s)
T1. Wiley, "Engineering Physics", Wiley India.

Reference Book(s)
R1. G Aruldhas, "Engineering Physics",PHI Learning Pvt. Ltd, Delhi.
R2. M.N Avadhanulu, P G Kshirsagar, "Engineering Physics", S Chand & Company Pvt. Ltd.
R3. Md. N. Khan, S Panigrahi, "Principles of Engineering Physics 1 & 2", Cambridge University Press.

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R4. Serway Raymond and Jewett John, *"Physics for Scientists and Engineers with Modern Physics"*, Cengage.

Course Name:	Elements of Electrical Engineering					
Course Code:	EEE 101	Credit Structure :	L	T	P	C
			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.

Text Book(s):
1. John Hiley, Keith Brown and Ian McKenzie Smith, *"Hughes Electrical and Electronic Technology",* Pearson.

Reference Book(s):
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	T	P	C
			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.

Text Book(s):
1. M.N. Shesha Prakash, Ganesh B. Mogaveer, "Elements of Civil Engineering and Engineering Mechanics", PHI Learning.

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2. Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das, "Elements of Civil Engineering", PHI Learning Pvt Ltd.

Reference Book(s):

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

Course Name:	**Engineering Graphics**					
Course Code:	**MEC 152**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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.

Text Book:

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

Reference Book (s):

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**	**T**	**P**	**C**
			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 world 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.

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Reference book (s):

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

Course Name:	**Engineering Physics Lab**					
Course Code:	**PHY 151**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description:
Course Description: This course includes the laboratory sessions on determination of the wave length of Laser, Rigidity modulus, dielectric constant, calculation of Numerical Aperture and energy band gab by four probe method, Fermi energy of copper and acceleration due to gravity by simple pendulum. It also includes experiments on characteristics of Transistor, Zener Diode and LCR Series and Parallel Resonance Circuits.

Course Material: "*Engineering Physics Lab manual"* Presidency University.

Course Name:	**Workshop Practice**					
Course Code:	**MEC 151**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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 Book(s):
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:	**Building Self Confidence**					
Course Code:	**PPS 105**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description:
Engineers work with people; with architects, clients and other engineers. Effective engineers are able to face people and different situations with confidence. In this Programme students get to work on their self-esteem, develop a lot of confidence through various activities like Ramp walk, introduction in public, dance and sing in class and telling stories in groups – this all generates amazing level of confidence.

Text Book(s):
1. Presidency University "*Building Self-Confidence"* Training Manual

Reference Book(s):
1.Jack Canfield, *"The Success Principles",* 8th Edition, HarperCollins Publishers India, 2015

Course Name:	**Engineering Chemistry**					
Course Code:	**CHE 101**	**Credit Structure :**	**L**	**T**	**P**	**C**
			4	**0**	**0**	**4**

Course Description:

The course intends to provide chemical concepts most relevant to engineering students and demonstrate them in an applied context. The course is designed to deal with the principles of various branches of chemistry such as (a) Organic, (b) Inorganic, (c) Physical and (d) Industrial Chemistry. The student is exposed to the principles required to understand important contemporary topics like materials chemistry, principles of electrochemistry in batteries and corrosion science, methods of analysis in water treatment, solid state and liquid crystals, phase rule and its applications.

The course begins with the chemical methods of analysis which emphasises on volumetric, gravimetric and instrumental methods which is followed by water technology wherein hardness, domestic water treatment, desalination techniques, treatment for boiler feed water and boiler troubles are covered.

The course presents the synthesis/ manufacture, properties and industrial applications of plastics, special polymers, elastomers, adhesives, composites, engineering materials such as metals, alloys, cementing materials and nanomaterials. It covers the study of batteries, fuel cells and corrosion science which has a massive impact in the industry. The course also deals with different types of fuels, calorific value, cracking and refining processes, adverse effects of knocking in IC engines which are of great significance for an engineering student.

The course also emphasises on introduction to crystallography, Bragg's law, imperfections in solids, liquid crystals and their industrial applications followed by Phase rule and its applications.

Textbook(s)
T1. Wiley, "Engineering Chemistry", Wiley.

Reference Book(s)

R1. Jain and Jain, "Engineering Chemistry", Dhanpat Rai Publication.
R2. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press.

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Course Name:	Elements of Electronics Engineering					
Course Code:	ECE 101	Credit Structure :	L	T	P	C
			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.

Textbook(s):
1. John Hiley, Keith Brown and Ian McKenzie Smith, *"Hughes Electrical and Electronic Technology",* Pearson.

Reference Book(s):
1. Smarajit Ghosh, *"Fundamentals of Electrical and Electronics Engineering*", PHI
2. D.P. Kothari, I. J. Nagrath, *"Basic Electronics",* McGraw Hill Education
3. Rajendra Prasad, *"Fundamentals of Electronics Engineering",* Cengane Learning

Course Name:	Elements of Mechanical Engineering					
Course Code:	MEC 101	Credit Structure :	L	T	P	C
			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.
Text Book (s):
1. K. P. Roy, S. K. Hajra Choudhury, Nirjhar Roy, *"Elements of Mechanical Engineering,"* Media Promoters and Publishers Pvt. Ltd. Mumbai.
Reference Book(s):
1. Pravin Kumar, *"Basic Mechanical Engineering*," Pearson.
2. V. K. Manglik, *"Elements of Mechanical Engineering,"* PHI.
2. Dr. D. S. Kumar, *"Elements of Mechanical Engineering," S.* K. Kataria & Sons.

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Course Name:	Environmental Science and Disaster Management					
Course Code:	CIV 102	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description:

The overall objective of the course is to provide an understanding of the resources of environment and its maintenance and also impart 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 preserving biodiversity. It also includes environmental pollution and its control, causes of environmental problems; human environmental disturbances, water and air pollution, hazards, disasters and mitigation measures, solid wastes, hazardous wastes, environmental management etc. No prior knowledge is required for pursuing the course. 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, the components of various types of ecosystem and interrelation between the components, various hazards and disasters, their affects and mitigation measures, various factors which cause environmental pollution and their control measures.

Text Book(s):

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

Reference Book(s):

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

Course Name:	Technical Spoken Communication					
Course Code:	ENG 104	Credit Structure :	L	T	P	C
			1	0	2	2

Course Description:

A course on Technical Spoken Communication aims at improving the target audience spoken skills in English. It is a theory cum practice course targeting to improve the 1st year B.Tech students' pronunciation, listening, narration, presentation and group discussion skills. Rules of pronunciation, syllable stress, traits of good listener, and types of listening, barriers to listening, strategies for improving narration, presentation and group discussion skills will be delivered in the theory hours and practice and evaluation on the theories will be done in the practical hours.

Reference book(s):

1. Tomson, Robert. *"The Interview."* Stories of Work, Life and the Balance in Between. The White 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

Course Name:	**Computer Programming**					
Course Code:	**CSE 151**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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.

Text Book(s):
1. E. Balagurusamy, "*Programming in ANSI C*", Tata McGraw Hill.

Reference Book(s):
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**	**T**	**P**	**C**
			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.

Reference

"Engineering Chemistry Lab Manual", Presidency University.

Course Name:	**Engineering Mathematics – II**					
Course Code:	**MAT 106**	**Credit Structure :**	**L**	**T**	**P**	**C**
			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.

Textbook(s)

T1 Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley-India Publishers, 2014.
T2 Ronald E. Walpole, Raymond H. Myers, Sharon. L. Myers and Keying E. Ye, "Probability and statistics for Engineers and Scintists", Pearson Education, Delhi. 9th Edition, 2012.

Reference Book(s)

R1 Peter V. O'Neil, Advanced Engineering Mathematics, 7th Edition, Cengage Learning, 2012.
R2 B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, 2014.

Course Name:	**Effective Communication**					
Course Code:	**PPS 106**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

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:	Engineering Mathematics – III					
Course Code:	MAT 107	Credit Structure :	L	T	P	C
			3	1	0	4

Course Description: This course aims to introduce Fourier series, various transforms, its applications and complex variables. The topics covered include the applications of Fourier series of continuous and discrete function, to evaluate the various forms of waves using Fourier series, the behavior of a system in terms of present and past time using Convolution theorem, identify first few coefficients of Fourier series using harmonic analysis. Also, to study the applications of Fourier transforms, Fast Fourier Transforms, Discrete Cosine Transforms and Z transforms. The course also introduces the function of complex variables and varieties of operations, analyses and problems that may arise within the context. It also equips the students with mathematical techniques and skills to handles complex integration.

Text Book
1. Advanced Engineering Mathematics, Erwin Kreyszig, Tenth Edition, 2014, John Wiley-India Publishers, 2014.

Reference Books
1. Advanced Engineering Mathematics, K.A. Stroud and Dexter Booth, Fifth Edition, Macmillan Education, UK
2. Higher Engineering Mathematics B.S. Grewal, 43rd edition, Khanna Publishers.

Course Name:	Data Structures and Algorithms					
Course Code:	CSE 221	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description:

Introduction to data structures, abstract data types, analysis of algorithms. Creation and manipulation of data structures: arrays, lists, stacks, queues, trees, heaps, hash tables, balanced trees, tries, graphs. Algorithms for sorting and searching, order statistics, depth-first and breadth-first search, shortest paths and minimum spanning tree, Divide & conquer and Dynamic programming Algorithms. The course has a design focus but realization and performance issues will also be emphasized.

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Text Book(s):

1. Michael T. Goodrich and Roberto Tamassia: Algorithm Design: Foundations, Analysis and Internet examples, John Wiley &Sons, Inc., 2002.

Reference Book(s):

1. T. Cormen, C. Leiserson, R. Rivest, C. Stein, Introduction to Algorithms, 2nd edition, Prentice-Hall India, 2001.
2. Richard F Gilberg and Behrouz A Forouzan, "Data Structures: A Pseudo code Approach with C", Cengage learning, 2nd Edition, 2016.
3. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education.

Course Name:	**Digital Design**					
Course Code:	**CSE 202**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course will provide the fundamental background needed to understand how digital systems work and how to design digital circuits. Students will gain experience with several digital systems, from simple logic circuits to programmable logic devices.

Topics include: Number systems and codes, Boolean algebra, logic circuits and minimization, Combinational and sequential logic circuits, Programmable Logic devices, State table and state diagrams, Counters and shift registers, Arithmetic operations and algorithms, fault diagnosis and tolerance.

Text Book(s):

1. Mano, M. Morris and Ciletti Michael D., *"Digital Design"*, Pearson Education.

2. Biswas N N ,*"Logic design Theory"*,Seagull Publishing.

Reference Book(s):

1. Jain, R. P., *"Modern Digital Electronics"*, McGraw Hill Education.

2. Roth, Charles H., Jr and Kinney Larry L., *"Fundamentals of logic Design"*, Cengage Learning.

3. Floyd T l ,*"Digital fundamentals"*,Pearson.

Course Name:	**Discrete Mathematics**					
Course Code:	**CSE 203**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**1**	**0**	**4**

Course Description: Discrete Mathematics must be a core subject in computer Science as per ACM and IEEE. In contrast to calculus (for all engineering Courses), Discrete Mathematics is the back bone for Computer Science.

Topics include: Prepositional logic, Predicate logic, Sets, functions, sequences and sums, Basic and Advance counting techniques, Induction and Recursion, Fundamental Algorithms, the integers, Matrices and Relations

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Text Book(s):

Kenneth H Rosen *"Discrete Mathematics and its Applications"*,McGraw Hill.

Reference Book(s):

1.S.EPP, *"Discrete Mathematics"*, Academic Press.

2. Thomas Kochy,*"Discrete Mathematics"*, Academic Press

Course Name:	**Object Oriented Programming**					
Course Code:	**CSE 204**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: This Course is designed for students who have prior programming experience. it introduces the concepts of object-oriented programming by focusing on the definitions and use of classes along with the fundamentals of object-oriented design.

Topics include: Control structures and data types, Object-oriented design- encapsulation and information-hiding, classes, objects, Constructor, Array, String, Inheritance, Polymorphism, Packages, Exception Handling, Thread, GUI and Applets

Text Book(s):

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.

Reference Book(s):

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.

Course Name:	**Computer Organization**					
Course Code:	**CSE 223**	**Credit Structure:**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This course covers basics of modern computer organization. The emphasis is on understanding the interaction between computer hardware and software at various levels. The students will learn the concepts of computer technology, performance evaluation, instruction set design, computer arithmetic, hierarchical memory systems, data path and control unit design of processors.

Topics: Introduction to Computer Arithmetic, Instruction sets, Processor vs. memory interaction, CPU Design, Memory system, Input-Output Interface, Asynchronous Data Transfer, Programmed I/O, Interrupts, Direct Memory Access, Basic Input / Output Structure.

Text Book(s):

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1. "Computer Organization"- Carl Hamacher, Zvonko Vranesic Et al. Fifth Edition.
2. "Computer Organization and Design." The Hardware/Software Interface-David A. Patterson & John L. Hennessy Fifth Edition

Reference Book(s):

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015

Course Name:	**Data Structures and Algorithms Lab**					
Course Code:	**CSE 259**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**

Course Description: Implementing Data structures like Stacks, Queues, Linked lists, Trees, Binary search trees, Heaps, Graph traversal using C language.

Text Book(s):

1. Michael T. Goodrich and Roberto Tamassia: Algorithm Design: Foundations, Analysis and Internet examples, John Wiley &Sons, Inc., 2002

Reference Book(s):

1. Behrouz A Forouzanand Richard F Gilberg, "*Computer science: A structured programming approach using C",*Cengage Learning.

2. Robert L Kruse, Bruce P Leung and Clovis L Tondo, "*Data Structures and Program Design in C"*, Pearson.

Course Name:	**Digital Design Lab**					
Course Code:	**CSE 252**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description: Implementing digital design concepts like verification of logic gates, De morgan's theorem, Reducing Boolean expression using K-map, Adder and subtractor circuits, Number conversion, Multiplexer and De multiplexer using gates, Flip flops, shift registers and counters.

Text Book(s):

1. Mano, M. Morris and Ciletti Michael D., *"Digital Design",* Pearson Education.

2. Biswas N N,*"Logic design Theory"*, Seagull publishing.

Reference Book(s):

1. Jain, R. P., *"Modern Digital Electronics"*, McGraw Hill Education.

2. Roth, Charles H., Jr and Kinney Larry L, *"Fundamentals of logic Design",* Cengage Learning, .

3. Floyd T l , "*Digital fundamentals",* Pearson.

Course Name:	**Design Thinking and Team Building**					
Course Code:	**PPS 107**	**Credit Structure :**	**L**	**T**	**P**	**C**

			0	**0**	**2**	**1**

Course Description: This Course is directed towards making students perform in teams, become an asset for a team and develop the Leadership Skills needed for today's time. It gives participants an understanding of their self-esteem level and how to have high self-esteem. The Course helps the participants to understand their level of assertiveness and helps them to develop their assertiveness in different situations. This Course also includes training on how to connect to team people, how to resolve conflicts among team members and how to lead oneself and a group of people. It covers details about different types of leadership, situational leadership and the situations where these different types of leadership are applicable.

Course Material: "*Professional and Business Skills - I training material"*, Presidency University.

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:	**PPS 108**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description: This Course is directed towards making students perform in teams, become an asset for a team and develop the Leadership Skills needed for today's time. It gives participants an understanding of their self-esteem level and how to have high self-esteem. The Course helps the participants to understand their level of assertiveness and helps them to develop their assertiveness in different situations. This Course also includes training on how to connect to team people, how to resolve conflicts among team members and how to lead oneself and a group of people. It covers details about different types of leadership, situational leadership and the situations where these different types of leadership are applicable.

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

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Course Name:	Numerical Methods, Probability Distributions and Sampling Techniques					
Course Code:	MAT 108	Credit Structure :	L	T	P	C
			3	1	0	4

Course Description

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 topic covered include basic concepts of probability and conditional probability, Baye's rule, discrete and continuous probability distributions covering binomial, Poisson, geometric, exponential, uniform, normal distributions and their applications, functions of random variable, random sampling and its properties, 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, chi-squared test of goodness of fit, correlations analysis, linear regression and method of least squares.

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.

Textbook(s)

T1 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.

T2 S.S. Sastry, Introductory methods of numerical analysis, 5th edition, Prentice-Hall of India, 2012.

T3Walpole R. E., Myers R. H., Myers S. L. and Ye K.E., "Probability and Statistics for Engineers and Scientists", Ninth Edition, Pearson Education (India), 2014.

Reference Book(s)

R1 B.S. Grewal, Numerical methods in engineering and science, 10th Edition, Khanna publishers, 2016.

R2 Curtis F. Gerald and Patrick O. Wheatley, Applied numerical analysis, Pearsoneducati E Education, 7th Edition, 2013.

R3 E. Ward Cheney and David R. Kincaid, Numerical Mathematics and Computing, 7th Edition, Cengage Learning, India, 2014.

R4 Richard A. Johnson, Irwin Miller and John Freund, "Miller & Freund's Probability and Statistics for Engineers", Eighth Edition, Pearson Education (India), 2015.

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R5 Sheldon M. Ross, "Introduction to Probability and Statistics for Engineers and Scientists", Fourth Edition, Academic Press, 2009.
R6 Ramalingam Shanmugam and Rajan Chattamvelli, "Statistics for Scientists and Engineers", First Edition, Wiley Publications, 2015.

Course Name:	Principles of Data Communications and Computer Networks					
Course Code:	CSE 236	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description:

Introduction to Data and Signals - Digital Transmission-Analog Transmission - Bandwidth Utilization: Multiplexing , demultiplexing and Spreading - Transmission Media -Switching -Using Telephone and Cable Networks for Data Transmission. Networking devices, network topologies- protocols and standards, types of networks - LAN, MAN, WAN, reference models – ISO/OSI.

Error Detection and Correction- Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC Data Link Control-Multiple Access- ALOHA-CSMA –CSMA/CD- CSMA/CA- Channelization-FDMA,TDMA,CDMA

Wired LANs: Ethernet - Wireless LANs - Connecting LANs, Backbone Networks, and Virtual LANs Fast Ethernet, Gigabit Ethernet. Token bus, token ring -Wireless WANs: Cellular Telephone and Satellite Networks –SONETISDH-Virtual-Circuit Networks: Frame Relay and ATM

Text Book:

1. "*Data Communications and Networking*:" Behrouz A. Forouzan, Tata McGraw-Hill, 5th Ed 2013
2. Larry L, Peterson and Bruce S. Davie, *"Computer Networks: A system Approach",* Elsevier. 5th Ed 2011

References:

1. William Stallings, "*Data and Computer Communications*", Tenth Edition, Pearson Education, 2017.
2. A. S. Tannenbum, D. Wetherall, *"Computer Networks",* Prentice Hall, 5th Ed 2011

Course Name:	Operating Systems					
Course Code:	CSE 210	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: Operating systems being central to computing activities, this Course provide understanding of the functions and functional modules of operating systems. The design and implementation of Operating systems is also covered.

Topics include: Core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output device management and security.

Students should have previous familiarity with programming in a high-level language, assembly language programming, CPU organization, instruction sets and registers.

Text Book(s):

Silberschatcz A, Galvin P B and Gagne G, "Operating System Concepts", Wiley.

Reference Book(s):

1. William Stallings, "Operating systems", Prentice Hall, Pearson.

2. Andrew S Tanenbaum and Albert S Woodhull, "Operating Systems Design and Implementation", Pearson.

Course Name:	**Microprocessors and Microcontrollers**					
Course Code:	**CSE 206**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: The objective of this Course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other Courses where control can be achieved via a microprocessor/ controller implementation. Topics include: Semiconductor memory devices and systems, microcomputer architecture, assembly language programming, I/ O programming, I/ O interface design, I/ O peripheral devices, data communications, and data acquisition systems.

Text Book (s):

1.Barry B Brey , "Intel *microprocessor 8086/ 8088*" ,Pearson,PHI.

2. Douglas V Hall, "*Microprocessors and Interfacing, Programming and Hardware*" Tata McGraw Hill.

Reference book(s):

1. Muhammad Ali Mazidi, "*Microprocessors and Microcontrollers*", Pearson.

2. Ramesh Gaonkar, "*Microprocessor Architecture, Programming and Applications with the 8085*", PHI

Course Name:	**Database Management Systems**		**Employability**			
Course Code:	**CSE 207**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course aims at developing and managing efficient and effective databases. It helps the students to learn and practice data modelling using the entity-relationship diagrams and developing database designs using structured query languages.

Topics include: Introduction to Database systems, Data modelling, Relational Database design, Various Database Languages, Relational Database Issues , Transaction Management, File structure Techniques, Query processing and optimization, Advanced topics- introduction to distributed databases and spatial-temporal databases.

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Text Book(s):

Silberschatz A, Korth H F andSudarshan S, “Database System Concepts”, McGraw Hill Education.

Reference Book(s):

1. Elmasri R andNavathe S B, “Fundamentals of Database System”, Pearson Education.

2. Hector G Molina, Jeffrey D Ullman and Jennifer Widom, “Database Management Systems”, McGraw Hill Education.

Course Name:	**Theory of Computation**					
Course Code:	**CSE 208**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**1**	**0**	**4**

Course Description: This is an introductory Course for the study of formal languages and the correspondence between language classes and the automata that recognize them.

Topics include: Formal definitions of grammars and acceptors, Deterministic and Nondeterministic systems, Grammar ambiguity, finite state and push-down automata; normal forms; Turing machines and its relations with algorithms.

Text Book(s):

Peter Linz, “*An introduction to Formal Languages and Automata*”, Jones and Bartlett Publications..

Reference Book(s):

1. Aho, Ullman and Hopcroft, “*Theory of Computation*”, Pearson India.

2. MichaelSipser, “*Theory of Computation*”, Cengage India

Course Name:	**Database Management Systems Lab**					
Course Code:	**CSE 253**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**

Course Description: Database management lab is designed to have a real feel of database design using structured query languages, which includes use of various data definition, data manipulation commands, functions, joins, sub-queries, views ,set operations, procedures and triggers.

Text Book(s):

Elmasri R andNavathe S B, “*Fundamentals of Database System*”, Pearson Education.

Reference Book(s):

Silberschatz A, Korth H F andSudarshan S, “*Database System Concepts*”, McGraw Hill Education.

Course Name:	**Microprocessors and Micro-Controllers Lab**					
Course Code:	**CSE 254**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description: Familiarize the architecture of 8086 processor, assembly language programming and interfacing with various modules. Students will get hands on experience of 8086 instruction set, Addressing modes, Macro, string operations, DOS interrupt, BIOS interrupt, and interfacing using assembly language.

Text Book(s):

1. Muhammad Ali Mazidi, *"Microprocessors and Microcontrollers"*, Pearson.
2. Douglas V Hall, *"Microprocessors and Interfacing, Programming and Hardware"*, Tata McGraw Hill.

Course Name:	**Being Corporate Ready**		**Life Skills Development**	**Professional Ethics**		
Course Code:	**PPS 108**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Description: This Course is directed towards making students perform in teams, become an asset for a team and develop the Leadership Skills needed for today's time. It gives participants an understanding of their self-esteem level and how to have high self-esteem. The Course helps the participants to understand their level of assertiveness and helps them to develop their assertiveness in different situations. This Course also includes training on how to connect to team people, how to resolve conflicts among team members and how to lead oneself and a group of people. It covers details about different types of leadership, situational leadership and the situations where these different types of leadership are applicable.

Course Name:	**Advanced Computer Networks**					
Course Code:	**CSE 237**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course description:

This course covers computer networks concepts, Internet, application layer, presentation layer, session layer, transport layer protocols, network layer and routing.

Topics :

Network Layer Design Issues- Store-and-Forward Packet Switching- Services Provided to the Transport Layer- implementation of Connectionless Service- Implementation of Connection-Oriented Service .Packet Switching and Datagram approach – IP addressing methods –IPV4 and IPV6 address in network, subnet calculation – Routing – Distance Vector Routing – Link State Routing – Routers.

The Transport Service- Elements Of Transport Protocols – Addressing- -Flow Control and Buffering – Multiplexing – Demultiplexing – Crash Recovery Congestion Control Algorithms- -User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) - Quality of services (QOS) .

Session Layer -Session and Transport Interaction , Synchronization Points, Session Protocol Data Unit Presentation formatting-xml ,Data compression –JPEG ,MPEG, Audio compression (MP3) . Application Layers: Domain Name Space (DNS) -The DNS Name Space- Name Servers - Electronic Mail -SMTP – FTP – HTTP – WWW

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Text Books:

1. Larry L, Peterson and Bruce S. Davie, "Computer Networks: A system Approach", Elsevier. 5th Ed 2011

2. A. S. Tannenbum, D. Wetherall, "Computer Networks", Prentice Hall 5th Ed 2011.

Reference Books:

1. FredHalsall, "Computer Networks", Addison – Wesley Pub. Co fifth Edition 2005

2. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill 4th Ed 2006

3. Wayne Tomasi, "Introduction To Data Communications and Networking", Pearson first Edition April 2011

4. William Stallings, "Data and Computer Communications", 9th Edition, Pearson Education.

Course Name:	Software Engineering and Project Management					
Course Code:	CSE 227	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION:

The objective of this course is to help students understand the process and fundamental principles involved in software system development and software project management. The course covers software process models, software requirement engineering processes, system analysis, design, implementation and testing aspects of software system development. The course also covers project evaluation, planning, effort estimation and risk management aspects in software project planning.

Topics include: Introduction to Software Engineering, Process Life Cycle Models, Requirement Analysis and Specification, User Interface Analysis and Design, Software Testing, Project Management, Project Planning, Effort Estimation Techniques, Project Scheduling, Project Metrics & Evaluation, Risk Management.

Text book(s):

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", VII Edition, McGraw-Hill, 2017.
2. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management", VI Edition, McGraw-Hill, 2018.

Reference book(s):

1. Ian Sommerville, "Software Engineering", IX Edition, Pearson Education Asia, 2011.

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2. Rajib Mall, “Fundamentals of Software Engineering”, VI Edition, PHI learning private limited, 2014.

Course Name:	Principles of Artificial Intelligence					
Course Code:	CSE 228	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION:

This Course will introduce the basic principles in artificial intelligence. It will cover representation schemes, problem solving paradigms, constraint propagation, search strategies, knowledge representation, Probabilistic Reasoning.

Topics include: AI methodology and fundamentals, intelligent agents, search algorithms, game playing, supervised and unsupervised learning, uncertainty and probability theory, probabilistic reasoning in AI, Bayesian networks, statistical learning.

Text Book(s):

1. Stuart J. Russell and Peter Norvig, Artificial intelligence: A Modern Approach, 3rd edition, Upper Saddle River, Prentice Hall.

2. Elaine Rich, Kevin Knight and ShivashankarB.Nair, “Artificial Intelligence”, TataMcGraw- Hill, Third Edition, 2009[R.N.].

Reference Book(s):

1. N J Nilsson (1997). Artificial Intelligence- A new synthesis, Elsevier Publications.

2. N J Nilsson (1982). Principles of Artificial Intelligence, Springer.

3. Patterson, D. W. (1990). Introduction to artificial intelligence and expert systems. Englewood Cliffs, Prentice Hall.

4. Luger, G. F. (2002). Artificial intelligence: Structures and strategies for complex problem solving, Harlow, Pearson Education.

Course Name:	Web Technologies					
Course Code:	CSE 264	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION:

This course is designed to introduce programming knowledge associated with the World Wide Web. It provides an overview of key concepts and few technologies involved in web based application development. Further, the course aims at introducing web-based media-rich programming techniques for creating interactive web pages. Students will learn to understand the working of website, design and develop effective web applications.

Topics include: Introduction to web concepts, HTML, CSS, JAVASCRIPT, PHP and MYSQL.

Textbook:

1. Robert W Sebesta, "Programming the World Wide Web", 8th edition, Pearson Education publishers, 2015.
2. Deitel, Deitel, and Nieto, "Internet and World Wide Web – How to program", 5th edition, Pearson Education publishers, 2008.

Reference Textbook:

1. Randy Connolly, "Fundamentals of Web Development", 3rd edition, Pearson Education publishers, 8th may 2014.

Course Name:	Network Simulation Lab					
Course Code:	**CSE 262**	**Credit Structure :**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**

COURSE DESCRIPTION:

Network Simulation intends to explore the opportunities for developing, maintaining and supporting distributed and network applications. The Course covers the construction of simple networks and implementation using various network simulators and tracing of packets in networks.

Topics include: Overview of computer network,Troubleshooting commands, Wireshark ,Cisco packet tracer,NS-2 Simulators to demonstrate the network protocols like TELNET,DHCP, HTTP, FTP, SMTP, NFS etc,.

REFERENCE MATERIALS: (i) "Network Simulation Lab Manual" Presidency University.

Course Name:	**Digital Entrepreneurship**					
Course Code:	**MGT 113**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

COURSE DESCRIPTION:

The course aims to strengthen the capabilities of participants to use disruptive digital technologies to design innovative and viable business models, processes, services, products and strategies. This course specifically focused on learning lean startup principles, how to identify potential new venture ideas that boost market growth, state customer value propositions and economic value. The course deals with the competencies needed to become an innovative, opportunity-driven, market-ready and

entrepreneurial manager. This course examines successful strategies, business models, frameworks, funding process, barriers and risks for introducing break-through products and services. Topics include business model innovation, strategic leadership, human centered and design-driven innovation and change management.

Text Book

Rogers. D., "*Digital Transformation Playbook – Rethink Your Business for the Digital Age"*, Columbia Business School Publishing, 2016.

Reference Books

(iii) Mayer, M. H., "*New Venture Creation: An Innovator's Guide to Entrepreneurship"*, 2nd Edition, Sage Publication, 2013.

(iv) Kuratko, D. F., & Rao, T. V., "*Entrepreneurship: A South Asian Perspective"*, Cengage Learning India Pvt. Ltd, Delhi, 2016.

(v) Kim, C. W.; "*Blue Ocean Strategy*", HBR Publishing House, 2005.

(vi) Dayer, J.Gregersen, H. and Christensen, C., "*The Innovator's DNA - Mastering the Five Skills of Disruptive Innovators"*, HBR Press, 2011.

(vii) Osterwalder, A. and Pigneur, Y., "*Business Model Generation: A Handbook for Visionaries, Game Changes, and Challengers",* John Wiley & Sons, 2010

Course Name:	**Business Intelligence**					
Course Code:	**MGT 114**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

COURSE DESCRIPTION:

Introduction to Business Intelligence /Data Analytics provides the student with a broad overview of the modern Analytics landscape, including the tools and techniques that are successfully utilized by 21st century organizations. Students learn about the history and evolution of Data Analytics (DA), Business Analytics (BA), and Business Intelligence (BI), from standardized reporting to a flexible, integrated *Information Ecosystem* that provides modern decision makers with essential, accurate, and timely information. The emphasis of this course centers on the proper deployment and use of DA, BA, and BI techniques and technologies to best meet the information requirements of modern decision makers. An overview of current DA, BA, and BI tools is also provided, including Data Warehousing, Data Mining, OLAP, and Business Performance Management (BPM).

Textbook:

1. *Business Intelligence, Analytics, and Data Science: A Managerial Perspective* - Fourth Edition, by Sharda, Delen, & Turban (Pearson/Prentice Hall, 2018)

References

1. Business Intelligence Guidebook: From Data Integration to Analytics

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2. Business Intelligence and Analytics: Systems for Decision Support (10th Edition)

3. Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big Data

Course Name:	**Big Data Analytics**					
Course Code:	**CSE 219**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: This Course shall provide the fundamental knowledge to equip students being able to handle real world big data problems including the three key sources of Big Data: people, organizations, and sensors. With the advance of IT storage, processing, computation, and sensing technologies, Big Data has become a novel norm of life.
Topics include: Big data and its importance, Four v's , big data analytics and applications. Big data technologies, data discovery, open source technology for big data analytics, cloud and big data, predictive analytics, mobile business intelligence and big data ,crowd sourcing analytics, inter- and trans-firewall analytics, information management, Processing big data, Hadoop mapreduce, implementation of big data analytics, big data convergence, analytics business maturity model. big data tools and techniques, installing and user defined functions, data processing operators, Sample projects using tools.

Text Book(s):

1. Big Data and Analytics- Seema Acharya, Subhashini Chellappan-2015, Wiley Publication.
2. Analytics in a Big data world- Bart Baesens- Wiley Publication.

Reference book (s):

1. Big data analytics, Radha Shankarmani and Vijalakshmi 2nd edition , Wiley Publications.
2. Big data, Anil Maheshwari, Mc Graw-Hill Education.
3. Tom White, "Hadoop: The Definitive Guide", O'reilly.

3. Tom White, *"Hadoop: The Definitive Guide"*, O'reilly.

Course Name:	**INTRODUCTION TO DEEP LEARNING-**					
Course Code:	**CSE 235**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**4**	**3**

COURSE DESCRIPTION: This course introduces students to fundamental concepts of deep neural networks and state of the art approaches to developing deep learning models to solve real world applications forvarious domains like imagerecognition, natural language processingetc.Topics include fundamental concepts of deep neural networks, Convolutional Neural Networks, Recurrent Network structures, Deep Unsupervised Learning, General Adversarial Networks and applications in various problem domains.

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Text Books:

1.Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", MIT Press.

2.Artificial Neural Networks B. YagnaNarayana, PH

Reference Books:

1.Deep Learning with Pythons, byFrancois Chollet, Manning Publications
2.Deep Learning by John D. Kelleher,MIT Press Essential Knowledge series
3.Hands-OnMachine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools andTechniques to Build Intelligent Systems by Aurelian Geron, Shroff/O'Reill

Course Name:	**Internet of Things**					
Course Code:	**CSE 220**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: The Internet of Things (IoT) is an emerging paradigm combining heterogeneous devices at an unprecedented scale, thereby enabling individuals and organizations to gain greater value from networked connections among people, processes, data, and things. The Internet of Things (IoT) is a Course of objects interacting with people, with information systems, and with other objects. The Course will focus on creative thinking, IoT concepts. IoT technologies.
Topics include: IoT definition and characteristics, physical design , Logical design , IoT enabling technologies, levels and Deployment, Domain specific IoTs, IoT and M2M, Simple Network Management Protocol, Iot platforms Design Methodology, IoT physical devices and Endpoints-introduction to Raspberry Pi, Cloud storage Models and Communication APIs, Tools for IoT and case studies

Text book(s):

ArshdeepBahga and Vijay Madisetti,*"Internet of Things a hands –on approach"*. University press

Reference Book(s):

1. RajkumarBuyya, Amir VahidDastjerdi, *"Internet of Things: Principles and Paradigms",* Morgan Kaufmann.
2. Adrian McEwen, Hakim Cassimally, *"Designing the Internet of Things",* Wiley.

Course Name:	**Semantic Web.**					
Course Code:	**CSE 266**	**Credit Structure :**	**L**	**T**	**P**	**C**
			2	**0**	**2**	**3**

COURSE DESCRIPTION

The aim of this course is to teach the students the concepts, technologies and techniques underlying and making up the Semantic Web. At the end of the course the student should be able to: understand and discuss fun-damental concepts, advantages and limits of the semantic web; understand and use ontologies in the context of Computer Science and the semantic web; use the RDF framework and

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associated technologies such as RDFa; understand the relationship between Semantic Web and Web 2.0.

Text book(s):

Pascal Hitzler, Markus Krötzsch, Markus Krötzsch **"Foundations of Semantic Web Technologies" CRC publication 2008**

John hebeler, Mathew fisher **"Semantic Web Programming" 1st Edition** Wiley; 1st edition (March 27, 2009)

3.1 COURSES FOR DISCIPLINE ELECTIVES

Course Name:	**Programming in Advanced Java**					
Course Code:	**CSE 301**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: This intensive, hands-on Course explores advanced Java features and packages. Students will learn Multi-threaded applications, client server programming and JDBC connection.

This Course provide in-depth knowledge in JAVA programming - advanced concepts in java , packages and applets, GUI concepts in java-swing, java database connectivity, servlets, J2EE framework, java script and XML.

Text Book(s):

Cay S Horstmann and Cary Gornell, *"CORE JAVA volume II-Advanced Features"*. Prentice Hall.

Reference Book(s):

1. Cay S. Horstman and Gary Cornell, "Core Java Volume I-Fundamentals", ,Prentice Hall.
2. Schildt Herbert, *"Java 2: The Complete Reference"*, Tata McGraw-Hill.
3. DeitelandDeitel, "*Java How to Program"*, Pearson Education Asia.

Course Name:	**Programming in C# and .NET Framework**					
Course Code:	**CSE 302**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: This Course deals with the programming skills that are required for developers to create Windows applications using the C# language. Helps the students to build an application that incorporates several features of the .NET Framework. C# and .NET is Microsoft's entry into the world of managed programming.

The Course introduces many of the techniques and technologies employed by modern desktop and enterprise applications, including- fundamentals of C# programming in Visual Studio. Overview of C#, CLR-Architecture, Object Oriented aspects of C#, Accessing data with ADO.NET, and Web based applications.

Text Book(s):

1. J. Liberty, *"Programming C#"*, O'Reilly.
2. AndrewTroelsen, *"Pro C# 10 and .NET 4 Platform"*, Apress.

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3. Herbert Schildt, *"The Complete Reference: C#",* Tata McGraw-Hill.

Reference Book(s):

1. Robinson et al, *"Professional C#"*,Wrox Press.
2. E. Balagurusamy, *"Programming in C#"*, Tata McGraw-Hill.
3. S. ThamaraiSelvi, R. Murugesan, *"A Textbook on C#",* Pearson.

Course Name:	**LAMP**					
Course Code:	**CSE 303**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description: This Course will introduce the students to the process of installing and configuring the Linux operating system, the Apache web server, the MySQL database application and the PHP server scripting language / Python. The Course also covers how to maintain and trouble-shoot the system. Students will also learn using PHP/ Python to create data-driven web applications.

Topics include - Install Linux on computer, use the shell to navigate within Linux, perform system administrative tasks, configure network applications, install and configure a mail server, install and configure the Apache Web Server, install and configure MySQL, install and configure PHP/ Python

Text Book(s):

Online manuals for Linux, Apache, MySQL, PHP/ Python

Course Name:	**Mobile Communications**					
Course Code:	**CSE 304**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: The Course helps the students to apply the engineering principles in the specification, design, development and deployment of mobile communications. Students will develop a detailed knowledge and critical understanding of the core skills in mobile communications and networks.

Topics include: Fundamental knowledge of wireless and mobile networks, mobile communication systems / networks / architecture. The cellular communications ,mobile networks, including wireless transmission technology, wireless PAN/ LAN/ MAN/ WAN, Mobile IP, AdHoc networks, sensor networks, wireless mesh networks

Text Book(s):

JochenSchiller ,*" Mobile Communications"*, Pearson Education.

Reference Book(s):

1. William tallings, *"Wireless Communications and Networks"* Pearson Education
2. C.K.Toh, *"AdHoc Mobile wireless Networks",*Pearson education

Course Name:	**Parallel Computing**					
Course Code:	**CSE 305**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

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Course Description: The Course gives introduction to parallel computing; Models of parallel computers, Interconnection networks, basic communication operations,Introduction to parallel algorithms, Parallel programming paradigms, issues in implementing algorithms on parallel computers, Parallel programming with message passing interface, Performance analysis, Scalability analysis, Basic design technique for parallel algorithms, Parallel algorithms for selected topics like sorting, searching and merging, matrix algebra, graphs.

Text Book(s):

AnanthGrama, Anshul Gupta, George KarypisandVipin Kumar, *"Introduction to Parallel Computing",* Pearson Education.

Reference Book(s):

1. M J Quinn, *"Parallel computing: Theory and practice"*,MGH.
2. M.J.Quinn, *"Parallel Programming in C with MPI and OPENMP"*, Jaico Books,
3. F.Thomson Leighton, *"Introduction to Parallel Algorithms and Architectures : Arrays, Trees, Hypercubes"*, Morgan Kaufmann.

Course Name:	**Cloud Computing**					
Course Code:	**CSE 306**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course description: This Course is designed to introduce the concepts of Cloud Computing as a new computing paradigm. Cloud Computing has emerged in recent years as a new paradigm for hosting and delivering services over the Internet. The students can explore various Cloud Computing terminology, principles and applications. Understanding different views of the Cloud Computing such as theoretical, technical and commercial aspects.

Topics include: Evolution of cloud computing and its services available today, Introduction, Architecture of cloud computing, Infrastructure, platform, software, Types of cloud, Business models, cloud services, Collaborating using cloud services, Virtualization for cloud, Security, Standards and Applications.

Text Book(s):

John Rittinghouseand James Ransome, *"Cloud Computing, Implementation, Management and Strategy",* CRC Press.

Reference Book(s):

1. David E.Y. Sarna,*"Implementing and Developing Cloud Application",* CRC press
2. Anthony T Velte, Toby J Velte, Robert Elsenpeter, *"Cloud Computing : A Practical Approach"*, Tata McGraw-Hill

Course Name:	**Data Mining**					
Course Code:	**CSE 307**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course covers theory and practice of extremely large information storage (warehousing) and analysis (mining) mechanisms, with data growing at exponential rates knowledge gathering and exploration techniques are essential for gaining useful intelligence.
Topics include: Data Model for Data Warehouses, data extraction, cleansing, transformation and loading, data cube computation, materialized view selection, OLAP query processing. Data mining-Fundamentals, data mining process and system architecture, relationship with data warehouse and OLAP systems, data pre-processing. Mining Techniques and Application: association rules, mining spatial databases, mining multimedia databases, web mining, mining sequence and time-series data, text mining.

Text Book(s):

T1. Tan P. N., Steinbach M & Kumar V. "*Introduction to Data Mining"* ,Pearson Education, 2016.

Reference Book(s):

1. Han J & Kamber M, "*Data Mining: Concepts and Techniques",* Elsevier, Second Edition, 2006
2. G K Gupta, "*Introduction to Data Mining with Case Studies*", PHI, Third Edition, 2014.
3. Alex Berson and Stephen J. Smith, *"Data Warehousing, Data Mining and OLAP"*, Tata McGraw – Hill.

Course Name:	**Artificial Intelligence**					
Course Code:	**CSE 308**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course will introduce the basic principles in artificial intelligence. It will cover representation schemes, problem solving paradigms, constraint propagation, search strategies, knowledge representation, natural language processing, Expert systems, vision and robotics will also be delivered.
Topics include: AI methodology and fundamentals, intelligent agents, search algorithms, game playing, supervised and unsupervised learning, decision tree learning, dimensionality reduction, clustering, support vector machines;, uncertainty and probability theory, probabilistic reasoning in AI, Bayesian networks, statistical learning , fuzzy logic. Several assignments will be given to enable the student to gain practical experience in using these techniques

Text Book(s):

S. Russell and P. Norvig. "*Artificial Intelligence: A Modern Approach"*. Pearson Education

Reference Book(s):

1. G F Luger "*Artificial Intelligence*",Pearson Education.
2. N J Nilsson "*Artificial Intelligence- A new synthesis*" Elsevier Publications.
3. N J Nilsson "*Principles of Artificial Intelligence*",Springer.

Course Name:	**Data Virtualization**					
Course Code:	**CSE 367**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

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Course Description: Introduction to virtualization, Emphasis is placed on virtualization terminology, virtual machine storage, virtual networking and access control. Operating Systems Primer, Understanding Virtualization, Installing Virtual Machines, CPU and Memory Basics, Upgrading Operating Systems, Understanding File Systems, Vitalizing Storage Devices, Managing Devices in Virtualization, Resource Sharing

Text Book (s):

D Ruest and N Ruest "*Virtualization: A Beginners Guide*",MacGraw Hill

Reference Book (s):

1. Mathew Portney, "*Virtualization Essentials*"- Sybex.
2. Chris Wolf and M Halter , "*Virtualization: From Desktop to enterprise*" ,Morgan Kaufmann.

Course Name:	**Mobile Applications Development**					
Course Code:	**CSE 310**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description The main objective of the Mobile Application Development Course is to teach students the basis of android platform and application life cycle. Students will develop a mobile app with Android containing at least one of the following phone material components: GPS, accelerometer or phone camera , use simple GUI applications and work with database to store data locally or in a server.

Topics will include memory management; user interface design; user interface building; input methods; data handling; network techniques and URL loading; GPS and motion sensing. Android application framework and deployment. Power management, Screen resolution, Touch interface, Store data on the device

Text book(s):

Online manuals for Mobile Applications development.

Course Name:	**Web Services**					**Category**
Course Code:	**CSE 311**	**L**	**T**	**P**	**C**	Employability
		1	**0**	**4**	**3**	

Course Description: The course includes the basic principles of service oriented architecture, its components and techniques. It provides an understanding of the architecture, technology, underlying service design and development aspects of web services. The students will also gain knowledge on the operational aspects of cloud services, which form the basic building blocks of cloud computing.

Topics include: Introduction to Service Oriented Architecture, Web Service fundamentals, WS-* extensions, Building Service Oriented Architecture, Web Services framework, Service Descriptions (WSDL), Messaging (SOAP & REST), Web Service Transactions, Orchestration and Choreography, Policies, Security.

Text book(s):

Thomas Erl, "*Service-Oriented Architecture: Concepts, Technology, and Design"*, Pearson Education.

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Reference Book(s):

1. Heather Williamson, "*XML, The Complete Reference*", McGraw Hill Education.

2. Frank. P. Coyle, "*XML, Web Services And The Data Revolution*", Pearson Education.

3. James Snell, Doug Tidwell, Pavel Kulchenko, "*Programming Web Services with SOAP*", O'Reilly publishers.

Course Name:	**Game Theory**					
Course Code:	**CSE 312**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: The Course takes a software engineering approach to game development. It introduces the architecture, algorithms, data structures and optimization techniques used in game development. Students are taught to use geometric models, 3D graphics pipeline, sound, music in game implementations. The use of networking techniques and factors which affect real time interactive control of games are introduced. After completing the Course students will be capable of developing their own interactive 3D computer game using established software engineering techniques by applying appropriate algorithms and data structures.

Text Book(s):

Steve Rabin, "*Introduction to Game Development*", copyright Charles River Media Incorporated,

Reference Book(s):

Joel Fan, CalinTenitchi, Eric Ries "*Black Art of Java Game Programming"*

Course Name:	**Storage Area Networks**					
Course Code:	**CSE 313**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: The course aims to equip students with basic introduction to Storage Area Networks, including storage architectures, logical and physical components of a storage infrastructure, managing and monitoring the data center and basic Disaster Recovery principles

Topics include:

Evolution of Storage Technology and Architecture, Data Center Infrastructure, Key Challenges in Managing Information, Information Life Cycle, Components of Storage System Environment, Data Protection, Intelligent Storage System, Implementation of RAID, Direct Information Storage, to understand the role of objects in software process models, impact on testing. Content-Addressed Storage, Storage Virtualization, Business Continuity, Backup and Recovery, Local Replication, Remote Replication, Securing the Storage Infrastructure, Managing the Storage Infrastructure

Text Book(s):

1. G. Somasundaram, AlokShrivastava "*Information Storage and Management"*, EMC Education Services, Wiley India.

Reference Book(s):

1. Ulf Troppens, Rainer Erkens and Wolfgang Muller *" Storage Networks Explained*", Wiley India.
2. Rebert Spalding *" Storage Networks The Complete Reference*", TataMcGraw Hill.

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3. Richard Barker and Paul Massiglia "*Storage Area NetworksEssentials A Complete Guide to Understanding and ImplementingSANs*", Wiley. India.

Course Name:	**Software Architecture**					
Course Code:	**CSE 314**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course is designed to understand the software architectural requirements and drivers, exposure to architectural styles and views andbe familiar with architectures for emerging technologies .Software architecture has emerged as the central theme over which all large scale software is built. It is the algorithmic counterpart for large programs. Major topics covered are Architecture Documentation, Architecture Evaluation, Product Lines Enterprise Architecture and so on.

Text Book(s):

Paul Clements, Rick Kazman, and Mark Klein, "*Evaluating software architectures: Methods and case studies*". Addison-Wesley

Reference Book(s):

Anthony J Lattanze, "*Architecting Software Intensive System. A Practitioner's Guide*", Auerbach Publications.

Course Name:	**Embedded Systems**					
Course Code:	**CSE 315**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course description: This Course covers the Embedded systems design concepts like overview of processors and hardware units, system on chip(SoC),VLSI circuit design technology, communication bus for device network, Device drivers and interrupt service mechanism, programming concepts-embedded C,C++, Real Time Operating systems, and embedded software development.

Text book(s):

Rajkamal, "*Embedded Systems Architecture, Programming and Design*", TATA McGraw- Hill.

Reference book(s):

1. Wayne Wolf, "*Computers as Components; Principles of Embedded Computing System Design",* Harcourt India, Morgan Kaufman Publishers.

2 K.V.K.K. Prasad, *"Embedded/ Real-Time Systems: Concepts, Design and Programming: The Ultimate Reference*", Dreamtech Press

Course Name:	**Advanced Computer Architecture**					
Course Code:	**CSE 316**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This course is designed to understand and analyse the high performance computers including multi core architecture. The major topics covered are Performance enhancements, advanced pipelining, dynamic scheduling and memory management, modern architectures, multi core multi CPU systems.

Text Book(s):

"Computer Architecture: A Quantitative approach" –Hennessy &Patterson.

Reference Book(s):

Kai Hwang, briggs," Computer Architecture and Parallel Processing" MGH

Course Name:	**Programming in Python**					
Course Code:	**CSE317**	**Credit Structure :**	**L**	**T**	**P**	**C**
			1	**0**	**4**	**3**

Course Description:

Python software provides the opportunity for the students of Computer Science engineering to develop scripts using its powerful programming features. This course enables the students to familiarize the Python IDLE and write simple Python code using the Python Shell. The students will also be trained on developing Python scripts using its powerful programming features like lists, sets, tuples and dictionaries.

Text Book(s):

1. Charles DierbachIntroduction to computer Science using python wiley
2. Mark Lutz, Learning Python, 5th Edition, O'Reilly
3. Al Sweigart, Invent Your Own Computer Games with Python, 4th Edition, 2016, No Starch Press.

Course Name:	**Information Retrieval**					
Course Code:	**CSE318**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description:

Basic information retrieval concepts: Boolean retrieval- Index construction and Compression; Text and vector space classification: Scoring, term weighting- The vector space model for scoring; **Recommender systems:** Collaborative recommendation- Content based recommendation-Knowledge based recommendation- Hybrid recommendation Systems; Web search and link Analysis: Search Engine Architecture- Web characteristics- The search user experience- Web crawlers and indexes- Hub and Authorities- HITS algorithm.

Text Books:

1. C. D. Manning, P. Raghavan and H. Schutze. Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Ricci, F.; Rokach, L.; Shapira, B.; Kantor, P.B. (Eds.), Recommender Systems Handbook, 1st Edition, 2011, 845 p. 20 illus., Hardcover, ISBN: 978-0-387-8581973.

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Reference Books:

1. Modern Information Retrieval, Ricardo Baeza-Yates and Berthier Ribeiro-Neto, Addison-Wesley, 2000.
2. Search Engines: Information Retrieval in Practice by Bruce Croft, Donald Metzler, and Trevor Strohman, Addison-Wesley, 2009.
3. Cross -Language Information Retrieval by By Jian - Yun Nie Morgan & Claypool Publisher series 2010
4. Multimedia Information Retrieval by Stefan M. Rüger Morgan & Claypool Publisher series 2010.
5. Information Retrieval: Implementing and Evaluating Search Engines by S. Buttcher, C. Clarke and G. Cormack, MIT Press, 2010.
6. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by B. Liu, Springer, Second Edition, 2011.

Course Name:	**Machine Learning**					
Course Code:	**CSE319**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description:

The Course aims at to introduce students to the concepts and techniques of Machine Learning, study the various probability based learning techniques and the graphical models of machine learning algorithms. This course includes the theoretical versus practical spectrum. Concepts behind several machine learning algorithms without going deep into the mathematics, gaining practical experience by applying them. Covering Pattern recognition and artificial intelligence perspectives and to have a thorough understanding of the Supervised and Unsupervised learning techniques, building ensembles, and practical limitations of predictive models. Correlations and regressions.

Text book/Reference Book(s):

1. Ethem Alpaydin, *Introduction to Machine Learning*, Second Edition.
2. Stephen Marsland, *Machine Learning: An Algorithmic Perspective*, Springer, 2014.

Course Name:	**Graphics Programming**					
Course Code:	**CSE320**	**Credit Structure :**	**L**	**T**	**P**	**C**
			2	**0**	**2**	**3**

Course Description:

The Course is intended to teach students the basic techniques to stimulate the human visual sense by introducing the visual forms of communication between user and the computer. The course will introduce the concepts not just about creating little 3-eyed aliens, but all aspects of computer data storage, from scientific visualization, to 3D modelling, to statistical results.

Topics include: 3D Mathematics, 2D Graphics, Animation, 3D Graphics Pipeline, Data representation for graphics, Lighting and Textures, Vertex buffer objects and Pixel buffer objects, Management of graphical assets, Advanced surface descriptions including normal mapping, Ray Tracing, WebGL, Shadows and reflections

Text Book(s):

1. Computer Graphics with OpenGL, 3/E Donald D Hearn & M. Pauline Baker, Publisher: Prentice Hall.

Reference Book(s):

1. OpenGL Programming Guide, VI edition, Jackie Neider, Tom Davis, Mason Woo. Shreiner, Addison-Wesley Publishing Company
2. Interactive Computer Graphics A Top-Down Approach with OpenGL -Edward Angel, 5th Edition, Addison-Wesley, 2008.

Course Name:	**Robotic Process Automation**					
Course Code:	CSE 321	Credit Structure	L	T	P	C
			3	0	0	0

Course Description:

Robotic Process Automation (RPA) enables automating business processes using software robots. Software robots interpret, trigger responses, and communicate with other systems just like humans do. Robotic processes and intelligent automation tools can help businesses improve the effectiveness of services faster and at a lower cost than current methods. *Robotic Process Automation* (*RPA*) is an advanced technology that automates huge quantities of redundant tasks by applying artificial intelligence (AI). *RPA* can be used for *processing* transactions, manipulating data, triggering responses and communicating with other digital systems.

Topics to Include:

Introduction Robotic Process Automation, UiPath programming techniques to deploy robot configurations, data extraction techniques, Debug a programmed robot including logging and exception handling, Maintain code version and source control, Record and Play, Data Manipulation, Taking Control of the Controls, Handling User Events and Assistant Bots, Exception Handling, Debugging, and Logging, Managing and Maintaining the Code, Deploying and Maintaining the Bot.

Text Book(s):

1. Alok Mani Tripathi, “Learning Robotic Process Automation”, Packt Publishing.(2018)
2. Richard Murdoch, “Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant”.

Reference(s):

1. Frank Casale, Rebecca Dilla, Heidi Jaynes, Lauren Livingston, “Introduction to Robotic Process Automation: a Primer”, Kindle Edition.
2. Srikanth Merianda, “Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation, Kindle Edition.

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Course Name:	Agile Technology				
Course Code:	CSE 322	L	T	P	C
		3	0	0	3

Course Description

The course will address what agile methods are, how they are implemented, and their impact on software engineering. A variety of agile methods will be described, but the focus will be on XP (Extreme Programming) and Scrum models. Issues associated with planning and controlling agile projects, along with the implications of empowered teams on the customer-supplier dynamic, will give a fuller picture of how the agile practices are realized. The course will conclude with a discussion of agile testing and some of the issues facing organizations adopting agile methods.

Topics include: Introduction to Agile technology, Big Picture of Agile Requirements, User Stories, Agile Estimating and Velocity, Understanding XP, XP Lifecycle, Adopting XP, Pair Programming, Collaborating with XP, Version Control, SCRUM Model, SPRINT, Role of Scrum Master, SCRUM Metrics, Staffing and Metrics, Test-driven development, testing tools.

Text book(s):

1. James Shore and Shane Warden, "*The Art of Agile Development*", O'Reilly Publisher, 2008.
2. Kenneth S. Rubin, "Essential SCRUM – A Practical Guide to the most popular Agile Process", Addison Wesley, 2013.

Reference Book(s):

1. Dean Leffingwell, "*Agile Software Requirements: Lean Requirements Practices for Teams, Programs, and the Enterprise*", Addison-Wesley Professional; 1st edition, 2011.
2. Craig Larman, "*Agile and Iterative Development: A Manager's Guide*", Addison Wesley, 2004.
3. Kent Beck and Cynthia Andres, "*Extreme Programming Explained: Embrace Change*", 2nd Edition, Pearson Education, 2004.

Course Name:	Introduction to Bio Informatics					
Course Code:	CSE 325	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION:

This course is designed to provide the knowledge of the concepts related to bioinformatics. The course is aimed at understanding the DNA and Protein sequences and databases. It also deals with Pairwise comparison and calculating the scoring matrix. Further, it focuses on Sequence Alignment techniques, discovering the Motifs in the sequence. Students will also learn the overview of Structural Bioinformatics and Genome sequencing.

Text Book(s):

1. Bioinformatics: Sequence and Genome Analysis, David W. Mount, Cold Spring Harbor Laboratory Press, 2004.
2. Introduction to Bioinformatics, Arthur Lesk, Fifth Edition, Oxford University Press, 2019

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Reference Book(s):

1. Bioinformatics Methods and Applications, S. C. Rastogi, N.Mendiratta, P.Rastogi, Fourth Edition, Prentice Hall India.
2. Bioinformatics Algorithms- An Active Learning Approach, Phillip Compeau & Pavel Pevzner, 2nd Edition, Vol. I & II, Active Learning Publishers, 2015

Course Name:	Distributed Systems					
Course Code:	CSE 368	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION: This course is designed to provide the knowledge of the concepts related to distributed system. The course is aimed at understanding the foundations of distributed systems. It also deals with Peer to peer services and to understand about the system level and support required for distributed system. Further, it focuses on Synchronization, Process and Resource Management. Students will also learn the overview of Distributed system.

Topics include: Introduction to Distributed Systems, Communication in Distributed System, Peer to peer services and file system, Synchronization, Process and resource Management.

Text Book(s):

T1: George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

Reference Book(s):

R1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Ninth edition, Prentice Hall of India, 2007.

R2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Second Edition, Pearson Education, 2007.

R3. Liu M.L., "Distributed Computing, Principles and Applications", First Edition, Pearson Education, 2004.

R4. Nancy A Lynch, "Distributed Algorithms", Second Edition, Morgan Kaufman Publishers, USA, 2003.

Web Reference(s):

1. NPTEL Videos- https://nptel.ac.in/courses/106/106/106106107/
2. https://www.youtube.com/watch?v=2L7jnaXuOc8
3. https://www.youtube.com/watch?v=bnrD2n55dfk

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3.2 COURSES FOR OPEN ELECTIVES

Course Name:	Image Processing					
Course Code:	CSE401	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: This Course is an introduction to image processing and image analysis techniques and concepts. Image processing has found much more wider applications not only in the space program, but also in the areas such as medicine, biology, industrial automation, astronomy, law enforcement, defense, intelligence. With the progress made in multimedia these days, digital image processing has become an indispensable part of our digital age.

Topics include: Fundamentals, Applications, Human Visual Perception, Image Formation, Sampling and Quantization, Binary Image, Three-Dimensional Imaging, Image file formats. Color and Color Imagery: Perception of Colors , Image Transformation: Fourier Transforms, Discrete Cosine Transform, Discrete Wavelet Transform: Wavelet Transform, Extension to 2D Signals, Lifting Implementation of the Discrete Wave Transforms ,Image Enhancement and Restoration , Image Restoration, Image Reconstruction, Image Segmentation, Recognition of Image Patterns,

Text Book(s):

TinkuAcharya and Ajoy K. Ray, "*Image Processing Principles and Applications*", John Wiley and Sons publishers.

Reference Book(s):

1. MariaPetrou and Costas Petrou , "*Image Processing the Fundamentals*", John-Wiley and Sons Publishers.
2. Rafael C. Gonzalez , Richard E. Woods, Steven L. Eddins, "*Digital Image Processing Using MATLAB*", Gatesmark Publishing.

Course Name:	Data Structures					
Course Code:	CSE402	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: The purpose of this Course is to provide the students with solid foundations in data structures and algorithms. It focuses on logical structures of data, their physical representation, design of algorithms and techniques for program development and debugging. Emphasis is placed on the appropriate use and choice of standard data structures.

Topics include: ADT, lists, stacks, queues, trees, heaps, hash tables, and graphs.

Text Book(s):

Richard F Gilberg and Behrouz A Forouzan, *"Data Structures: A Pseudocode Approach with C", Cengage learning.*

Reference Book(s):

1. Robert L Kruse, Bruce P Leung and Clovis L Tondo, *"Data Structures and Program Design in C"*, Pearson.
2. Seymour Lipschutz, "*Data Structures with C(Schaum's Outline Series)"*, McGraw Hill Education.

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Course Name:	Software Testing and Quality Assurance					
Course Code:	CSE403	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: This Course is designed to make the students understand the strategies, methods and the technologies of software testing effectively. It aims at Designing test plans and test cases, doing automatic testing; reporting on software defectives; assessing the software product correctly; and distinguish the relationship between software testing and quality assurance. In addition, students are expected to do a group assignment on software testing tools of their choice.

Topics include: Testing techniques, integration, code inspection, peer reviews, verification and validation, statistical testing methods, preventing and detecting errors, selecting and implementing project metrics, and defining test plans and strategies that map to system requirements. Testing principles, formal models of testing, all aspects of quality assurance, performance measuring and monitoring

Text book(s):

1. SrinivasanDesikan and Gopalaswamy Ramesh, "*Software Testing – Principles and Practices*", Pearson Education,
2. Daniel Galin, "*Software Quality Assurance: From Theory to Implementation*", Pearson.

Reference Book(s):

1. Aditya P. Mathur, "*Foundations of Software Testing _ Fundamental Algorithms and Techniques*", Pearson Education.
2. KshirasagarNaik, PriyadarshiTripathy "*Software Testing and Quality Assurance Theory and Practice*", Wiley and sons.

Course Name:	Social Network Analytics					
Course Code:	CSE404	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: The Course Social Network Analysis is to provide students with essential knowledge of network analysis applicable to real world data, with examples from today's most popular social networks. The Course presents mathematical methods and computational tools for Social Network Analysis (SNA). Students learn how to identify key individuals and groups in social systems, to detect and generate fundamental network structures, and to model growth and diffusion processes in networks.

Topics include: Introduction to social network analysis, Descriptive network analysis, Network structure, Node centralities and ranking on network, Network communities , Affiliation networks , Information and influence propagation on networks , Network visualization , Social media mining , SNA in real world.

Text Book(s):

StanleyWasserman and Katherine Faust. "*Social Network Analysis.Methods and Applications*." Cambridge University Press.

Reference Book(s):

1. David Easley and John Kleinberg. "*Networks, Crowds, and Markets: Reasoning About a Highly Connected World*." Cambridge University Press.
2. Eric Kolaczyk, Gabor Csardi. "*Statistical Analysis of Network Data with R (Use R!)*".Springer.

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Course Name:	Digital and Mobile Forensics					
Course Code:	CSE405	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: The use of Mobile phones and digital devices across the globe has increased dramatically. These devices are more susceptible to information security attacks and thus they also possess huge evidences which shall be used during crime scene investigation. This makes the Course on mobile and digital forensics an inevitable one for the security professionals. This Course on mobile and digital forensics will provide a better understanding on different forms of evidences in many digital devices, collection and interpretation of the same.
Topics include: Wireless technologies and security-wireless protocols, wireless threats, cell phones and GPS, SMS and data interception in GSM. Mobile phone forensics - files present in SIM card, device data, external memory dump, Android forensics. Digital forensics:- evaluating digital evidence, Digital forensics examination principles.

Text Book(s):
Gregory Kipper, "*Wireless Crime and Forensic Investigation*", Auerbach Publications.

Reference Book(s):
1.Losif I. Androulidakis, "*Mobile phone security and forensics: A practical approach*", Springer publications.
2. Andrew Hoog, "*Android Forensics: Investigation, Analysis and Mobile Security for Google Android*", Elsevier publications.
3. Angus M.Marshall, " *Digital forensics: Digital evidence in criminal investigation*", John – Wiley and Sons.

Course Name:	Database Management Systems					
Course Code:	CSE406	Credit Structure :	L	T	P	C
			3	0	0	3

Course Description: This Course aims at developing and managing efficient and effective databases. It helps the students to learn and practice data modelling using the entity-relationship diagrams and developing database designs using structured query languages.
Topics include: Introduction to Database systems, Data modelling, Relational Database design, Various Database Languages, Relational Database Issues , Transaction Management, File structure Techniques, Query processing and optimization, Advanced topics- introduction to distributed databases and spatial-temporal databases.

Text Book(s):
Silberschatz A, Korth H F and Sudarshan S, "*Database System Concepts*", McGraw Hill Education.

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Reference Book(s):

1. Elmasri R andNavathe S B, *"Fundamentals of Database System"*, Pearson Education.

2. Hector G Molina, Jeffrey D Ullman and Jennifer Widom, *"Database Management Systems"*, McGraw Hill Education.

Course Name:	**Multimedia and Animations**					
Course Code:	**CSE 407**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course aims to equip students with the fundamental skills in traditional and digital Multimedia and Animation techniques. It emphasizes on practical applications. It will also help the students to develop creativity and conceptualizing ability, effective communication and presentation skills. Topics include: Introduction to multimedia, Design fundamentals, Image editing techniques, Graphic design techniques, Fundamentals of engineering graphics. Fundamentals of art , Concepts of storyboarding, Principles of animation, Interactive animation techniques, Programming fundamentals, 2D Animation. Digital Media Fundamentals, Modellingand Texturing, Audio Editing Techniques, Video Editing Techniques, Lighting and Rendering,3D Animation.

Text Book(s):

RalfSteinmentz , klaraNaestedt, "*Multimedia Fundamentals: Vol 1- Media Coding and Content processing"*, PHI.

Reference Book(s):

1. Prabhat K. Andleigh, kiranThakrar, "*Multimedia Systems Design"*, PHI.
2. Ze-Nian Li-Mark S Drew*, "Fundamentals of Multimedia"*, PHI.
3. Donald Hearn and M.Pauline Baker, "*Computer Graphics C Version*‖*"*, Pearson Education.

Course Name:	**Programming in Java**					
Course Code:	**CSE 408**	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

Course Description: This Course is designed for students who have basic programming knowledge. It introduces the object-oriented programming concept using Java.

Topics include: Introduction to JAVA, Class Fundamentals, Method Overriding, Inheritance, Packages, Exception Handling, Multithreading, Input and Output Stream Classes, Utility Packages, Applets, Swings, Database Connectivity, Servlet and JSP.

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Text book(s):

1. Y. Daniel Liang "Introduction to Java Programming" 10th Edition, PEARSON

Reference book(s)

1. Herbert Schildt, "Java 2: The Complete Reference", 9th Edition, McGraw Hill Education, 2014

2. Cay S Horstmann and Gary Cornell, *"CORE JAVA volume II-Advanced Features"*. Prentice Hall.
3. Paul Deitel Harvey Deitel, "*Java How to Program"*, Pearson Education.
4. http://docs.oracle.com/javase/tutorial/

Course Name:	**Service Oriented Architecture**					
Course Code:	CSE 265	**Credit Structure :**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

COURSE DESCRIPTION:
Based on an understanding of architectural styles, understanding web applications based on XML, review architectures for web applications, explore the basics of Service-Oriented Architecture (SOA) in two approaches: Web Services (WS*) and Representational State Transfer (REST) architecture

REFERENCE MATERIALS:

i) Text Book(s):

1. Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2002.
2. Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

ii) Reference Book(s):

1. **Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002**
   2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005
   3. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2004.
   4. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, "Java Web Services

Architecture", Morgan Kaufmann Publishers, 2003.

Course Name:	Cloud Computing and Services					
Course Code:	CSE 233	Credit Structure :	L	T	P	C
			3	0	0	3

fundamentals of cloud computing, virtualization and cloud computing services. high-throughput and data-intensive computing. security and standards in cloud computing. the installation and configuration of virtual machine.

Course Name:	Web 2.0					
Course Code:	CSE 244	Credit Structure :	L	T	P	C
			1	0	4	3

COURSE DESCRIPTION

The purpose of this course is to introduce the next level of web design using Web 2.0 technologies. Web 2.0 is the business revolution in the computer industry caused by the evolution of social networking. Students will be trained in planning and designing effective web pages by writing code using current leading trends in the web domain, enhancing web pages with the use of JavaScript frameworks. The major focus is on the key elements of web 2.0 like Rich internet applications, Service-oriented architecture, and social web.

Course Name:	Information Retrieval and Organization					
Course Code:	CSE 232	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION

The Course studies the theory, design and implementation of Text- based information systems. The Information Retrieval core concepts of the course include statistical characteristics of text, representation of information needs and documents. Several important retrieval models (Basic IR Models, Boolean Model, TF-IDF (Term Frequency/Inverse Document Frequency) Weighting, Vector Model, Probabilistic Model, Latent Semantic Indexing Model, Neural Network Model). Retrieval Evaluation, Retrieval Metrics, Text Classification and Clustering algorithms, Web Retrieval and Crawling. Recommender Systems: Basics of Content-based Recommender Systems, Content-based Filtering, Collaborative Filtering, Matrix factorization models and neighbourhood models.

Course Name:	Programming in GO					
Course Code:	CSE 399	Credit Structure :	L	T	P	C
			3	0	0	3

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Description:

This course will provide an introduction on how to write computer programs using a programming language designed by Google named "Go" to students of Engineering. This module includes both lecture hours and hands-on sessions. Topics covered in this course are Program Structure; data types; Composite Types; functions; methods; structs, interfaces; Concurrency, Packages and applications of Go. In the hands-on session students are required to solve problems based on the above concepts to illustrate the features of this programming language.

Proposed Text Books:

- John Badner, "Learning Go: An Idiomatic Approach to real World Go Programming", Oreilly, 2021

Reference Book:

- Alan A.A. Donovan and Brian W. Kernighan, "The Go Programming Language", Addison Wesley, 2016

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Course name	Data Warehousing and Mining					
Course code	CSE 384	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION

The course is an intermediary course and aims to provide students with an in-depth understanding of design and implementation of data warehousing and data mining. The course will help students to enhance their understanding of various classification, clustering and outlier analysis methods. An interest to understand the concepts of data warehousing, data mining and a desire to be a successful data scientist are key to enable students to complete the course successfully.

Topics include: Data Model for Data Warehouses, data extraction, cleansing, transformation and loading, data cube computation, materialized view selection, OLAP query processing. Data mining-Fundamentals. Mining Techniques and Application: Classification, Clustering, Outlier analysis.

Text Books:

T1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", McGraw Hill, 2016

T2. Jiawei Han, Micheline Kamber, Jian Pei, "Data-Mining.-Concepts-and-Techniques ", The-Morgan-Kaufmann, 3rd-Edition-Morgan-Kaufmann, 2012

Reference Books:

R1. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World", Pearson, 2016

R2. Tan P. N, Steinbach M and Kumar V, "Introduction to Data Mining", Pearson Education, 2016

Course name	Social Media Analytics					
Course code	CSE 234	Credit Structure :	L	T	P	C
			2	0	2	3

The rapid growth of social media has given the mass consumers a powerful tool to create knowledge and propagate opinions. At the same time, social media has created an unprecedented opportunity for companies to engage real-time interactions with consumers. In addition, the size and richness of social media data has provided companies an unusually deep reservoir of consumer insights to transform the business and marketing operations. The social media analytics course will enable students to grasp the analytics tools to leverage social media data. The course will introduce tools such as engagement analytics, sentiment analysis, topic modeling, social network analysis, identification of influencers and evaluation of social media strategy.

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Text Books:

T1. 1. Matthew A. Russell & Mkihail Klassen, Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, GitHub, and More, 3rd Edition (O'Reilly, 2019).

Course name	INTRODUCTION TO DEEP LEARNING					
Course code	CSE 235	Credit Structure :	L	T	P	C
			3	0	0	3

COURSE DESCRIPTION:

This course introduces students to fundamental concepts of deep neural networks and state of the art approaches to developing deep learning models to solve real world applications for various domains like image recognition, natural language processing etc.

Topics include fundamental concepts of deep neural networks, Convolutional Neural Networks, Recurrent Network structures, Deep Unsupervised Learning, General Adversarial Networks and applications in various problem domains.

Text Books:

T1. Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", MIT Press, 2016.

Reference Books:

T1. Deep Learning with Pythons, by Francois Chollet, Manning Publications, 2017

T2. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems by Aurelian Geron, Shroff/O'Reilly, 2017.

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Course name	Natural Language Processing					
Course code	CSE 243	Credit Structure:	L	T	P	C
			2	0	0	2

COURSE DESCRIPTION

The course is an introductory course on Natural Language Processing (NLP), which is a branch of Artificial Intelligence. The primary focus of the course will be on understanding various NLP tasks, the algorithms for effectively solving these problems, and evaluating their performance. There will be a focus on statistical and deep learning algorithms, as well as natural language toolkits (Eg. Spacy, NLTK, etc.).

Text Book(s):

T1. Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition. Daniel Jurafsky and James H Martin. 2nd Edition. Prentice Hall. 2008

T2. Foundations of Statistical Natural Language Processing. Chris Manning and Heinrich Schutze. 1st Edition. MIT Press. 1997.

Course name	Front-end Full Stack Development					
Course code	CSE 390	Credit Structure:	L	T	P	C
			0	0	4	2

COURSE DESCRIPTION

This intermediate course enables students to perform front-end full stack development, with emphasis on employability skills. The course covers key technologies and architectures that enables the student to design and implement front-end. 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.

Text Book(s):

T1. Fender, Young, “Front-end Fundamentals”, Leanpub, 2015
T2. Northwood, Chris, “The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer”, APress, 2018

Course name	**Java Full Stack Development**					
Course code	**CSE 391**	**Credit Structure:**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**

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.

Text Book(s):

T1. Fender, Young, “Front-end Fundamentals”, Leanpub, 2015

Course name	**.NET Full Stack Development**					
Course code	**CSE 392**	**Credit Structure:**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**

COURSE DESCRIPTION

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This advanced level course enables students to perform full stack development using .NET, 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 .NET and the related technologies/tools like C#, ASP.NET, Entity Framework 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.

Text Book(s):

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.

Course Name:	**ETHICS IN ENGINEERING PRACTICE**					
Course Code:	**CSE 357**	**Credit Structure :**	**L**	**T**	**P**	**C**
			2	**0**	**0**	**2**

Course Description: The course deals with the responsibilities of an engineer towards the society. Engineering as a profession is meant to serve the public by strictly adhering to codes of conduct and placing paramount the health, safety and welfare of public. Engineering ethics is the study of moral issues and decisions confronting individuals and organizations engaged in engineering and the study of related questions about the moral ideals, character, policies and relationships of people and corporations involved in technological activity. To prepare students for their professional responsibilities as Engineers. To help them recognize and think through ethically significant problem situations that are common in Engineering and to evaluate the existing ethical standards for Engineering Practice.

Text/ Reference Books:

1. Ethics in Engineering practice and Research (2nd Edition) by Caroline Whitbeck Cambridge
2. Ethics in Engineering MW Martin and R Schinzinger MC Graw Hill
3. Engineering Ethics and Environment P A Vesilind and AS Gunn Cambridge

Course Name:	**DATA SCIENCE FOR ENGINEERS**					
Course Code:	**CSE359**	**Credit Structure :**	**L**	**T**	**P**	**C**
			2	**0**	**0**	**2**

Course Description: The course deals with the study of data to extract meaningful insights for business. The course introduces R as a programming language, mathematical foundations required for data science, first level algorithms, data analytics problem solving framework and practical capstone case study.

Text/ Reference Books:

1. Introduction to Linear Algebra - by Gilbert Strang
2. Applied Statistics and Probability for Engineers – by Douglas Montgomery

Course Name:	**INTRODUCTION TO SOFT COMPUTING**					
Course Code:	**CSE360**	**Credit Structure :**	**L**	**T**	**P**	**C**
			2	**0**	0	**2**

Course Description: The course deals with soft computing based on some biological inspired methodologies such as genetics, evolution, ant's behaviors, particles swarming, human nervous systems, etc. Now, soft computing is the only solution when we don't have any mathematical modeling of problem solving (i.e., algorithm), need a solution to a complex problem in real time, easy to adapt with changed scenario and can be implemented with parallel computing. It has enormous applications in many application areas such as medical diagnosis, computer vision, hand written character recondition, pattern recognition, machine intelligence, weather forecasting, network optimization, VLSI design, etc.

Text/ Reference Books:

1. An Introduction to Genetic Algorithm Melanic Mitchell (MIT Press)
2. Evolutionary Algorithm for Solving Multi-objective, Optimization Problems (2nd Edition), Collelo, Lament, Veldhnizer (Springer)
3. Fuzzy Logic with Engineering Applications Timothy J. Ross (Wiley)
4. Neural Networks and Learning Machines Simon Haykin (PHI)

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Course Name:	**INFORMATION SECURITY-5 -SECURE SYSTEM ENGINEERING**

Course Code:	CSE358	Credit Structure :	L	T	P	C
			2	0	0	2

Course Description: The course deals with the overview of security and its aspects. Then goes through the different threats, and methods to protect the information. This course gives an overview of cryptography and discusses the various techniques related with it. The students who wish to enhance their knowledge on recent trends of IT and Computers and those who wish to understand the term information or cyber security are equally benefitted with the contents of this course

Text/ Reference Books:

1. W. Stallings, Cryptography and Network Security Principles and Practices, 4th Ed., Prentice-Hall of India, 2006.
2. C. Pfleeger and S.L. Pfleeger, Security in Computing, 3rd Ed., Prentice-Hall of India, 2007.
3. D. Gollmann, Computer Security, John Wiley and Sons, NY, 2002.
4. J. Piwprzyk, T. Hardjono and J. Seberry, Fundamentals of Computer Security, Springer-Verlag Berlin, 2003.
5. J.M. Kizza, Computer Network Security, Springer, 2007.
6. M. Merkow and J. Breithaupt, Information Security: Principles and Practices, Pearson Education, 2006.

Course Name:	Technical Training					
Course Code:	CSE501	Credit Structure :	L	T	P	C
			0	0	6	3

Course Description: The course primarily deals with the preparation for the placements. A comprehensive coding ability is what is expected of a student ready for a professional career. This course covers the basics of programming and gradually progress to become expert programmer. Since most of the companies prefer Java as a programming language especially wrt fresher, this course fundamentally deals with Java Programming and Object Oriented Concepts.

Text/ Reference Books:

Text Books:

1. **Cay S Horstmann and Cary Gornell, *"CORE JAVA volume I-Fundamentals"*, Pearson 2015**
2. **Cay S Horstmann and Cary Gornell, *"CORE JAVA volume II-Advanced Features"*,**

Pearson 2017.

References

1. Herbert Schildt, *"The Complete Reference Java 2",* Tata McGraw Hill Education, 10th Edition 2017.

2. James W. Cooper, *"Java TM Design Patterns – A Tutorial"*, Addison-Wesley Publishers 2000.

Web resources:

1. https://www.udemy.com/course/object-oriented-programming-oops-concepts-in-english/
2. https://archive.nptel.ac.in/courses/106/105/106105191/