

School of Engineering



Bachelor of Technology Degree Program Regulations and Curriculum 2019-2023

B.Tech. (Civil Engineering) 2019-2023

Regulations No.: PU/AC-20.5/CIV15/CIV/2019-23

Resolution No. 5 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.

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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 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 shall supersede all the earlier Bachelor of Technology Degree Program Regulations and Curriculum, along with all the amendments thereto.
- (e) These Regulations shall come into force from the academic year 2019-2020.

Definitions:

In these Regulations, unless the context otherwise requires:

- a) "Academic Council" means the Academic Council of the University;
- b) "Academic Regulations" means the Academic Regulations, 2019, of the University;
- c) "Academic Term" means a Semester or Summer Term;
- *d) "Act" means the Presidency University Act, 2013;*
- e) "Board of Examinations (BOE)" means the Board of Examinations of the University;
- f) "Board of Management (BOM)" means the Board of Management of the University;
- g) "CGPA" means Cumulative Grade Point Average as defined in the Academic Regulations, 2019;
- *h) "Clause" means the duly numbered Clause, with Sub-Clauses included, if any, of these Regulations;*
- "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" mean the Statutes of Presidency University;
- v) "Sub-Clause" means the duly numbered Sub-Clause of these Program Regulations;
- w) "Summer Term" means an additional Academic Term conducted during the summer break (typically in June-July) for a duration of about eight (08) calendar weeks, with a minimum of thirty (30) University teaching days, and,
- *x*) *"University" means Presidency University, Bengaluru;*

1. INTRODUCTION:

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

- 1.3.9. Bachelor of Technology in Electrical and Electronics Engineering, abbreviated as B. Tech. (Electrical and Electronics Engineering);
- 1.3.10. Bachelor of Technology in Mechanical Engineering, abbreviated as B. Tech. (Mechanical Engineering); and,
- 1.3.11. Bachelor of Technology in Petroleum Engineering, abbreviated as B. Tech. (Petroleum Engineering).
- 1.4. These Program Regulations shall be applicable to other similar programs, which may be introduced in future.
- 1.5. These Program Regulations may evolve and get amended or modified or changed through appropriate approvals from the Academic Council, from time to time, and shall be binding on all concerned.
- 1.6. The effect of periodic amendments or changes in the Program Regulations, on the students admitted in earlier years, shall be dealt with appropriately and carefully, so as to ensure that those students are not subjected to any unfair situation whatsoever, although they are required to conform to these revised Program Regulations, without any undue favour or considerations.
- 1.7. These Program Regulations are structured as follows:
 - 1.7.1. Part A: Specific regulations relevant to the Bachelor of Technology (B. 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.

2. PART A: PROGRAM REGULATIONS

2.1. Program Description and Duration

B. Tech. Degree Programs are offered in the following branches/disciplines by the respective Parent Departments as indicated in Table 1 below:

	Table 1										
	B. Tech. Degree Programs and Respective Par	rent Departments									
S. No.	B. Tech. Program (Branch/Discipline)	Parent Department									
1	B. Tech. (Civil Engineering)	Department of Civil Engineering									
2	B. Tech. (Computer Engineering)										
3	B. Tech. (Computer and Communication Engineering)	Department of Computer Science and Engineering									
4	B. Tech. (Computer Science and Engineering)	REGISTRAR									
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5	B. Tech. (Information Science and Engineering)			
6	B. Tech. (Information Science and Technology)			
7	B. Tech. (Electronics and Communication Engineering)	Department of Electronics and		
8	B. Tech. (Electronics and Computer Engineering)	Communication Engineering		
9	B. Tech. (Electrical and Electronics Engineering)	Department of Electrical and Electronics Engineering		
10	B. Tech. (Mechanical Engineering)	Department of Mechanical Engineering		
11	B. Tech. (Petroleum Engineering)	Department of Petroleum Engineering		

The Bachelor of Technology Degree Program is a four-year, full-time, Semester based Program. The minimum duration of the B. Tech. Program is four (04) years and each year comprises of two academic Semesters (Odd and Even Semesters) and, hence, the duration of the B. Tech. Program is eight (08) Semesters.

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

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

The admission criteria to the B. Tech Programs are listed in the following Sub-Clauses:

- 2.2.1. An applicant who has successfully completed the Pre-University course or Senior Secondary School Course (+2) or equivalent such as (11+1), 'A' level in Senior School Leaving Certificate Course from a recognised university of India or outside or from Senior Secondary Board or equivalent, constituted or recognised by the Union or by the State Government of that Country for the purpose of issue of qualifying certificate on successful completion of the course, may apply for and be admitted into the course.
- 2.2.2. Provided further, the applicant must have taken Physics and Mathematics as compulsory subjects in the Pre-University/Higher Secondary/(10+2)/(11+1) examination, along with either Chemistry/Biology/Electronits/Computer Science/Biotechnology subject, and, the applicant must have obtained a minimum of 45% of the total marks (40% in case of candidates belonging to the Reserved Category as classified by the Government of Karnataka in

these subjects taken together.

- 2.2.3. The applicant must have appeared for the Joint Entrance Examinations (JEE) Main/JEE (Advanced)/Karnataka CET/COMED-K, or any other State-level Engineering Entrance Examinations.
- 2.2.4. Reservation for the SC/ST and other backward classes shall be made in accordance with the directives issued by the Government of Karnataka from time to time.
- 2.2.5. Admissions are offered to Foreign Nationals and Indians living abroad in accordance with the rules applicable for such admissions, issued from time to time by the Government of India.
- 2.2.6. Candidates must fulfil the medical standards required for admission as prescribed by the University.
- 2.2.7. If, at any time after admission, it is found that a candidate had not in fact fulfilled all the requirements stipulated in the offer of admission, in any form whatsoever, including possible misinformation and any other falsification, the Registrar shall report the matter to the Board of Management (BOM), recommending revoking the admission of the candidate.
- 2.2.8. The decision of the BOM regarding the admissions is final and binding.

2.3. Lateral Entry

The University admits students directly to the second year (3rd Semester) of the B. Tech. Degree Program as per the provisions and/or regulations of the Government of Karnataka pertaining to the "Lateral Entry" scheme announced by the Government from time to time.

Further, the general conditions and rules governing the provision of Lateral Entry to the B. Tech. Program of the University are listed in the following Sub-Clauses:

- 2.3.1. Admission to the 2nd year (3rd Semester) of the B.Tech Degree program shall be open to the candidates who are holders of a 3-year Diploma in Engineering (or equivalent qualification as recognised by the University), who have secured not less than forty-five percent (45%) marks in the final year examination (fifth and sixth Semesters of the Diploma Program) in the appropriate branch of Engineering. Provided that, in case of SC/ST and OBC candidates from Karnataka the minimum marks for eligibility shall be forty percent (40%).
- 2.3.2. Provided further that candidates seeking Lateral Entry may be required to complete specified Bridge Courses as prescribed by the University. Such Bridge Courses, if any, shall not be included in the CGPA computations.
- 2.3.3. All the existing Regulations and Policies of the University shall be binding on all the students admitted to the Program through the provision of Lateral Entry.
- 2.3.4. The Course requirements prescribed for the 1st Year of the B. Tech. Program shall be waived for the student(s) admitted through Lateral Entry and the duration of the B. Tech. Program for such students is three (03) years, commencing from the 3rd Semester (commencement of the 2nd Year) of the B. Tech. Program and culminating with the 8th Semester (end of the 4th Year) of the B. Tech. Program.
- 2.3.5. The existing Program Regulations of the concerned Program to which the student is admitted through the provision of Lateral Entry shall be binding

on the student with effect from the 3rd Semester of the Program, i. e., the Program Structure and Curriculum from the 3rd to 8th Semesters of the Program concerned shall be binding on the student admitted through Lateral Entry. Further, any revisions/amendments made to the Program Regulations thereafter shall be binding on all the students of the concerned Program.

2.3.6. All the Courses (and the corresponding number of Credits) prescribed for the 1st Year of the concerned B. Tech. Program shall be waived for the student(s) admitted to the concerned B. Tech. Program through Lateral Entry. Further, the *Minimum Credit Requirements* for the award of the B. Tech. Degree in the concerned Program shall be prescribed/calculated as follows:

The *Minimum Credit Requirements* for the award of the Bachelor of Technology (B. Tech.) Degree prescribed by the concerned Bachelor of Technology Degree Program Regulations and Curriculum 2019-2023, minus the number of Credits prescribed for the 1st Year (total 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. Degree 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 recognised 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 recognised University, may be permitted to transfer to the 2nd Year (3rd Semester) of the B. Tech. Program of the University as per the rules and guidelines prescribed in the following Sub-Clauses:

- 2.4.1. The concerned student fulfils the criteria specified in Sub-Clauses 2.3.1, 2.3.2 and 2.3.3.
- 2.4.2. The student shall submit the Application for Transfer along with a nonrefundable Application Fee (as prescribed by the University from time to time) to the University no later than July 10 of the concerned year for admission to the 2nd Year (3rd Semester) of the B. Tech. Program commencing on August 1 on the year concerned.
- 2.4.3. The student shall submit copies of the respective Markave and Grade Sheets/Certificates along with the Application for Transfer REGISTRAR
- 2.4.4. The transfer may be provided on the condition that the Courses and Credits completed by the concerned student in the 1st Year of the B. Tech./B. E./B.

S., four-year Degree Program from the concerned University, are declared equivalent and acceptable by a Committee constituted by the Vice Chancellor for this purpose. Further, the Committee may also prescribe the Courses and Credits the concerned students shall have to mandatorily complete, if admitted to the 2nd Year of the B. Tech. Program of the University.

2.4.5. The Branch/Discipline allotted to the student concerned shall be the decision of the University and binding on the student.

2.5. Change of Branch/Discipline

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

- 2.5.1. Normally, only those students, who have passed all the Courses prescribed for the 1st Year of the B.Tech Program and obtained a CGPA of not less than 6.00 at the end of the 2nd Semester, shall be eligible for consideration for a change of Branch.
- 2.5.2. Change of Branch, if provided, shall be made effective from the commencement of the 3rd Semester of the B. Tech. Program. There shall be no provision for change of Branch thereafter under any circumstances whatsoever.
- 2.5.3. The student(s) provided with the change of Branch shall fully adhere to and comply with the Program Regulations of the concerned Branch of the B. Tech. Program, the Fee Policy pertaining to that Branch of the B. Tech. Program, and, all other rules pertaining to the changed Branch existing at the time.
- 2.5.4. Change of Branch once made shall be final and binding on the student. No student shall be permitted, under any circumstances, to refuse the change of Branch offered.
- 2.5.5. The eligible student may be allowed a change in Branch, strictly in order of *inter se* merit, subject to the conditions given below:
 - 2.5.5.1. The actual number of students in the third Semester in any particular Branch to which the transfer is to be made, should not exceed the intake fixed by the University for the concerned Branch; and,
 - 2.5.5.2. The actual number of students in any Branch from which transfer is being sought does not fall below 75% of the total intake fixed by the University for the concerned Branch.
- 2.5.6. The process of change of Branch shall be completed within the first five days of Registration for the 3rd Semester of the B. Tech. Program.

2.6. Professional Practice Courses

Professional Practice Courses (Professional Practice-I and Professional Practice-II) are practicebased Courses with the objective to equip students with the skills of problem identification, root

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cause analysis and problem solving, innovation and design thinking through industry exposure and project based learning. The expected outcomes are first level proficiency in problem solving and design thinking skills to better equip B. Tech. graduates for their professional careers. The method of evaluation and grading for the Professional Practice Courses shall be prescribed and approved by the concerned Departmental Academic Committee (refer Annexure A of the Academic Regulations, 2019). The same shall be prescribed in the Course Handout.

2.7. Professional Practice–I

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

2.7.1. Internship Program in an Industry/Company:

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

- 2.7.1.1. The Internship Program shall be conducted in accordance with the Internship Policy prescribed by the University from time to time.
- 2.7.1.2. The selection criteria (minimum CGPA, pass in all Courses as on date, and any other qualifying criteria) as applicable/stipulated by the concerned Industry/Company for award of the Internship to a student.
- 2.7.1.3. The number of Internships available for the concerned Academic Term: further, the available number of internships shall be awarded to the students by the University on the basis of merit using the CGPA secured by the student. Provided further, the student fulfils the criteria, as applicable, specified by the Industry/Company providing the Internship, as stated in Sub-Clause 2.7.1.2 above.
- 2.7.1.4. A student may opt for Internship in an Industry/Company of her/his choice, subject to the condition that the concerned student takes the responsibility to arrange the Internship on her/his own. Provided further, that the Industry/Company offering such Internship confirms to the University that the Internship program shall be conducted in accordance with the Program Regulations and Internship Policy of the University.
- 2.7.1.5. A student selected for an Internship in an Industry/Company shall adhere to all the rules and guidelines prescribed in the Internship Policy of the University.

2.7.2. Project Work:

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

- 2.7.2.1. The Project Work shall be approved by the concern of and be carried out under the guidance of a faculty member REGISTRAR REGISTRAR
- 2.7.2.2. The student may do the project work in an Industry / Company

Research Laboratory of her/his choice subject to the above mentioned condition (Sub-Clause 2.7.2.1). Provided further, that the Industry/Company/Research Laboratory offering such project work confirms to the University that the project work will be conducted in accordance with the Program Regulations and requirements of the University.

2.8. Professional Practice–II

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

2.8.1. Internship Program in an Industry/Company:

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

- 2.8.1.1. The Internship Program shall be in conducted in accordance with the Internship Policy prescribed by the University from time to time.
- 2.8.1.2. The selection criteria (minimum CGPA, pass in all Courses as on date, any other qualifying criteria) as applicable/stipulated by the concerned Industry/Company for award of Internship to a student.
- 2.8.1.3. The number of Internships available for the concerned Academic Term: further, the available number of Internships will be awarded to the students by the University on the basis of merit using the CGPA secured by the student. Provided further, the student fulfils the criteria, as applicable, specified by the Industry/Company providing the Internship, as stated in Sub-Clause 2.8.1.2 above.
- 2.8.1.4. A student may opt for Internship in an Industry/Company of her/his choice, subject to the condition that the concerned student takes the responsibility to arrange the Internship on her/his own. Provided further, that the Industry/Company offering such Internship confirms to the University that the Internship program shall be conducted in accordance with the Program Regulations and Internship Policy of the University.
- 2.8.1.5. A student selected/awarded an Internship Program in an Industry/Company shall adhere to all the rules and guidelines prescribed in the Internship Policy of the University.

2.8.2. Project Work with a Dissertation:

A student may do an extensive Project Work (with a Dissertation) in an Industry/Company/Research Laboratory or the University Department(s), subject to the following conditions: 2.8.2.1. The Project Work shall be approved by the concerned HOP 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 sensitise 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 sensitised 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 the 'NC' grade is awarded for "non-completion" of the Course. The student who receives the 'NC' grade shall repeat the SIC (it may be another type of SIC as approved by the concerned DAC) until the concerned student secures the 'S' grade in the SIC. The 'S' and 'NC' grades do not carry grade points and, hence, are not included in the SGPA, CGPA computations.

2.10. Open Electives

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

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

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

2.11. Specific Regulations regarding Assessment and Evaluation

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

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

2.11.1. Normally, for the Courses that have only the Lecture and Tutorial or Lecture Credit Structure (L-T-0 or L-0-0), with no Practical component, the components of Continuous Assessment and the distribution of weightage among the components of Continuous Assessment and duration of the examination/assessment shall be as detailed in Table 2 below:

	Table 2 Method of Assessmentfor Courses with Credit Structures L–T–0 and L–0–0									
S. No.	Components of Continuous Assessment	Weightage (% of Total Marks)	Duration of Assessment							
1	Continuous Assessment 1: Mid-Term Examination	30%	1.5 hours							
3	Continuous Assessment 2: 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							
4	End Term Final Examination	50%	3 hours							
	Total	100%								
]	Note: (i) This method of assessment is applicable from AY 2022-23 onwards.									

- (ii) Normally, the End Term Final Examination shall cover the entire course coverage as prescribed in the Course Handouts.
- 2.11.2. Normally, for Laboratory/Practice Based Courses with a Credit Structure of (0–0–P) or (L–0–P) the components of Continuous Assessment and the distribution of weightage among the components of Continuous Assessment and duration of the examination/assessment shall be as detailed in Table 3 below:

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fe	Table 3 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	Continuous Assessment 1: 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 2: Practical Test/Viva-Voce/Quiz/Practice Assignments/Presentations and other assessments as prescribed in the Course Handout.	20%	NA							
3	End Term Practical Examination: Practical Experiment/Practice Test(s) with Viva-Voce, Jury or any other type of assessment as prescribed in the Course Handout.	50%	2 or 3 hours							
	Total	100%								

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

2.12. Course Handout

The Course Handout (Refer Clause 6.2 of the Academic Regulations, 2019) is a comprehensive document describing the Objectives/Outcomes of the Course, the detailed syllable with the prescribed Textbook(s) and Reference Material), the Lesson/Session-wise Plan, and all the

relevant and necessary details regarding the pedagogy, expectation from the students regarding preparation, participation and self-learning, components of continuous assessment and respective weightage (in percentage (%) of the total marks of all components of assessment) given to the components, and the method of evaluation. The guidelines for preparation of the Course Handout, its approval and delivery are listed in the following Sub-Clauses:

- 2.12.1. The Course Handout will be prepared as per the Outcome Based Education Guidelines of the University.
- 2.12.2. Normally, the Course Handout is prepared by the Course Instructor(s) assigned to teach the Course. In cases of multiple sections of students registered for the same Course, an Instructor In-Charge, assigned by the DAC, shall prepare the Course Handout in consultation with the other Course Instructors assigned to the concerned Course.
- 2.12.3. The DAC shall examine each Course Handout and arrange for necessary deliberations as required. On acceptance of the completeness and quality of the Course Handout, the DAC shall approve the Course Handout.
- 2.12.4. A consolidated printed/soft copy of the Booklet of all Course Handouts corresponding to the concerned Semester of a particular Program of Study shall be provided to every student concerned on the first day/Registration day of the concerned Semester.
- 2.12.5. The Course Handout Booklet is a very important guide for the students registered in the concerned course. The students are expected to use the Course Handout Booklet to prepare regularly and benefit from each session (Lecture/Tutorial/Practical) of the Course(s) and perform well in the Continuous Assessments and End Term Final Examinations, as applicable. Every student shall read and adhere to all the guidelines prescribed in the Course Handout Booklet.

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

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

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

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

2.13.1. A student may complete SWAYAM-NPTEL courses and transfer equivalent credits to partially or fully complete the mandatory credit requirements of Discipline Elective Courses and/or the mandatory credit requirements of 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 as prescribed by the Program Regulations and Curriculum of the concerned B. Tech. Program Regulations and Curriculum 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 4 below.

Tal	Table 4 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 Managoment Sciences Courses as prescribed in the concerned Program REGERAR (Registrar) 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 5 below.

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

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



3.0 PART B: PROGRAM CURRICULUM **BACHELOR OF TECHNOLOGY DEGREE PROGRAM IN CIVIL ENGINEERING B.TECH (CIVIL ENGINEERING)** 2019 - 2023

PROGRAM NEEDS

Creating a sustainable world that provides a safe, secure, healthy, productive, and sustainable life for all people should be a priority for the engineering profession. Civil Engineers have an obligation to meet the basic needs of all humans for water, sanitation, shelter, food and health. Educating engineers to become facilitators of sustainable development, befitting technology, social and economic changes, represents one of the greatest challenges faced by the engineering profession today.

Our B.Tech Civil engineering curriculum addresses these challenges and provides opportunities for intellectual growth in the context of an engineering discipline, for the attainment of professional competence, and for the development of a sense of the social context of technology, with well-defined educational goals. It also provides higher visibility to a profession that will certainly play a critical role in creating structures and enabling technology to sustain a decent quality of life for current and future generations, especially in the developing world.

To meet the requirement locally and globally, along with our curriculum, graduates are required to emphasize on soft tools to understand the behavior of all the structural components in civil engineering practice and be well-versed with global codal provisions applicable to civil engineering practice.

Program offers many opportunities for budding civil engineers such as:

- To become involved in engineering education through projects in developing communities around the world (including India).
- It provides an innovative way to educate young engineers interested in addressing the problems of developing countries and communities.
- Inspires engineers to embrace the principles of sustainable development, renewable resources management, appropriate technology, and systems thinking
- Prepares engineers for social, economic, and environmental stewardships.

In addition, the program ensures that graduates are equipped with the basic civil engineering core competencies to meet the requirements for the practice of civil engineering at the local, national and global context.

The Program Educational Objectives, Program Outcomes, Program Specific Outcomes and Learning Objectives of the B. Tech. Program in Civil Engineering in Presidency University are as follows:

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

PEO-1: The graduates shall acquire core competence in basic science and civil engineering.

PEO-2: The graduates shall constantly pursue the professional growth with multidisciplinary optionk

PEO-3: The graduates shall work with high professionalism and ethical standards.

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PEO-4: Graduates shall be responsive to societal needs for sustainable development.

PROGRAM OUTCOMES (PO)

Civil Engineering Graduates will be able to:

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: 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.

PO-3: 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.

PO-4: 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.

PO-5: 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

PO-6: 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.

PO-7: 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.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: 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.

PO-11: 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.

PO-12: Life-long learning: Recognize the need for, and have the preparation and an engage in independent and life-long learning in the broadest context of technological changes

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO-1: Use technical, teamwork and communication skills along with leadership principles, to pursue civil engineering courses in area such as structural, transportation, geotechnical, materials, environment, construction and water resources engineering fields.

PSO-2: Understanding and applying the mathematical and scientific concepts for analytical and design skills concerned with civil engineering practice.

PSO-3: Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education by post graduate degree and research

PSO-4: Sensitizing towards contemporary issues, societal needs with professionalism and ethics for sustainable development.

LEARNING OBJECTIVES (LO)

LO-1: Apply principles of basic sciences and applied sciences to analyze civil engineering structures/systems

LO-2: Survey, map, measure and analyze data for sustainable infrastructure planning/designing and execution.

LO-3: Predict and forecast societal needs, shelter, floods, droughts, pollution and travel demand.

LO-4: Analyze, design and maintain concrete and steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

LO-5: Creating work culture to enhance capability in dealing with multi-disciplinary projects and demonstrate social responsibility and professional ethics.



3.1 PROGRAM CURRICULUM

3.1.1 Mandatory Courses and Credits

The B.Tech (Civil Engineering) Program Structure (2019-2023) consists of 180 credits.

Table 6 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 6 B.Tech (Civil Engineering) 2019-2023: Mandatory Courses and Credits									
S. NO	TYPE OF COURSES	NO. OF COURSES	CREDITS							
1.	Humanities (HS)	2	5							
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. (Civil Engineering) Degree is 180 Credits.									

The Table 6 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 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 6 lists the mandatory Courses, type of Courses, number of type of Courses and the associated credits required for the completion of the B.Tech (Civil Engineering) Program.

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3.1.2 B.Tech. (Civil Engineering) Program Year Wise Structure

First Year S				nd Year	·	Thi	rd Year		Fourt	h Year
Sem. 1	Sem. 2		Sem.3	Sem. 4	Τ	Sem. 5	Sem. 6		Sem. 7	Sem. 8
BS-3 ES-4 HS-1 PPS-1	BS-4 ES-3 HS-1 PPS-1	Summer Term	BS-1 CC-7 PPS-1	BS-1 CC-6 PPS-1	Summer Term/PF	CC-5 MS-1 DE-2 SIC-1	CC-5 MS-1 DE-1 OE-1	Summer Term	CC-5 DE-1 OE-1	PP-II DE-2 OE-1

Mandatory Minimum Credits required for the award of the B.Tech (Civil Engineering) Degree: 180

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 (Civil Engineering) Program of four years duration.

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3.2 PROGRAM STRUCTURE

	I Sem- PHYSICS CYCLE (Aug-Dec)*									
G	COUDSE	COURSE NAME	CRI	EDĽ	ГST	RUCTURE	CONTACT HOURS	TYPE OF	COUDSE	
5. No.	CODE		L	Т	Р	CREDITS		SKILL/ FOCUS	INTEGRATES	
1	MAT 105	Calculus and Linear Algebra	3	1	0	4	4	\mathbf{F}^1	-	
2	PHY 101	Engineering Physics	4	0	0	4	4	F	-	
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3	\mathbf{P}^2	-	
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3	Р	Env^4	
5	MEC 152	Engineering Graphics	2	0	4	4	6	Р	-	
6	ENG 1XX	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	Р	-	
9	PPS 105	Building Self Confidence	0	0	2	1	2	Е	-	
TOTAL 17 2 1						24	29			
¹ Fou	¹ Foundation Course					³ Employab	ility Skills			
² Pro	fessional Ski	lls				⁴ Environme	ental Issues			

		I Sem - CHEMI	YCI	LE (Aug-De	ec)#				
G	COUDSE		CR	EDĽ	ГSТ	RUCTURE		TYPE OF	COUDSE
S. CC No. C	CODE	COURSE NAME	L	Т	Р	CREDITS	HOURS	SKILL/ FOCUS	INTEGRATES
1	MAT 105	Calculus and Linear Algebra	3	1	0	4	4	F	-
2	CHE 101	Engineering Chemistry	4	0	0	4	4	F	-
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3	Р	-
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	Р	-
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG 1XX	Humanities – I	1	0	2	2	3	Е	-
7	CSE 151	Computer Programming	2	0	4	4	6	Е	-
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 Pro	fessional Eth	ics							
⁶ Sus	tainability Is	sues							



	II Sem- CHEMISTRY CYCLE (Jan-May) *								
G	COUDSE	COURSE NAME	CR	EDI	ГST	RUCTURE	CONTACT HOURS	TYPE OF	COUDSE
5. No.	CODE		L	Т	Р	CREDITS		SKILL/ FOCUS	INTEGRATES
1	MAT 106	Calculus, Differential Equations and Complex Variables	3	1	0	4	4	F	-
2	CHE 101	Engineering Chemistry	4	0	0	4	4	F	-
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3	Р	-
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3	Р	-
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3	F	Env
6	ENG 1XX	Humanities – II	1	0	2	2	3	Е	-
7	CSE 151	Computer Programming	2	0	4	4	6	Е	-
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		

	II Sem -PHYSICS CYCLE (Jan-May) #									
G	COUDEE		CRI	EDĽ	ГST	RUCTURE	GONTLOT	TYPE OF	COUDSE	
S. No.	COURSE	COURSE NAME	IAME L T		Р	CREDITS	HOURS	SKILL/ FOCUS	INTEGRATES	
1	MAT 106	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	Р	-	
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3	Р	Env	
5	MEC 152	Engineering Graphics	2	0	4	4	6	Р	-	
6	ENG 1XX	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	Р	-	
9	PPS 106	Effective Communication	0	0	2	1	2	Е	-	
		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.

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

- * The students undergoing the "Physics" cycle shall take the Courses as indicated.
- # The students undergoing "Chemistry" cycle shall take the Courses as indicated.

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	III SEMESTER													
S.	COURSE	COURSE NAME	CRI	EDI	т ят	RUCTURE	CONTACT	TYPE OF SKILL/	COURSE					
110.	CODE		L	Т	Р	CREDITS	HUUKS	FOCUS	INTEGRATES					
1	MAT 107	Transform Techniques, Partial Differential Equations and Probability	3	1	0	4	4	Foundation	-					
2	CIV 201	Strength of Materials	3	1	0	4	4	Skill Development	Sustainability					
3	CIV 202	Surveying	3	1	0	4	4	Employability	Ethics					
4	CIV 203	Engineering Geology	3	0	0	3	3	Employability	Env. & Sustainability					
5	CIV 208	Fluid Mechanics	3	1	0	4	4	Skill Development	-					
6	CIV 219	Building Materials and Concrete Technology	3	0	0	3	3	Employability	Env. & Sustainability					
7	CIV 263	Basic Materials Testing Lab	0	0	2	1	2	Skill Development	Ethics					
8	CIV 252	Surveying Practice	0	0	2	1	2	Skill Development	Env. & Sustainability					
9	PPS 107	Design Thinking and Team Building	0	0	2	1	2	Entrepreneurship	Human Val & Ethics					
		TOTAL	18	4	6	25	28							

	IV SEMESTER													
S.	COURSE COURSE NAME			EDI	ГST	RUCTURE	CONTACT	TYPE OF SKILL/	COURSE					
NO.	CODE		L	Т	Р	CREDITS	HOURS	FOCUS	INTEGRATES					
1	MAT 108	Numerical Methods, Probability Distributions and Sampling Techniques	3	3 1 0		4	4	Foundation	-					
2	CIV 205	Structural Analysis-I	3	1	0	4	4	Skill Development	Ethics					
3	CIV 210	Geotechnical Engineering	3	1	0	4	4	Employability	Env. & Sustainability					
4	CIV 220	Highway Engineering	3	1	0	4	4	Employability	Env. & Sustainability					
5	CIV 221	Water Resources Systems	3	0	0	3	3	Employability	Env. & Sustainability					
6	CIV 253	Engineering Geology Lab	0	0	2	1	2	Skill Development	Env. & Sustainability					
7	CIV 254	Fluid Mechanics Lab	0	0	2	1	2	Skill Development	Env. & Sustainability					
8	PPS 108	Being Corporate Ready	0	0	2	1	2	Employability	Human Val & Ethics					
	TOTAL 15 4 6 22 25													
							3	REGISTRAR	legistrar) 🏐					

*** Students will undergo Professional Practice – I during the summer break between the fourth and fifth sensesters and the credits earned will be accounted for in the fifth sensester.

	V SEMESTER													
S.	S. COURSE COURSE NAME			EDI	ГST	RUCTURE	CONTACT	TYPE OF SKILL/	COURSE					
110.	CODE		L	Т	Р	CREDITS	HOUKS	FOCUS	INTEGRATES					
1	CIV 209	Structural Analysis-II	3	1	0	4	4	Skill Develop.	Ethics					
2	CIV 211	Design of RC Structural Elements	3	1	0	4	4	Employability	Sustainability					
3	CIV 214	Foundation Engineering	3	0	0	3	3	Employability	Sustainability					
4	MGT 1XX	Management Sciences I	3	0	0	3	3	Entrepreneurship / Skill Develop.	Human Val & Ethics					
5	CIV XXX	Discipline Elective I	3	0	0	3	3	-	-					
6	CIV XXX	Discipline Elective II	3	0	0	3	3	-	-					
7	CIV 258	Computer Aided Building Drawing Lab	0	0	2	1	2	Skill Develop.	Sustainability					
8	CIV 260	Geotechnical Engineering Lab	0	0	2	1	2	Skill Develop.	Env. & Sustainability					
9	SIC 501	Social Immersion Course ⁺	0	0	0	1	-	Skill Develop.	Gender Issues / Env. & Sustainability					
10	PIP 101	Professional Practice –I***				<mark>5</mark>		Employability	Ethics					
		TOTAL	18	2	4	27/28	24							

The students have to register for extensive survey project one month before the end of fifth semester & undergo the "Survey Camp" for about 2 weeks during the Winter Break (December/ January) and the credits earned will be accounted for in the sixth semester.

+ Student has to register for Social Immersion Course in any of the fifth or sixth semester to earn the mandatory credits.

	VI SEMESTER												
S.	COURSE	COURSE NAME	CR	EDI	гзт	RUCTURE	CONTACT	TYPE OF SKILL/	COURSE				
140.	CODE		L	Т	Р	CREDITS	HOUKS	FOCUS	INTEGRATES				
1	CIV 213	Design of Structural Steel Elements	3	1	0	4	4	Employability	Sustainability				
2	CIV 222	Water Infrastructure Systems	3	0	0	3	3	Employability	Env. & Sustainability				
3	MGT 1XX	Management Sciences II	3	0	0	3	3	Entrepreneurship / Skill Develop.	Human Val & Ethics				
4	CIV XXX	Discipline Elective III	3	0	0	3	3	-	-				
5	XXX XXX	Open Elective I	3	0	0	3	3	-	-				
6	CIV 261	Computer Aided Structural Analysis Lab	0	0	2	1	2	Skill Develop.	Sustainability				
7	CIV 262	Concrete and Highway Materials Testing Lab	0	0	2	1	2	Skill Develop.	Sustainability				
8	CIV 255	Extensive Survey Project ##				<mark>3</mark>		Skill Develop.	Env. & Sustainability				
9	SIC 501	Social Immersion Course ⁺				1		SkillyDevelopcy	Gender Issues / Env. & Sustainability				
		TOTAL	15	1	4	21/22	20	* Regi					
						•	•	WGP	1000				

	VII SEMESTER														
S.	COURSE	COURSE NAME	CR	EDIT	r st	RUCTURE	CONTACT	TYPE OF SKILL/	COURSE						
140.	CODE		L	Т	Р	CREDITS	nours	FOCUS	INTEGRATES						
1	CIV 215	Estimating, Costing and Valuation	3	1	0	4	4	Employability	Ethics						
2	CIV 223	Waste Water Treatment and Disposal Systems	3	0	0	3	3	Employability	Env. & Sustainability						
3	CIV 224	Design of Irrigation Water Resources Systems	3	0	0	3	3	Employability	Env. & Sustainability						
4	CIV 225	Railway, Airport and Harbour Engineering	3	0	0	3	3	Employability	Env. & Sustainability						
5	CIV XXX	Discipline Elective IV	3	0	0	3	3		-						
6	XXX XXX	Open Elective – II	3	0	0	3	3	-	-						
7	CIV 259	Environmental Engineering Lab	2	1	2	Skill Development	Env. & Sustainability								
	TOTAL 18 1 2 20 21														

		V * For students who h	III SI ave go	E ME one a	STE	E R* ad under varie	ous MoUs			
S. No.	COURSE CODE	COURSE NAME	CR	EDI	r st	RUCTURE	CONTACT HOURS	TYPE OF SKILL/	COURSE INTEGRATES	
			L	Т	P	CREDITS		FUCUS		
<mark>1</mark>	PIP 102	Professional Practice - II				<mark>15</mark>	-	Employability	Ethics	
	TOTAL 0 0 0 15 -									

	VIII SEMESTER ⁺ ⁺ Replacement of PIP 102 for regular 2019-2023 batch students													
S.	COURSE	COURSE NAME	CREDIT STRUCTURE CO		CONTACT SKILL		COURSE							
10.	CODE		HOUKS	FOCUS	INTEGRATES									
1	XXX XXX	Open Elective – III	6		-									
2	CIV XXX	Discipline Elective V	2	0	0	2	2		-					
3	CIV XXX	Discipline Elective VI	2	0	0	2	2		-					
<mark>4</mark>	PIP 103	Professional Practice - II				8	-	Employability	Ethics					
	TOTAL 0 0 0 15 10 aure													

	TABLE — 7													
	LIST OF COURSES IN HUMANITIES													
S. COURSE COURSE NAME CREDIT STRUCTURE CONTACT TYPE OF														
NO.	CODE	COURSE NAME	L	Т	Р	CREDITS	HOURS	SKILL/ FOCUS	INTEGRATES					
1	ENG 103	Technical Written Communication	2	1	0	3	3	Employability	-					
2	ENG 104	Technical Spoken Communication	1	0	2	2	3	Employability	-					

	TABLE — 8													
	LIST OF MANAGEMENT SCIENCES COURSES													
S. COURSE COURSE NAME CREDIT STRUCTURE CONTACT TYPE OF SKILL														
NO.	CODE		L	Т	Р	CREDITS	HOURS	FOCUS	INTEGRATES					
1	MGT 112	Engineering Economics	3	0	0	3	3	Employability	-					
2	MGT 113	Digital Entrepreneurship	3	0	0	3	3	Entrepreneurship	-					

	TABLE – 9													
	DISCIPLINE ELECTIVES													
S. No	COURSE CODE	COURSE NAME	L	Т	Р	CREDITS	TYPE OF SKILL/ FOCUS	COURSE INTEGRATES						
1	CIV 301	Pavement Design	3	0	0	3	Employability	Env. & Sustainability						
2	CIV 302	Ground Improvement Techniques	3	0	0	3	Skill Development	Env. & Sustainability						
3	CIV 303	Environmental Pollution and Control	3	0	0	3	Skill Development	Env. & Sustainability						
4	CIV 304	Bridge Design	3	0	0	3	Employability	Env. & Sustainability						
5	CIV 305	Remote Sensing and Geographical Information System	3	0	0	3	Entrepreneurship / Skill Develop.	Ethics						
6	CIV 306	Principles of Construction Management	3	0	0	3	Entreprendurship	Human Val & Ethics						
7	CIV 307	Elements of Prestressed Concrete Structures	3	0	0	3	Employed	Env. &						

8	CIV 308	Ground Water Hydrology	3	0	0	3	Employability	Env. & Sustainability
9	CIV 309	Environmental Impact Assessment	3	0	0	3	Skill Development	Env. & Sustainability
10	CIV 310	Elements of Earthquake Engineering	3	0	0	3	Employability	Env. & Sustainability
11	CIV 311	Environmental Geotechnics and Solid Waste Management	3	0	0	3	Employability	Env. & Sustainability
12	CIV 312	Urban Transport Planning and Traffic Engineering	3	0	0	3	Skill Development	Env. & Sustainability
13	CIV 313	Advanced Surveying	3	0	0	3	Employability	Env. & Sustainability
14	CIV 314	Design of Industrial Structures	3	0	0	3	Employability/ Skill Development	Env. & Sustainability
15	CIV 315	Advanced Concrete Technology	3	0	0	3	Employability	Env. & Sustainability
16	CIV 316	Industrial Wastewater Treatment	3	0	0	3	Employability	Env. & Sustainability
17	CIV 317	Advanced RCC structures	3	0	0	3	Employability	Env. & Sustainability
18	CIV 318	Repair and Rehabilitation of Structures	3	0	0	3	Employability	Env. & Sustainability
19	CIV 319	Matrix Methods of Structural Analysis	3	0	0	3	Skill Development	-
20	CIV 320	Masonry Structures	3	0	0	3	Employability	-
21	CIV 321	Reinforced Farth Structures	3	0	0	3	Skill	Env. &
	017 521	Remitive Latin Structures	5	Ŭ	Ŭ		Development	Sustainability
22	CIV 322	Advanced Design of Steel Structures	3	0	0	3	Skill Development	Env. & Sustainability
23	CIV 323	Design of Retaining Structures	3	0	0	3	Employability	Env. & Sustainability
24	CIV 324	Structural Dynamics	3	0	0	3	Skill Development	-
25	CIV 325	Stability of Structures	3	0	0	3	Skill Development	-
26	CIV 326	Theory of Elasticity	3	0	0	3	Skill Development	-
27	CIV 328	Climate Change and Sustainable Development	3	0	0	3	Skill Development	Env. & Sustainability
28	CIV 329	Urban Flooding: Analysis and Control	3	0	0	3	Skill Development	Env. & Sustainability
29	CIV 330	Urban Air Pollution and Control	3	0	0	3	Skill Development	Env. & Sustainability
30	CIV 331	Urban Waste Management	3	0	0	3	Entrepreneurship/ Skill Developmentue	Env. & Sustainability
31	CIV 332	Open Channel Flow	3	0	0	3	De-clor ment	Registrar
32	CIV 226	Digital Land Surveying And Mapping	2	0	0	2	Skill *	ANGALOE -

33	CIV 227	Safety in Construction	2	0	0	2	Entrepreneurship/ Skill Development	Ethics
		ТАВ	LE -	- 10				
	(OPEN ELECTIVES OFFERED BY DE	EPAH	RTM	ENI	COF CIVIL	ENGINEERING	
S. No	COURSE CODE	COURSE NAME	L	Т	Р	CREDITS	TYPE OF SKILL/ FOCUS	COURSE INTEGRATES
1	CIV 380	Geographical Information Systems	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
2	CIV 280	Environmental Impact Assessment	3	0	0	3	Skill Development	Env. & Sustainability
3	CIV 281	Sustainable Materials and Green Buildings	3	0	0	3	Skill Development	Env. & Sustainability
4	CIV 381	Construction Project Management	3	0	0	3	Entrepreneurship / Skill Develop.	Ethics
5	CIV 282	Hazardous Waste Treatment	3	0	0	3	Entrepreneurship / Skill Develop.	Env. & Sustainability/ Ethics
6	CIV 283	Elements of Construction Management	3	0	0	3	Skill Development	Ethics
7	CIV 382	Systems Design for Environment and Sustainability	3	0	0	3	Entrepreneurship / Skill Develop.	Env. & Sustainability/ Ethics
8	CIV 383	Infrastructure Systems for Smart Cities	3	0	0	3	Entrepreneurship/ Skill Develop.	Env. & Sustainability/ Ethics
	OPEN ELE(CTIVES OFFERED BY DEPARTMEN	VT O	F CO	OMF	UTER SCII	ENCE AND ENGI	NEERING
1	CSE 395	Image Processing	3	0	0	3	Skill Development	-
2	CSE 296	Data Structures Using C	3	0	0	3	Skill Development	-
3	CSE 396	Software Testing and Quality Assurance	3	0	0	3	Employability / Skill Develop.	-
4	CSE 297	Social Network Analytics	3	0	0	3	Employability / Skill Develop.	-
5	CSE 397	Digital and Mobile Forensics	3	0	0	3	Skill Development	-
6	CSE 298	Database Management Systems	3	0	0	3	Skill Development	-
7	CSE 398	Multimedia and Animation	3	0	3	3	Skrig und Development	NCY UNITED
8	CSE 299	Data Analytics Using R	3	0	0	3	Employability / Skill Develop.	

10 CSE	E 501	Technical Training					· · · · · · · · · · · · · · · · · · ·	
0	DENT	5	0	0	6	3	Employability / Skill Develop.	-
U	PEN E	LECTIVES OFFERED BY DEPART	MEN	T O	F EI	LECTRICA	L AND ELECTRO	DNICS
		ENGI	NEE	KIINU	J	[
1 EEE	E 221	Energy Audit	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
2 EEE	E 222	Research Methodology	3	0	0	3	Skill Development	-
3 EEE	E 223	Smart Grid Technology	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
4 EEF	E 103	Professional Ethics in Engineering	3	0	0	3	-	Ethics
5 EEE	E 224	Soft Computing Techniques	3	0	0	3	Employability / Skill Develop.	-
6 EEE	E 104	Control Systems	3	0	0	3	Skill Development	-
7 EEE	E 225	Fundamentals of Robotics	3	0	0	3	Employability / Skill Develop.	-
8 EEE	E 105	Electrical Engineering Lab	2	0	2	3	Employability / Skill Develop.	-
9 EEE	E 226	Nanotechnology Fundamentals and Applications	3	0	0	3	Skill Development	-
	D	OPEN ELECTI	VES	OFF	ERI	ED BY		
	D.	EPARTMENT OF ELECTRONICS A		CON	INIU	INICATION	ENGINEERING	
1 ECE	E 295	Artificial Neural Networks	3	0	0	3	Skill Development	-
2 ECE	E 296	Biomedical Instrumentation	3	0	0	3	Skill Development	-
3 ECE	E 297	Internet of Things	3	0	0	3	Employability	-
4 ECE	E 298	Industrial Automation and Control	3	0	0	3	Employability	-
5 ECE	E 299	Computational Intelligence and Machine Learning	3	0	0	3	Skill Development	-
	OPEN	NELECTIVES OFFERED BY DEPAR	RTM	ENT	OF	MECHANI	CAL ENGINEER	ING
1 MEC	C 102	Automotive Vehicles	3	0	0	3	Employability	-
2 MEC	C 103	Nanotechnology	3	0	0	3	-	-
3 MEC	C 328	Engineering Optimisation	3	0	0	3	-	-
4 MEC	C 329	Operations Research for Engineers	3	0	0	3	Employability	-
5 MEC	C 104	Operations Management	3	0	0	3	Employability	
6 MEC	C 105	Work Study	3	0	0	3	Employability	-
7 MEC	C 106	Project Management	3	0	0	3	Employaciinty	no optimi-
8 MEC	C 107	Organizational Behavior	3	0	0	3	Employability	Registrar

9	MEC 330	Renewable Energy Systems	3	0	0	3	-	Env. & Sustainability
10	MEC 331	Design of Automatic Control Systems	3	0	0	3	-	-
	OPE	N ELECTIVES OFFERED BY DEPAI	RTM	IEN	Г ОF	PETROLE	UM ENGINEERI	NG
1	PET 231	Computational Methods in Chemical Engineering	3	0	0	3	Skill Development	-
2	PET 232	Computational Fluid Dynamics	3	0	0	3	Skill Development	-
3	PET 233	Petroleum Corrosion Technology	3	0	0	3	Employability / Skill Develop.	-
4	PET 234	Polymer Technology	3	0	0	3	Employability / Skill Develop.	-
5	PET 235	Oil and Gas Quality Management	3	0	0	3	Employability / Skill Develop.	-
6	PET 236	Oil and Gas Transportation and Marketing	3	0	0	3	Employability / Skill Develop.	-
7	PET 237	Material Science and Engineering	3	0	0	3	Skill Development	-
	OPEN EI	LECTIVES OFFERED BY DEPARTM	IEN	ГОЕ	BA	SIC SCIEN	CES AND HUMA	NITIES
1	PSY 401	Social Psychology	3	0	0	3	Employability / Skill Develop.	Ethics
2	ENG 401	Literature Appreciation	3	0	0	3	Employability / Skill Develop.	Gender
3	CHE 201	Composite Materials	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
4	CHE 202	Catalysis Technology	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
5	CHE 203	Surface Coating Technology and Corrosion Science	3	0	0	3	Employability / Skill Develop./ Entrepreneurship	Env. & Sustainability
6	CHE 204	Bioenergy	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
7	CHE 205	Advanced Separation Technology	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
8	PHY 201	Elements of Nuclear Radiation and Technology	3	0	0	3	Employability / Skill Develop.	Env. & Sustainability
9	PHY 202	Amorphous Semiconductors for Technological applications	3	0	0	3	Employability / Skill Develop./ Entrepreneurship	-
10	PHY 203	Nano Structured Materials	3	0	0	3	Employability / Skill Develop./ Entrepreneurshin	-
		OPEN ELECTIVES OFFERED BY	LE	ARN	JING	AND DEV	ELOPMET	ENCYUNZER
1	PPS 401	Coding & Aptitude Training	3	0	0	3	Employability * Skill Develop./	vegistrari

3.3 COURSE DESCRIPTION AND SYLLABUS

Course Name:	Calculus a	nd Linear Algebra				
Course Code:	MAT 105	Credit Structure:	L	Т	Р	С
			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):

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

Reference Book(s):

- 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:	Engin	eering Physics				
Course Code:	DHV 101	Cradit Structura .	L	Т	Р	С
	PHY 101	Credit Structure :	4	0	0	4

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

Text Book(s):

1. Wiley, Engineering Physics, 2014 Wiley India.

Reference Book(s):

- 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. Idd.
- 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", 7th Edition McGraw Hill Education, 2017.

Course Name:	Elements of H	Electrical Engineerin	g			
Course Code:	FFF 101	Cradit Structura :	L	Т	Р	С
	ELE IVI	Crean Structure : 3	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 o	f Civil Engineering				
Course Code:	CIV 101	Cradit Structura :	L	Т	Р	С
Course Code:		Credit Structure :	3	0	0	3

Course Description: The objective of this Course is to make students learn the basics of Civil Engineering concepts, role of civil engineers 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, 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, 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.
- 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

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- 2. S. S. Bhavikatti, "Basic Civil Engineering", New Age International Publication
- 3. Satheesh Gopi, "Basic Civil Engineering", Pearson Publication

Course Name:	Engi	neering Graphics				
Course Code:	MEC 152 Credit S	Cradit Structure :	L	Т	Р	С
		Crean Structure :	2	0	4	4

Course Description: The course is designed with the objective of giving an overview of engineering drawing with the help of software tools. It is introductory in nature and acquaints the students with the techniques used to create engineering drawings with computerised drafting tools. Computerised drafting provides accurate and easily modifiable graphic entities, easy data storage, easy retrieval facility and it enhances creativity. It will expose students to the concept of engineering drawing and teach them to draw different views of planes and solids in different orientations. The course will teach students to use AutoCAD to produce engineering drawings. They will learn to create drawing layouts, dimensioning, the theory of projection, orthographic projection of points, lines, planes and solids, isometric projection and be introduced to the development of surfaces.

Course Material: "Engineering Graphics Lab Manual," Presidency University

Text Book(s):

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 Name:	Technical V	Technical Written Communication							
Course Code:	ENG 103	Credit Structure .		Т	Р	С			
		Credit Structure :	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 Book(s):

- 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 Local Constant* 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: Globarena Online Language Learning Software.

Course Name:	Engin	eering Physics Lab				
Course Code:	DHV 151	Credit Structure :	L	Т	Р	С
	PHY 151		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:	Wo	rkshop Practice				
Course Code:	MEC 151	151 Credit Structure		Т	Р	С
	MEC 151	Credit Structure :	0	0	2	1

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

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

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

Reference 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:	Buildin	Building Self Confidence							
Course Code:	DDS 105	Credit Structure .	L	Т	Р	С			
	PPS 105	Credit Structure :	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.

Course Material: Building Self Confidence Training Manual, Presidency University

Reference Book(s):

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

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- 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:	Engine	Engineering Chemistry							
Course Code:	СНЕ 101	Cradit Structura :	L	Т	Р	С			
	CHE IVI	Credit Structure :	4	0	0	4			

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

Text Book(s):

- 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 Book(s):

- 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	Т	Р	С
			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, pressions, implementation using basic gates. Basics of communication systems, introduction to microprocessors and its applications.
Text Book(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", Cengage Learning.

Course Name:	Elements of Mechanical Engineering						
Course Code:	MEC 101	Cradit Structure .	L	Т	Р	С	
	WIEC 101	Crean Structure .	3	0	0	3	

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

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

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

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

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

Text Book(s):

1. 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:	ENC 104	Cradit Struatura .	L	L T F	Р	С	
	ENG 104	Crean Su acture.	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 Book(s):

- 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:	Comp	uter Programming				
Course Code:	CSE 151	Cradit Structure	L	Т	Р	С
	CSE 151	Credit Structure :	2	0	4	4

Course Description: This course will provide an introduction to foundational concepts of computer programming to students of all branches of Engineering. This module includes a max of traditional lectures and laboratory sessions. Each meeting starts with a lecture and finishes with a letteratory 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", Mc Graw 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:	СНЕ 151	Cradit Structura .	L	Т	Р	С	
	CHE 151	Crean Structure :	0	0	2	1	

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

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

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

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

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

Text Book(s):

- 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 Book(s):

- 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:	Effecti	ve Communication				
Course Code:	DDS 106	Cradit Structure :	L	Т	Р	С
	PPS 106	Crean Structure :	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.

Course Material: "Effective Communication" Training Manual, Presidency University.

Course Name:	Transform Techniques, Partial D	Transform Techniques, Partial Differential Equations and Probability							
Course Code:	MAT 107	Cradit Structure .	L	Т	Р	С			
	MAI 107	Crean Structure :	3	1	0	4			

Course Description: This course aims to introduce Fourier transform, z-transform and Laplace transform. The topics include the applications of Laplace transform in LCR circuits and solution of difference equations using z-transform.

This course is commonly designed for all engineering branches and the contents learned in the previous semester are the prerequisite for this course. Solution of second and higher order, linear ordinary differential equations with constant and variable coefficients. Formation of Partial Differential Equations (PDE), solution of homogeneous and non-homogeneous PDEs and the application of PDEs. Laplace transforms of functions and properties; Laplace transform of periodic and unit step functions. Inverse Laplace Transforms, Application of Laplace transforms and solution of differential equations.

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

Text Book(s):

- 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 Book(s):

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

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

Course Name:	Strength	Strength of Materials						
Course Code:	CIV 201	Cradit Structure :	L	Т	Р	C		
	CIV 201	Credit Structure : 3	1	0	4			

Course Description: This Course deals with effect of forces on semi-rigid bodies. It includes the concepts of Hooke's law, elastic constants, compound stresses, composite bars, thermal stresses, strain energy due to axial force, resilience, stresses due to impact and suddenly applied load, principal stress and principal planes - Mohr's circle, Centroid and Moment of Inertia, beams and support conditions, Columns and struts, types of supports and loads, shear force and bending moment, theory of simple bending and elements of torsion.

This Course helps students to design various engineering materials subject to bending, compression, shear force and torsion and also read allied Courses like structural analysis.

Text Book(s):

1. S. Ramamrutham, R Narayanan, "Strength of Materials", Dhanpat Rai Publishing

1. P. Beer, E. R. Johnston (Jr.) and J.T. DeWolf, "Mechanics of Materials", Tata McGraw Hill.

Reference Book(s):

- 1. Egor Popov, "Mechanics of Materials", Pearson
- 2. Timoshenko, S.P. and Gere, "J.M. Mechanics of Materials", Tata McGraw Hill.
- 3. Kazimi, 'Mechanics of Solids", Tata McGraw Hill.

Course Name:	Su	rveying				
Course Code:	CIV 202	Cradit Structura :	L	Т	P	C
	CIV 202	Credit Structure : 3	1	0	4	

Course Description: This Course deals with the introduction to survey, objectives, plane surveying principles, preparation of map and plan, chain surveying, locating building corners, field book, chain surveying instruments, Compass surveying, Plane table surveying, Levelling and contouring, contour maps, computation of areas and volumes, theodolite surveying, tachometric surveying, trigonometric surveying.

Basic knowledge of mathematics is required for pursuing the Course. The concepts learned from the Course can be adopted in various fields like highway route alignment, setting out of building plan, drawing of site map etc.

Text Book(s):

1. "Surveying I and II", B.C. Punmia, Ashok Kr. Jain, Arun Kr. Jain., Laxmi Publications.

Reference Book(s):

1. "Plane Surveying and Higher Surveying", Chandra. A.M, New Age International (P) Limited, Publishers, Chennai.

2. "Surveying Vol. I and II", Duggal, S.K., Tata McGraw Hill.

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Course Name:	Engineering Geology					
Course Code:	CIV 203	Credit Structure :	L	Т	Р	С
	CIV 203		4	0	0	4

Course Description: The basic objective of this Course is to enable the students understand implications of geology in planning, designing and construction of big civil engineering projects.

The Course covers the following key areas-composition and constitution of the earth, earth movements and plate tectonics, structural geology, interpretation of geological maps, weathering, erosion and denudation, superficial movements, physical processes in different environments, sedimentation, igneous activity, metamorphism, rock types and their engineering properties.

No prior knowledge is required to understand the Course and it gives basic geological knowledge to be applied for civil engineering project.

Text Book(s):

1. P.K Mukherjee, "Textbook of Geology", World Press Pvt Ltd, Kolkata

Reference Book(s):

- 1. Judd and Krynine, "Principles of Engineering Geology and Geotechnics", McGraw-Hill Book Company.
- 2. N Chenna Kesavulu, "Textbook of Engineering Geology", Trinity Press.

Course Name:	Fluid	Fluid Mechanics						
Course Code:	CIV 208	Cradit Structura .	L	Т	Р	С		
	CIV 208	Credit Structure :	3	1	0	4		

Course Description: The main objective of this course is to understand the properties of fluid at rest and in motion. The students having basic knowledge of mechanics and strength of materials can easily understand this course.

The course is designed to present the fundamental properties of fluids, density, specific weight, specific volume, viscosity, Vapor pressure, cavitation, surface tension, capillary effect, fluid pressure, and its measurements, variation of pressure, Pascal's law, hydrostatic forces on plane surface and curved surface, buoyancy and stability, fluids in rigid - body motion, Lagrangian and Eulerian descriptions, flow patterns and flow visualization, the Reynolds transport theorem, Bernoulli and energy equations, Momentum analysis of flow systems, Newton's laws, forces acting on a control volume, The linear and angular momentum equations, Dimensional analysis and modeling, Types of flows and major and minor losses, Differential analysis of fluid flow, Conservation of Mass – Continuity Equation, Cauchy's equation and Navier –stokes equation.

Text Book(s):

1. "Hydraulics And Fluid Mechanics Including Hydraulics Machines", P.N.Modi and S.M.Seth, Standard Book House, 2002

Reference Book(s):

- 1. "A Textbook of Fluid Mechanics", R.K. Bansal, S. Chand
- 2. "Fluid Mechanics Fundamentals and Applications", Yunus A. Cengel, John M. Children Hill.

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Course Name:	Building Materials	Building Materials and Concrete Technology							
Course Code:	CIV 210	Cradit Structure .	L	Т	Р	С			
	CIV 217	crean su acture.	3	T 0	0	3			

Course Description: The course consists of the study of different building materials and their properties which are used in construction of civil engineering projects. The course includes the basic properties of constituents of concrete like cement, aggregates and water. It also includes various assessment tests on quality of ingredients on concrete as per IS codal provisions. The students can develop first-hand knowledge on concrete production process and properties and uses of concrete as a modern material of construction. The courses will enable one to make appropriate decision regarding ingredient selection and use of concrete. Students have the opportunity to experience material capacity and behavior as well as construction methods in the form of demonstrations. Furthermore, material applications and detailing in structural and non-structural building components are explored.

Text Book(s):

- 1. "Building Materials", S. S. Bhavikatti, Vices publications House private ltd.
- 2. "Building Construction", S. S. Bhavikatti, Vices publications House private ltd.
- 3. "Properties of Concrete", Neville, A.M, ELBS Edition, Longman Ltd, London.
- 4. "Concrete Technology Theory and Practice", M. S Shetty, S. Chand

Reference Book(s):

- 1. "Concrete Technology", A.R.Santhakumar, Oxford.
- 2. "A textbook Building Materials", P.C Varghese, Prentice-Hall of India Pvt Ltd.
- 3. "Engineering Materials", Sushil Kumar, Standard Publication and Distributors, New Delhi.

Course Name:	Basic Mate	Basic Materials Testing Lab						
Course Code:	CIV 263	Cradit Structure :	L	Т	Р	С		
	CIV 205	Crean Structure :	0	0	2	1		

Course Description: The primary objective of the Course is to make the students gain knowledge on mechanical properties of engineering materials.

The students should have studied strength of materials theory Course to pursue the Course. This Course provides an overview of the mechanical properties of structural materials. It is a practical oriented Course dealing with the mechanical properties of materials such as tensile strength, compressive strength, flexural strength, shear strength, torsion, hardness, toughness and tests on fine and coarse aggregates.

This Course helps students to determine the strength of various engineering materials subject to bending, compression, shear force and torsion.

Course Material: "Basic Materials Testing Lab Manual", Presidency University.

Course Name:	Survey	ving Practice	
Course Code:	CIV 252	Credit Structure :	I T P C

Course Description. This Course gives the complete concept of measuring the various the field. Basic knowledge of mathematics is required to pursue the Course.

This Course contains chain surveying, locating building corners, field book, chain surveying instruments, compass surveying, plane table surveying, levelling and contouring, contour maps, areas, theodolite survey and traversing, tachometric surveying, curve setting, EDM instruments, Total Station and Global Positioning System.

Course Material: "Surveying Lab Manual", Presidency University.

Course Name:	Design Thinkin	g and Team Building				
Course Code:	DDS 107	Cradit Structure :	L	Т	Р	С
	113107	Crean Structure :	0	0	2	1

Course Description: Anyone who has ever been successful, rich and famous has become so by solving some problem or the other. Problem solving skills can catapult an ordinary executive to become the top CEO of an organisation. They have always been the X factor and they will always be. In this programme, we introduce, explain and give enough exercises to students to become a good problem solver and work in teams effectively.

We introduce students to established and scientific problem solving tools like Brainstorming, Group Discussion, Root Cause Analysis, 6 Thinking Hats and give them plenty of exercises to develop their ability to solve any kind of problem in real life and in their career. The exercises challenge the students to work in teams, think in teams and perform in teams. During these exercises, they are educated about team building skills and leadership from time to time.

Course Material: Presidency University, "Design Thinking & Team Building", Training Manual.

Course Name:	Numerical Methods, Probability Distributions and Sampling Techniques						
Course Code:	MAT 108	Cradit Structure .	L	Т	Р	C	
	WIA1 100	crean su acture.	3	1	0	4	

Course Description: The objective of Numerical Methods, Probability and Sampling Distributions is to equip the students with adequate knowledge of basic mathematics that will enable them in formulating problems and solving them analytically as well as numerically in their Engineering programme. The course enables students to incorporate the knowledge of complex variables and their significance in engineering, Numerical methods and sampling theory to support their concurrent, subsequent engineering studies to explore complex systems, physicists, engineers and mathematicians require computational methods since mathematical models are rarely solvable analytically. This course provides an introduction to basic numerical methods such as fitting of various curves, interpolation, differentiation, integration. This course also provides an introduction to numerical solution of algebraic and transcendental equations, ordinary differential equations such as Taylor's series method, modified Euler's method and Runge-Kutta Methods. The course aims at introducing students to quantitative uncertainty analysis and risk assessment for engineering applications. Probability theory is of great use in understanding and modeling phenomena that exhibit random behavior and the emphasis is on real-world applications to engineering problems. The topic covered include 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 varianded, 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.

Text Book(s):

- Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons (India), 2014.
- 2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computations, 6th Edition, New age Publishing House, 2015.
- 3. Ronald E. Walpole, Raymond. H. Myers, Sharon. L Myers, and Keying E. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Delhi-9th edition, 2012.

Reference Book(s):

- 1. B.S. Grewal, "*Higher Engineering Mathematics*", 43rd Edition, Khanna Publishers.
- 2. B.S. Grewal, "Numerical Methods in Engineering and Science", 10th Edition, Khanna publishers, 2016.
- 3. Kishor S Trivedi, "*Probability and Statistics with Reliability, Queuing and Computer Science Applications*", John Wiley & Sons, 2nd Edition, 2008.

Course Name:	Structu	Structural Analysis-I					
Course Code:	CIV 205	Cradit Structura :	L	Т	Р	С	
	CIV 205	Crean Structure.	3	1	0	4	

Course Description: The course is designed to calculate the forces acting on different structural elements and to distinguish between determinate and indeterminate structures.

Extending the concept of static equilibrium, deformation relationships, and geometric compatibility, this course covers basic methods used to estimate internal forces, reactions, and deflections in 2D structures. This course includes the analysis of trusses using the method of joints and sections. It covers different methods of calculating deflection in beams; analysis of cables and arches. It also helps in learning various ways of controlling deflection and displacements under various loading conditions. Introduction to indeterminate analysis by consistent deformation method.

The subject helps the student in understanding the forces required for the further design of the structure. The one basic and core concept for any civil engineer is the ability to draw shear force and bending moment diagrams for various beams is a pre-requisite for the student. A basic understanding of elements of civil engineering, strength of materials and mathematics is required to pursue the Course.

Text Book(s):

- 1. T.S. Thandavamoorthy, "Structural Analysis", Oxford University Press.
- 2. C.S. Reddy, "Basic Structural Analysis", McGraw Hill
- 3. S. Ramamrutham, R. Narayan, "Theory of Structures", Dhanpat Rai Publishing Company.
- 4. S S Bhavikatti, "Structural Analysis Vol 1", Vikas Publishing House.

Reference Book(s):

1. M.L. Gambhir, "*Fundamentals of Structural Mechanics and Analysis*", Eastern Economy Edition, PHI publishing Pvt. Ltd., 2nd printing, 2014.

2. Dr. R. Vaidyanathan, Dr. P. Perumal, "*Structural Analysis – Volume – I*", Laxmi Public ations I virlated 3. Dr. R. Vaidyanathan, Dr. P. Perumal, "*Structural Analysis – Volume – II*", Laxmi Public ations Pvr. Ltd.

4. Russell C. Hibbeler, "Structural Analysis", Pearson Prentice Hall.

Course Name:	Geotechni	Geotechnical Engineering						
Course Code:	CIV 210	Cradit Structure :	L	Т	Р	С		
	CIV 210	Crean Structure.	3	T 1	0	4		

Course Description: This Course is intended to cover the most essential aspects and properties of soil as an engineering material and its effect in laying foundation systems. The students need to have a prior knowledge of mathematics, physics and engineering mechanics to pursue the Course.

The Course covers origin and classification of soil, phase relationships, effective Stress Principle; effective Stress Under Hydrostatic and 1D flow; Permeability; Flow Through Soils–Laplace equation, seepage; Compressibility; Consolidation; Terzaghi's 1D Consolidation Theory; Shear Strength; Drainage Conditions; Pore Water Pressure; Mohr's Circle; Failure Envelope and Strength Parameters; Factors Affecting Shear Strength; Critical State frame work; behavior of soils under cyclic loading, Liquefaction,; Compaction; Engineering properties of Natural soils, Compacted Soils and modified soils; Site Investigations; etc.

This Course helps the students to understand soil behavior as an engineering material.

Text Book(s):

1. Gopal Ranjan and Rao A.S.R, "*Basic and applied soil Mechanics*", New Age International (P) Ltd., New Delhi.

Reference Book(s):

- 1. Ian Smith, Elements of Soil Mechanics, Blackwell Publishing.
- 2. V.N.S Murthy, "*Principles and Practices of Soil Mechanics and Foundation Engineering*", UBS Publishers and Distributors, New Delhi.
- 3. Braja, M. Das, "Geotechnical Engineering", Cengage Learning.

Course Name:	Highwa	Highway Engineering						
Course Code:	CIV 220	Cradit Structure :	L	Т	Р	С		
	CIV 220	Crean Structure.	3	1	0	4		

Course Description. This Course gives an overall exposure to the importance of different modes of transportation and also explains the concepts of planning and design of transport system. The students have a prior basic knowledge of surveying and mathematics for this course.

This Course consist of introduction and importance of transportation, different modes of transportation, highway development and planning, highway alignment, highway surveys, highway geometric design, traffic studies, traffic operations, design of intersections, tests on pavement materials, design of flexible and rigid pavements as per IRC, pavement construction and maintenance.

These concepts can be applied in designing of highway and pavement components.

Text Book(s):

1. "*Highway Engineering*", Khanna, S.K and Justo, C.E.G., Nem Chand and Bros. Roorkee (U.P), 1998.

- 1. "Traffic Engineering and Transport Planning", Kadiyali, L.R, Khanna Publishers, New Delvi, 2005
- 2. "Principles and Practice of Highway Engineering", Kadiyali, L.R, and Lal, N.B. Khanna Publishers.2005.

Course Name:	Water Res	Water Resources Systems						
Course Code:	CIV 221	Cradit Structure :	L	Т	Р	С		
	CIV 221	crean su acture.	3	0	0	3		

Course Description: This course deals with the concepts of hydrologic cycle and the interrelationship of its components such as rainfall, infiltration, evaporation, and runoff. It deals with quantitative methods for analyzing large-scale water resource problems, surface and ground water, addressing water quantity, human influences on the hydrological system. Topics covered include precipitation and losses from precipitation, hydrographs, estimation of flood and flood routing.

Text Book(s):

1. "Engineering Hydrology", Subrahmanya, K., 2008, Tata Mc Graw Hill Pub. Co., New Delhi.

Reference Book(s):

1. "*Applied Hydrology*", Chow, V. T., Maidment and Mays, L. A., 2010, Tata Mc Graw Hill Pub. Co., New York.

Course Name:	Engineeri	Engineering Geology Lab						
Course Code:	CIV 253	Cradit Structure	L	Т	Р	С		
	CIV 255	Crean Structure :	0	0	2	1		

Course Description: The Course provides an overview of the study of earth (Engineering Geology) which includes types of rocks, their origin and formation.

The engineering geology lab mainly deals with Identification of the type of materials (minerals and rocks) by visual inspection- Geologic concepts and approaches on rock engineering projects - Interpretation of Geological Maps etc.

Students should have studied engineering geology theory Course to perform the laboratory experiment.

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

Course Name:	Fluid M	Fluid Mechanics Lab						
Course Code:	CIV 254	Cradit Structura :	L	Т	Р	С		
	CIV 254	crean su acture.	0	0 0	2	1		

Course Description: The Course is designed to impart knowledge on properties of fluids at rest and in motion. The students having basic knowledge on fluid mechanics theory Course can easily understand this Course.

The Course contains an overview of the fluid mechanics and its applications. It is practical oriented Course that deals with fundamental fluid properties, pressure measurement, discharge measurement in pipes and open channel flow including head losses.

This Course helps students design culverts, bridges and closed conduits to carry particular discharge.

Course Material: "Fluid Mechanics Lab Manual", Presidency University.

Text Book(s):

1. Shesha Prakash M N, "Experiments in Hydraulics and Hydraulic Machineries:" The Freistand Procedures" PHI Learning Pvt Ltd, New Delhi.

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- 1. R.K Bansal, "A text book of Fluid Mechanics and Hydraulic Machines", Laxmi publications, New Delhi.
- 2. P.N Modi and Dr. S.M. Seth, "Hydraulics and Fluid Mechanics" Standard Book House, New Delhi.

Course Name:	Being Co	Being Corporate Ready						
Course Code	DDS 108	Cradit Structure .	L	Т	Р	С		
Course Coue:	Code: PPS 108 Credit Structure :	0	0	2	1			

Course Description: This programme is like a potpourri consisting of Group Discussion (GD), Personal Interview (PI), Corporate Grooming and Presentation Skills. During this programme, students are given techniques of performing well in GD & PI and then given a lot of mock sessions in groups to equip them for clearing these processes. Students are also educated on various aspects like grooming, etiquettes and manners, professionalism to be more corporate ready.

The students are educated about successful presentation skills and various techniques that helps them deliver effective presentations. They are given assignments to sharpen their presentation skills followed by feedback from the faculty.

Text Book(s):

1. Presidency University "Being Corporate Ready" Training Manual.

Reference Book(s):

- 1. Carmine Gallo, "Talk like Ted", Pan MacMillan 2015
- 2. OP Singh, "The Art of Effective Communication in group Group discussion and interview", S Chand publication.

Course Name:	Structural Analysis - II						
Course Code:	CIV 200	Cradit Structura :	L	Т	Р	С	
	CIV 209	Credit Structure :	3	1	0	4	

Course Description: This Course is a continuation of Structural Analysis – I, where the student learns more advance methods of finding forces in structural systems.

This Course helps the student to understand the different types of displacement methods to analyze continuous beam and portal frames by slope deflection method, moment distribution method, Kani's method, stiffness matrix method and flexibility matrix method. It imparts understanding of indeterminacy of a structure and also the best method suitable to analyze a given system.

This advance Course is required to help students grasp design requirements on a macro level i.e. buildings, bridges, etc. Prior knowledge of Structural analysis – I and strength of materials is required for this Course.

Text Book(s):

- 1. T.S. Thandavamoorthy, "Structural Analysis", Oxford University Press.
- 2. C.S. Reddy, "Basic Structural Analysis", McGraw Hill
- anno 3. S. Ramamrutham, R. Narayan, "Theory of Structures", Dhanpat Rai Publishing Company
- 4. S S Bhavikatti, "Structural Analysis Vol II", Vikas Publishing House.

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- 1. M.L. Gambhir, "*Fundamentals of Structural Mechanics and Analysis*", Eastern Economy Edition, PHI publishing Pvt. Ltd., 2nd printing, 2014.
- 2. Dr. R. Vaidyanathan, Dr. P. Perumal, "*Structural Analysis Volume I*", Laxmi Publications Pvt Ltd.
- 3. Dr. R. Vaidyanathan, Dr. P. Perumal, "*Structural Analysis Volume II*", Laxmi Publications Pvt Ltd.
- 4. Russell C. Hibbeler, "Structural Analysis", Pearson Prentice Hall.

Course Name:	Design of RC Structural Elements							
Course Code:	CIV 211	Cradit Structure .	L	Т	Р	С		
		Crean Structure :	3	1	0	4		

Course Description: This Course is designed to learn the basics of designing structural elements that make up a structural system. The prerequisite for this Course is the knowledge of structural analysis and an understanding of strength of materials.

The Course contains the introduction to limit state design, serviceability limit states, limit state design of beams, slabs, columns and footings.

This Course helps the student develop an understanding of designing structures like buildings, bridges, water tanks, etc.

Text Book(s):

1. Unnikrishnan Pillai and Devadas Mennon, "Design of Reinforced Concrete Structures", Tata McGraw Hill Publications.

Reference Book(s):

- 1. Verghese P C, "Limit State Design of Reinforced Concrete", Prentice Hall of India, New Delhi
- 2. Park and Paulay, "*Reinforced Concrete*", John Wiley and Sons.
- 3. N. Krishnaraju, "Reinforced Concrete Design: Principles and Practice", New Age International.

Course Name:	Foundation Engineering							
Course Code:	CIV 214	Cradit Structure .	L	Т	Р	С		
	CIV 214	Crean Structure :	3	0	0	3		

Course Description: This is an application of soil mechanics and other related techniques to the design of foundation. A prior knowledge of soil mechanics is required to pursue the Course.

The Course deals with lateral earth pressure theories and its types, earth retaining structures, stability of retaining walls or anchored sheet-pile walls etc. It also deals with the methods of site and soil exploration; shallow foundation, generalized bearing capacity theory, empirical methods, layered soil, settlement of foundations, codal provisions, deep foundations-types and their selection, ultimate load of individual piles in compression and uplift, pile load tests, pile groups etc.

This Course provides students with a working knowledge of the state-of-practice of foundation engineering, covering bearing capacity and settlement of shallow and deep foundations.

Text Book(s):

1. V. N. S. Murthy, "Soil Mechanics and Foundation Engineering", CBS Publishers and Distributors.

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- 1. Das, B. M. "Principles of Foundation Engineering", Thomson India Edition, New Delhi.
- 2. Craig, R. F. (1983), "Soil Mechanics", English Language Book Society and Van Nostrand Reinhold Co. Ltd., London.
- 3. IS Code: IS 1904 -1986: "General Requirements for Design and Construction of Foundation".
- 4. J.E. Bowles, "Foundation Analysis and Design", McGraw Hill Pub. Co. New York.

Course Name:	Digital Entrepreneurship						
Course Code:	MCT 113	Cradit Structure :	L	Т	Р	С	
	WIGT 115	Crean Structure :	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 scalable new venture ideas that fulfill a market need, 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, 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(s):

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

Reference Book(s):

- 1. Mayer, M. H., *New Venture Creation: An Innovator's Guide to Entrepreneurship*, 2nd Edition, Sage Publication, 2013.
- 2. Kuratko, D. F., & Rao, T. V., *Entrepreneurship: A South Asian Perspective*, Cengage Learning India Pvt. Ltd, Delhi, 2016.
- 3. Kim, C. W.; "Blue Ocean Strategy", HBR Publishing House, 2005.
- 4. Dayer, J. Gregersen, H. and Christensen, C., *The Innovator's DNA Mastering the Five Skills of Disruptive Innovators*, HBR Press, 2011.
- 5. Osterwalder, A. and Pigneur, Y., *Business Model Generation: A Handbook for Visionaries, Game Changes, and Challengers, John Wiley & Sons, 2010.*

Course Name:	Computer Aided Building Drawing Lab							
Course Code:	CIV 258	Cradit Structure :	L	Т	Р	C		
	CIV 258		0	0	2	1		

Course Description: The Course imparts knowledge to students on the basics of architectural and structural drawings helpful for execution at site

The Course contains drafting of residential and public buildings, office building, basic structured detailing of beam, slab, column, footing in AutoCAD, basic design calculation and shear force bending moment diagram in MS-Excel and also basic structural analysis using STAAD Pro and ETABS.

The students would benefit from having knowledge and expertise in drafting and design to be competitive in the job market

Text Book(s):

1. "Limit State Design of Reinforced Concrete", PC Varghese, Vol-II-: Prentice Hall of India (P) Ltd".

Reference Book(s):

- 1. "Analysis of Structures Vol-II", Vazirani V N and M M Ratwani, Khanna Publishers, New Delhi.
- 2. "Reinforced Concrete Structures", B C Punmia, Vol-II-: Laxmi Publications (P) Ltd, New Delhi

Course Name:	Geotechnical Engineering Lab						
Course Code:	CIV 260	Cradit Structure :	L	Т	Р	С	
	CIV 200	Credit Structure :	0	0	2	1	

Course Description: This Course is aimed to perform common soil mechanics tests in order to better understand soils behaviour.

The Course includes experiments on moisture content, Specific gravity, liquid and plastic limit, and analysis of grain size distribution including both sieve analysis and hydrometer, field density tests, hydraulic conductivity test including both constant and falling head tests, one dimensional consolidation test, direct shear test, unconfined compressive strength and UU triaxial test.

The Course would help the students develop an ability to design and conduct experiments, as well as to analyze and interpret data.

Course Material: "Soil Mechanics Laboratory Manual", Presidency University

Text Book(s):

1. Lambe T.W., "Soil Testing for Engineers", Wiley Eastern Ltd., New Delhi

Reference Book(s):

 Gopal Ranjan and Rao A.S.R. (2000), "Basic and Applied Soil Mechanics", New Age International (P) Ltd., New Delhi

Course Name:	Social Immersion Course						
Course Code:	SIC 501	Cradit Structure :	L	Т	Р	С	
	510 501	crean su acture.	-	-	-	1	

Course Description: Social Immersion Course is one unit credit Course which includes the knowledge, skills and competencies embedded within every aspect of the college to inspire and enhance each student's transferable learning skills. It represents the broad categories of competence that enable students to be successful in further education, careers, as citizens and in their personal lives. Students will effectively express and exchange ideas through listening, speaking, reading, writing and other modes of interpersonal expression. Students will be able to gather and synthesize relevant information, evaluate alternatives and implement creative and effective solutions. Students will be prepared to practice community engagement that addresses environmental responsibility, social justice and contact every for Students will become independent learners who understand and express the lifelong statistic ensary for physical, social, economic, mental and emotional health.

Course Name:	Professional Practice – I						
Course Code:	DID 101	Cradit Structure :	L	Т	Р	С	
		Crean Structure.	-	-	-	5	

Course Description: The Professional Practice (PP) links the university with the professional world by infusing the reality of the world of work into the educational process. The classroom is shifted for a period of two months in PP-I and an additional two months in PP-II to a professional location where the students, under the supervision of the faculty, are involved in applying the knowledge acquired in the classroom to finding solutions to real life problems. The PP program has two components, namely PP-I of two months duration implemented during the summer following the 2nd year and PP- II for four months duration implemented in the eighth semester, final year.

PP-I is the first exposure to the world of work, necessary for the subsequent problem solving experience during PP-II. It is implemented at large industrial complexes, research and development centers, software development houses, pharmaceutical companies, etc. While the general aim of PP-I is to afford an opportunity for the student to learn how work is organized and carried out; by a process of observation and participation, the learning can be quite varied and exhaustive depending on the nature of the organization. It provides an opportunity for a detailed understanding of vast engineering operations and its various facets such as inventory, productivity, management, information systems, human resource development, etc.

Course Name:	Design of Structural Steel Elements							
Course Code:	CIV 213	Cradit Structure :	L	Т	Р	С		
		CIV 213 Credit Structure :	3	1	0	4		

Course Description: The objective of the course is to develop the knowledge in design of the various structural steel elements using limit state method conforming to codal provision. The design methodology is based on the latest Indian Standard Code of Practice for general construction (IS 800:2007). The course covers all the necessary components such as material specifications, connections and elementary design of structural members for designing steel structures. The behavior and design of tension members, compression members, and flexural members will be discussed. Design of compression members, built-up compression members along with the batten and lacing systems will also be explained. It comprises of design of various types of column bases which transfers different kind of loads from super structures to underneath soil. The design of beam to beam, beam to column connections using bolted and welded connections shall also be covered. Students are expected to obtain basic knowledge about the design and failure mode of steel structural members after finishing this course.

Text Book(s):

- 1. "Limit state Design of steel Structures", S.K. Duggal, McGraw Hill Education (India) Pvt. Ltd.
- 2. "Design of Steel Structures", Subramanian N, Oxford University Press, New Delhi

Reference Book(s):

- 1. "Limit State Design of Steel structures", Dr. Ramachandra & Virendra Gehlot, Scientific Publishers
- "Design of Steel Structures by Limit State Method", S.S. Bhavikatti, I.K. International publishing house.
- 3. IS 800-2007, IS 875-1987 SP- 6 (Part 1) or "Steel Tables", Bureau of Indian Standards.

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Course Name:	Water Infrastructure Systems						
Course Code:	CIV 222	Cradit Structure .	L	Т	Р	С	
	CIV 222	Credit Structure :	3	0	0	3	

Course Description: This course deals with Introduction to Water Infrastructure Systems-Importance and necessity for Planned water supply, Various types of water demand, Per capita demand, variation in demand pattern, Design period and Population forecasting methods. Source of water-Intakes, types of intakes and conduits for transporting water. Water quality and its parameters, BIS and WHO standards. Water treatment processes and treatment units-Screening, Aeration Plain sedimentation, , sedimentation with coagulation, types of coagulants, optimum dose of coagulants, mixing devices, Theory of filtration, types of filters and their comparison, design of slow and rapid sand filter, washing of filter and methods of disinfection. Distribution system.

Text Book(s):

- 1. "Water Supply Engineering", S.K. Garg, Khanna Publishers.
- 2. *"Water Supply Engineering, Vol. 1"*, B.C. Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi.

Reference Book(s):

- 1. *"Environmental Engineering"*, Howard S. Peavy, Donald R. Rowe, George T, New York, 2000, Tata McGraw Hill, Indian Edition, 2013
- 2. "*Water supply and sanitary engineering*", GS Birdie, JS Birdie, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.

Course Name:	Engineering Economics						
Course Code:	МСТ 112	Cradit Structure .	L	Т	Р	С	
	MGT 112	Crean Structure :	3	0	0	3	

Course Description: The objective of this Course is to enable engineering students to analyze cost/ revenue data and make an economic analysis, which can help in the decision making process either to justify or reject alternative projects. This Course is designed to present the concepts and techniques of economic analysis needed in the decision making process. The emphasis is on the analytical analysis of money and its impact on decision making.

The Course introduces the student to the discipline of economics and its application in the field of engineering. The Course examines the concept of time value of money and how engineers can apply it for making economic decisions. It also explains how interest rates and different compounding periods influence the value of various capital expenditures. The Course also deals with the effect of depreciation, taxes and inflation on capital expenditure decisions.

Text Book(s):

1. Niall M Fraser, "Engineering Economics", Pearson.

Reference Book(s):

1. Jose Sepulveda, "Schaum's Outline of Engineering Economics", McGraw-Hill.

2. Tara Chand, "Engineering Economics", Vol-1, Nem Chand and Brothers.

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Course Name:	Computer Aided Structural Analysis Lab							
Course Code:	CIV 261	Cradit Structure :	L	Т	Р	C		
		Crean Structure :	0	0	2	1		

Course Description: The Course is designed to make the students understand the design and detailing requirements of a structure that helps holding back of soil, containment of water and various foundations of a building.

It includes analysis and design of Retaining wall; Footings: Rectangular slab and beam type combined footing, Raft foundation; Water Tank resting on the ground; Slender columns subjected to axial load and biaxial bending, etc. The modelling and analysis are done with the software Packages STAAD.Pro and ETABS, whereas drafting and detailing with AutoCAD.

Text Book(s):

- 1. T.S. Sarma, "Staad Pro v8i for beginners", Notion Press, 2014
- 2. T.S. Sarma "Design of RCC Buildings using Staad Pro V8i with Indian Examples Static and Dynamic Methods", Educreation Publishing, 2017
- 3. Sham Tickoo, "Exploring Bentley STAAD.Pro V8i (SELECTseries 6)", BPB publications, 2017

Reference Book(s):

- 1. P C Varghese, "Limit State Design of Reinforced Concrete", Vol-II, Prentice Hall of India (P) Ltd.
- 2. Vazirani V N and M M Ratwani, "Analysis of Structures", Vol-II, Khanna Publishers, New Delhi.
- 3. B C Punmia, "Reinforced Concrete Structures", Vol-II, Laxmi Publications (P) Ltd, New Delhi.
- 4. Staad.Pro, ETABS, AutoCAD user manuals.

Course Name:	Concrete and Highway Materials Testing Lab							
Course Code:	CIV 262	Cradit Structura :	L	Т	Р	С		
	CIV 262	Crean Structure :	0	0	2	1		

Course Description: The objective of concrete laboratory is to determine the physical properties of building construction materials like cement, fine and coarse aggregate. The tests include determination of specific gravity, fineness, normal consistency, setting times, workability and soundness of cement, fineness modulus of fine and coarse aggregate, strength of cement mortar, cement concrete. Students can design the mix, make the specimens and test the same for their respective strengths.

The objective of highway materials laboratory is to determine some of the properties of coarse aggregates and bitumen. Experiments include tests for impact, abrasion and crushing strength for coarse aggregates. For bitumen, tests include penetration, ductility, viscosity, softening point and flash and fire point, Marshall Stability and Binder content. The students will be able to infer the suitability of these materials for construction of road. This laboratory course will help the students to understand the theoretical concepts learned in the course transportation engineering

On pursuing this Course, the students would develop first-hand knowledge on the properties and uses of concrete and highway materials.

Course Material: "Concrete and Highway Materials Testing Lab Manual", Presidence

Text Book(s):

1. B.L. Gambhir, "Concrete Technology", Tata McGraw Hill, New Delhi

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- 2. Khanna SK and Justo C E G, Veeraraghavan A "Highway Engineering", Nem Chand Bros, Roorkee.
- 3. M.S. Shetty, "Concrete Technology", Chand S and Co.

Course Name:	Extensive Survey Project						
Course Code:	CIV 255	Credit Structure .	L	Т	Р	С	
	CIV 255	Credit Structure :	0	0	2	1	

Course Description. This Course gives the complete practical concept of measuring the various dimensions across the field.

This Course initially contains establishing Bench marks for the respective projects. The projects should include New Tank Project, Water Supply and Sanitary Project and Highway Project.

Course Material: "Extensive Survey Project Manual", Presidency University.

Course Name:	Estimating, Costing and Valuation							
Course Code:	CIV 215	Cradit Structura .	L	Т	Р	С		
	CIV 215	Credit Structure :	3	1	0	4		

Course Description: This Course basically aims at describing various aspects of engineering estimation and the methods of costing and valuation in various types of construction.

The topics covered include **e**stimation-objectives, process components, basic principles of measurement, units of measurement, different types of estimate, quantification of various items of construction, Illustrative examples for different types of structures, reinforcement bar bending and bar requirement schedules, principles of rate analysis, measurement of earthwork for roads, contracts and its types, standard data and schedule of rates approximate estimates, specification and valuation. This also includes preparation of detailed estimates, preparation of specifications report accompanying the estimate approximate methods of Costing, types of estimate, costing for various structures, rate analysis, rate for material and labour, schedule of rates, data sheets, and abstract estimate. Values and its kinds, valuation – purpose, scope, methods, land and building method, factors affecting the value of plot and building - depreciation - Valuation of residential building with case study.

The students should have prior knowledge about surveying, Reinforced concrete structures and basic mathematics for pursuing this Course. This principle can be adopted various like quantity surveying, valuation of old building and structures.

Text Book(s):

1. B.N. Dutta, "*Estimating and Costing in Civil Engineering Theory and Practice*", UBS Publishers and Distributors Limited New Delhi.

- 2. M. Chakraborti, "*Estimating, Costing, Specification and Valuation on Civil Engineering*" National Halftone Co, Calcutta.
- 3. IS: 1200 1974- Parts 1 to 25, "*Methods of Measurement of Building and Civil Engineering Works*", Bureau of Indian Standards, New Delhi.

Course Name:	Waste Water Treatn	Waste Water Treatment and Disposal Systems									
Course Code:	CIV 223	Cradit Structure :	L	Т	Р	C					
	CIV 223	Crean Structure :	3	0	0	3					

Course Description: This course provides fundamental information on wastewater treatment with a focus on understanding the principles governing design of biological, physical and chemical treatment processes.

The main objective of the Course is to learn the basics of sewage composition and its characteristics and to provide the adequate information on various disposal standards for industrial effluents.

This Course deals with the characteristics and composition of sewage sampling, analysis, population equivalent, drainage in buildings, plumbing systems for drainage, primary treatment, secondary treatment, sludge digestion, tertiary treatment, disposal standards, self-purification of rivers, Streeter Phelps equation, oxygen sag curve etc.

This Course helps students to design various treatments units and to pursue further study on waste water treatment.

The students may have studied environmental Engineering-I with basic knowledge on chemistry and physics to pursue the Course

Text Book(s):

- 1. "*Waste water Engineering, Vol. II*", B.C. Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi
- 2. "Sewage Disposal and Air Pollution", S.K. Garg, Khanna Publishers, New Delhi, 28th edition and 2017
- 3. *"Environmental Engineering"*, Howard S. Peavy, Donald R. Rowe, George T, New York, 2000, Tata McGraw Hill, Indian Edition, 2013

Reference Book(s):

- 1. *"Waste Water Engineering, Collection, Treatment and Disposal"*, Metcalf and Eddy, Tata McGraw Hill, Inc., New York.
- 2. "Water & Waste Water Technology", Mark. J Hammer, John Wiley & Sons Inc., New York, 2008
- 3. "Manual of Sewage and Sewage Treatment", CPHEEO, 1999

Course Name:	Design of Irrigation	Design of Irrigation Water Resources Systems								
Course Code:	CIV 224	Credit Structure :	L	Т	Р	С				
	CIV 224		3	0	0	3				

Course Description: The main theme of this course is to understand the theory and design of irrigation structures. The course covers the major topics such as assessment of water requirements for crops, seepage theories and design of canals, canal headworks, regulation works, and cross-drainage works. Design principles of hydraulic structures like Gravity Dam, Earth Dam, and Spillway are introduced.

Text Book(s):

1. "Irrigation Water Resources and Water Power Engineering", Dr. P. N. Modi, Standard Rook House

Reference Book(s):

1 mere

1. "Irrigation Engineering and Hydraulic Structures", Garg S K, Khanna Publications.

Course Name:	Railway, Airport a	Railway, Airport and Harbour Engineering								
Course Code:	CIV 225	Credit Structure .	L	Т	Р	С				
	CIV 225	Creatt Structure :	3	0	0	3				

Course Description: This course deals with the designing of various components of railway, airport, docks and harbour. This course also gives the idea of planning the transportation system in modern cities.

This course consists of railway engineering, location surveys and alignment, permanent way, gauges, geometric design, track Junctions-Points and crossings, railway stations and yards, signaling and interlocking, control systems of train movements, airport engineering, aircraft characteristics, airport obstructions and zoning, runway, taxiways and aprons, terminal area planning and urban transportation systems etc.

These concepts can be applied in designing railway, airport and harbour components.

Text Book(s):

- 1. "Railway Engineering", M.M. Agarwal, Prabha & Co. 2007.
- 2. "Airport Planning and Design", Khanna, S.K. and Arora, M.G., Nemchand and Bros. 1999.
- 3. "Elements of Dock and Harbour Engineering", Oza and Oza, Charotar Publishing House, 1996.

Course Name:	Environment	Environmental Engineering Lab							
Course Code:	CIV 250	Cradit Structure	L	Т	Р	С			
	CIV 239	Crean Structure :	0	0	2	1			

Course Description: This Course is a practical application of the knowledge developed from the Courses on Environmental engineering. Basic knowledge on Chemistry and physics is required to pursue this Course.

The Course will provide an overview of physical, chemical and biological properties of surface water and waste water. It is practical oriented Course detailing about determination of concentration of physical, chemical and biological impurities of surface and waste water. Based on the test results line and degree of treatment of surface and waste water can be decided.

This laboratory Course helps students to accesses the quality of surface, ground water and waste water from various industries.

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

Text Book(s):

1. "Manual of water and wastewater analysis" NEERI Publication"

- 1. "Manual on Water supply and Treatment" CPHEEO.
- 2. "Manual of Sewage and Sewage Treatment" CPHEEO.



Course Name:	Profession	Professional Practice – II							
Course Code:	DID 102	Cradit Structure :	L	Т	Р	С			
	1 11 102	02 Credit Structure :	-	-	-	15			

Course Description: Professional Practice-II (PP-II) is necessary for the subsequent problem solving experience after PP-I. Students observe science and technology in action, develop an awareness of the method of scientific experimentation, and often get an opportunity to see, study and operate sophisticated and costly equipment. They also learn about the implementation of the principles of management they have learnt in class, when they observe multidisciplinary teams of experts from engineering, science, economics, operations research, and management deal with techno-economic problems at the micro and macro levels. Finally, it enables them to develop and refine their language, communication and interpersonal skills, both by its very nature, and by the various evaluation components, such as seminar, group discussion, project report preparation, etc. The broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the nature of real-life problems. It is offered to students who are going abroad under various MoUs.

PIP 103 – Professional Practice II for 8 credits is approved for regular 2019-2023 batch students.

3.4 COURSES FOR DISCIPLINE ELECTIVES

Course Name:	Pavement Design						
Course Code:	CIV 301	Credit Structure:	L	Т	Р	С	
			3	0	0	3	

Course Description: This Course gives detailed knowledge about designing of different types of pavements based on various load and climatic conditions.

The Course consists of analysis and design of pavement, types and component, comparison between Highway and Airport pavements, sub grade properties, stresses and deflections, wheel load stresses, design, advantages and applications of different Pavement Design Methods, Pavement Analysis like ESWL, Wheel Load Stresses, Warping Stresses, Friction Stresses, Combined Stresses Rigid Pavement Design - Types of Joints in Cement Concrete Pavements, IRC Method of Design.

The student should have prior knowledge about Structural Analysis, Geo-Technical Engineering, Design of Reinforced Concrete and Highway Engineering for pursuing this Course. These concepts can be applied in the field design of pavement for highways and airport runways.

Text Book(s):

1. Yoder and Witezak, "Principles of pavement design", John Wiley and Sons.

- 1. Yang, "Design of functional pavements", McGraw-Hill.
- 2. Huang, Y.H. "Pavement Analysis and Design", Second Edition, Dorling Kindersley (India) Pv. Ltd., New Delhi, India.

Course Name:	Ground Improvement Techniques						
Course Code:	CIV 302	Credit Structure:	L	Т	Р	С	
	017 302	or curt off acture.	3	0	0	3	

Course Description: The Course is designed to provide an overview of the ground improvement techniques that improve the stability of ground to withstand major civil engineering projects. The students who have studied Soil mechanics can pursue this Course.

The Course deals with the concept of improvement of construction sites that are not suitable for supporting physical infrastructure such as buildings, bridges, highways, tunnels and dams. It deals with various ground improvement techniques employed, need for improvement, compaction, preloading, dewatering, admixtures, grouting, heat treatment, ground freezing, inclusion, anchorage, micropiles, stone columns, heavy tamping electro-kinematic stabilization, physical and chemical improvement etc. Soil reinforcement principles, geosynthetics, vertical drains, ground anchorage, rock bolting, soil nailing, deep mixing with lime cement etc. are also covered in the Course.

Text Book(s):

1. Manfired R. Hausmann, "Engineering Principles of Ground Modification", McGraw-Hill Pub, Co.,

Reference Book(s):

1. Koerner, R. M., "Designing with geosynthetics", Prentice Hall Inc.

2. P. Purushothama Raju, "Ground improvement Techniques", USP.

Course Name:	Environmental Pollution and Control						
Course Code:	CIV 303	Credit Structure:	L	Т	Р	С	
			3	0	0	3	

Course Description: The Course has been designed to improve the understanding of the students about different pollution control strategies and the skills of application of remediation techniques to combat pollution in three environmental compartments i.e. air, water and soil.

This Course will give an idea of different sources of pollution: Important cases for atmospheric, hydrosphere and land pollution and related control strategies. Water-borne, air-borne and vector-borne common diseases – transmission modes and control measures. Excreta disposal in unsewered areas-various options and their selection, noise pollution and engineering approaches for its abatement, Environmental Impact Assessment and Auditing, few case studies etc.

No prior knowledge is required as this Course is introducing basic knowledge to the students on environmental pollution and control strategies.

Text Book(s):

1. De A.K., "Environmental Chemistry", Wiley Eastern Ltd.

- 1. Brady N.C., "The Nature and Properties of Soil", Prentice-Hall India.
- 2. Ecrenfelder W, "Industrial Pollution Control", McGraw Hill Int. Ed.



Course Name:		Bridge Design				
Course Code:	CIV 304	Credit Structure:	L	Т	Р	С
	017 304	or cut off acture.	3	0	0	3

Course Description: Basic concepts and the knowledge of various types of bridge systems will be imparted to the student who will take this Course.

The Course includes the study of various types of bridges, specification of road bridges and the various types of rolling loads, design of RCC slab culvert, T beam bridge design, an introduction of bearings, and joints.

The knowledge of bridge design in useful for designing bridges across highway or waterway. The previous knowledge of structural analysis, design of RC elements, design of steel structures and also soil mechanics is required for pursuing the Course.

Text Book(s):

Johnson D Victor, "Essentials of Bridge Engineering", Oxford and IBH Publishing Co New Delhi
Krishna Raju N, "Design of Bridges", Oxford and IBH Publishing Co New Delhi

Reference Book(s):

1. S P Bindra, "*Principles and Practice of Bridge Engineering*", Dhanpat Rai and Sons New Delhi 2. "*IRC 6 – 2000 Standard Specifications and Code of Practice for Road Bridges Section II Loads and Stresses*", The Indian Road Congress, New Delhi.

Course Name:	Remote Sensing and Geographical Information System						
Course Code:	CIV 305	Credit Structure:	L	Т	Р	С	
			3	0	0	3	

Course Description: This course enables the students to explore the various ways in which remote sensing systems provide geospatial information that is relevant, accurate, timely, accessible and available in an appropriate format. Recent developments in Earth observation such as imaging radar, LIDAR and hyper-spectral sensors are increasing the wealth of information that can be generated from remotely sensed data sources. As a consequence, numerous new GIS applications that rely on advanced remotely sensed data sources have emerged at local, regional and global scales. Topics include the use of remote sensing data, platforms and sensors, photogrammetry, image interpretation and processing techniques, fundamentals of GIS and spatial data analysis and applications of remote sensing and GIS in environment and urban applications.

Text Book(s):

- 1. *"Remote Sensing and Image Interpretation"*, Lillesand, T.M. and Kieffer, R.W., 5th Edition., Wiley, New York, 2003
- 2. *"Fundamentals of Geographic Information Systems"*, Chakraborty and Sahoo, Viva Books Private Limited, India, 2008

- 1. "Remote Sensing of the Environment", John R. Jensen, Prentice Hall, 2000.
- 2. "Geographical Information Systems: Principles and Applications", Magwire, D. J., Goodchild, M.Y. and Rhind, D. W, Longman Group, U.K, 1991

Course Name:	Principles of Construction Management					
Course Code:	CIV 306	Credit Structure:	L	Т	Р	С
			3	0	0	3

Course Description: This Course deals with the management aspects of construction projects.

It includes introduction to construction project and its management, life cycle of a construction project, stakeholders, phases in a project, construction equipment and technology; analysis for technical feasibility, environmental impact, risk analysis in construction projects, building, Industrial and infrastructure construction, interdisciplinary nature of construction projects; specifications and quality control; types of contracts, (Lump Sum, Unit rate, etc.); estimation of quantities, cost estimation from clients perspective, project selection using time value of money concept, construction contract, cost estimate – contractors perspective, project planning and network analysis-PERT, CPM, and Precedence Network, Resource scheduling, Time Cost trade off, Time-cost monitoring and control using S-curve and earned value analysis, Construction claims and disputes, and introduction to construction quality and safety, legal Issues, construction by-laws, Arbitration; Safety issues in construction projects; Case studies.

Text Book(s):

1. KN Jha, "Construction Project Management – Theory and Practice", Pearson

Reference Book(s):

1. Sengupta B. and Guha H, "Construction Management and Planning", Tata McGraw Hill, New Delhi.

2. Jebsen J, "Cost and Optimisation Engineering", McGraw Hill, New York.

3. Moder J.J. and Phillips C.R., "Project Management with CPM and PERT"

Course Name:	Elements of Prestressed Concrete Structures					
Course Code: CIV 307 Credit Structure:	L	Т	Р	С		
			3	0	0	3

Course Description: The main objective of this Course is to provide civil engineering students with the knowledge of pre-stressed concrete structures

This Course is an introduction to design of pre-stressed concrete structures. It deals with the characteristics of High strength concrete and steel, basic principles of pre-stressing, pre-tensioning and post-tensioning system, analysis of section for flexure, stresses in concrete due self-weight, normal force and bending, losses of pre-stress, deflection of pre-stressed structures, losses in pre-tensioning and post-tensioning members, design of pre stressed concrete structures using limit state of collapse, design of end blocks and beams.

The students having basic knowledge of concrete technology and design of reinforced concrete structures can easily understand this Course. This Course helps students to design pre and post tensioned concrete structures used for bridges and other important places.

Text Book(s):

1. N. Krishna Raju, "Pre-stressed concrete", Tata McGraw Publishers.

Reference Book(s):

1. T.Y. Lin and Ned H. Burns, "Design of Pre-stressed concrete structures", John Willey and New York.

Course Name:	Ground Water Hydrology					
Course Code:	CIV 308	Credit Structure:	L	Т	Р	С
			3	0	0	3

Course Description. This Course deals with the study of water that flows below the ground surface and gives detailed idea about the behaviour of water below the ground level.

The Course includes aquifer and types, surface and sub-surface investigation by various methods, flow of water, secular and seasonal variations, fluctuations due to evapo-transpiration, meteorological phenomena, tides, role of sea water in ground water, occurrence of sea water intrusion, length and structure of the fresh salt water interface, prevention and control of seawater intrusion etc.

A prior knowledge about geology, soil mechanics and fluid mechanics is required for pursuing the Course.

Text Book(s):

1. Raghunath H.M., "Ground Water Hydrology", New-Age International, 2nd Edition.

Reference Book(s):

1. Todd, D.K., and Mays, L. W., "Groundwater Hydrology", John Wiley and Sons, Singapore.

2. Garg S.P. "Groundwater and Tube Wells", Oxford and IBH Publishing Co. New Delhi.

Course Name:	Environmental Impact Assessment					
Course Code:	CIV 309	Credit Structure:	L	Т	Р	С
			3	0	0	3

Course Description: The main objective of this Course to assess the impact of any engineering projects on environment.

This Course introduces the methodology of environmental impact assessment (EIA) as a vital tool for sound environmental management and decision-making. The Course provides an overview of the concepts, methods, issues and various forms and stages of the EIA process. It examines the development of EIA overseas and in India. Different levels and systems of EIA are examined to highlight the diversity of approach and impact of the EIA process.

This Course helps student to assess impact of engineering projects on environment and to prepare EIA report on any projects.

The students having good knowledge on air pollution and water pollution can easily understand this Course.

Text Book(s):

1. Larry W Canter, "Environment impact Assessment", McGraw Hill Publication

Reference Book(s):

1. Jain R.K – Van, "Environment impact Analysis", Nostrand Reinhold Co

Course Name:	Elem	ents of Earthquake Engine	eering
Course Code:	CIV 310	Credit Structure:	L REGISTRAR 3 0 0 3 *
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Course Description: The objective of this Course is to teach the students how to design a structure resistant to the natural force of an earthquake.

The Course includes basic engineering seismology response spectra, conceptual design, linear earthquake analysis and load combinations using Indian standard codes, design of shear walls etc.

Prior knowledge of RC design, steel design, structural analysis and soil mechanics are a major perquisite for this Course. The Course finds application in the design of a structure, resistant to natural earthquake force resulting from tectonic plate movements.

Text Book(s):

- 1. Pankaj Agarwal and Manish Shrikande, "*Earthquake Resistant Design of Structures*", Prentice Hall of India Private Ltd, New Delhi
- 2. Duggal S K, "Earthquake Resistant Design of Structures", Oxford University Press, New Delhi

Reference Book(s):

- 1. Anil K Chopra, "Dynamics of Structures", Pearson Education, Asia, New Delhi
- 2. Steven L Kramer, "Geotechnical Earthquake Engineering", Pearson Education, Asia, New Delhi

Course Name:	Environmental Geotechnics and Solid Waste Management					
Course Code:	CIV 311	Credit Structure:	L	Т	Р	С
	01.011		3	0	0	3

Course Description: This Course deals with the identification, characterization and regulatory requirements for disposal of hazardous, non-hazardous and domestic wastes. Previous knowledge of soil mechanics and environmental engineering is helpful in pursuing the Course.

The Course includes causes and effects of subsurface contamination, waste disposal on land; waste management-recycling, composting, incineration and various disposal methods, characteristics of solid wastes; waste containment principles; site selection and geo-environmental investigations, natural attenuation process and mechanism of attenuation, types of landfills; planning of landfills; design of liners and covers for landfills; environmental monitoring around landfills; detection, control and remediation of subsurface contamination; geotechnical re-use of solid waste materials.

It also includes application of geosynthetics in waste disposal design, types of geosynthetics, testing and evaluation; designing with geotextiles, geogrids, geonets and geomembranes, leachate collection and detection system, landfill construction etc.

Text Book(s):

1. Lakshmi Reddi, Hilary I. Inyang, "Geoenvironmental Engineering: Principles and Applications", Marcel Dekkar, New York.

Reference Book(s):

1. George Tchobanoglous and Frank Kreith, "Handbook of solid waste management", McGraw-Hill.

2. H.D. Sharma and K. Reddy, "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies".

3. R. N. Yong and H.R. Thomas, "Geoenvironmental Engineering contaminated ground," Fate of pollutants and remediation", Thomas Telford, London.

Course Name:	Urban Transport Planning and Traffic Engineering						
Course Code:	CIV 312	Credit Structure:	L	Т	Р	С	
			3	0	0	3	

Course Description: This Course deals with the planning of transportation systems in modern cities. This course consists of urban mass transportation, urban transport planning, data collection and inventories, modeling techniques in planning, trip generation, distribution, traffic assignment and modal split. The course also deals with traffic engineering comprising of various traffic studies, methods of data collection, fundamentals of traffic flow, concepts of road safety and the design of traffic signals.

Text Book(s):

- 1. Kadiyali L R, "Traffic Engineering and Transport Planning", Khanna Publishers.
- 2. Khanna, S.K and Justo, C.E.G., "Highway Engineering", Nem Chand and Bros. Roorkee (U.P), 1998
- 3. Mc. Shane, William R., Roess, Roger P. and Prassas Elena S., "Traffic Engineering", Pearson, 2019.

Reference Book(s):

- 1. Jothi Kristey and Lal, "Introduction to Transportation Engineering", PHI, New Delhi.
- 2. Wilson AG, "Urban and Regional Models in Geography and Planning", John Wiley and Sons, London.
- 3. Papacostas, "Fundamentals of Transportation Planning", Tata McGraw Hill.
- 4. Hutchinson, B.G, "Introduction to Urban System Planning", Tata McGraw Hill
- 5. Subash C Saxena, "A Course in Traffic Planning and Designing", Dhanapat Rai and Sons, Delhi.

Course Name:	Advanced Surveying					
Course Code:	CIV 313	Cradit Structure .	L	Т	Р	С
	CIV 515	Crean Structure.	3	0	0	3

Course Description: This course will enable students to apply geometric principles to arrive at solutions to surveying problems. Analyze spatial data using appropriate computational and analytical techniques. Use the concepts of advanced data capturing methods necessary for engineering practice.

The Course consists of advanced surveying concepts including geodetic surveying, theory of errors, introduction to field astronomy, aerial photogrammetry and modern surveying instruments.

Text Book(s):

- 1. B.C. Punmia, "Surveying Vol.2", Laxmi Publications pvt. Ltd., New Delhi.
- 2. Chandra A.M, "*Plane Surveying and Higher Surveying*", New Age International (P) Limited, Publishers, Chennai.

- 1. James M Anderson and Adward M Mikhail, "*Surveying theory and practice*", 7th Edition, Tata McGraw Hill Publication.
- 2. Kanetkar T P and S V Kulkarni, "Surveying and Levelling Part 2", Pune Vidyarthi Griha Prakashan,
- 3. K.R. Arora, "Surveying Vol. III" Standard Book House, New Delhi.
- 4. Sateesh Gopi, "Global Positioning System", Tata McGraw Hill Publishing Co. Ltd. New Delhi.

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Course Name:	Design of Industrial Structures						
Course Code:	CIV 314	Cradit Structura .	L	Т	Р	С	
	CIV 514	crean structure.	3	0	0	3	

Course Description: This course deals with requirements, planning and design of industrial structures. It covers the different types of industrial structures and planning of Industrial Structures including the requirements regarding Lighting, Ventilation and Fire Safety - Protection against noise and vibration –as per Guidelines of Factories Act. It also includes the design of auxiliary structures like Bunkers & Silos, Chimneys and Pipes. The course also focuses on large span roof structures and structural aspects of foundation for industrial structures.

Text Book(s):

- 1. "Advanced Reinforced Concrete Design", N. Krishna Raju, CBS Publishers & Distributors
- 2. *"Design of Steel Structures"*, Ram Chandra.
- 3. "Design of Steel Structures", Duggal.
- 4. "Tall Chimneys Design and Construction", Manohar S.N, Tata McGraw Hill, 1985
- 5. "Planning of Industrial Structures", Dunham, C.W., John Wiley and Sons, 2001.
- 6. "Transmission Line Structures", Santhakumar A.R. and Murthy S.S., Tata Mc Graw Hill, 1992.

Reference Book(s):

- 1. "Handbook of Machine Foundations", Srinivasulu P and Vaidyanathan.C, Tata McGraw Hill, 1976.
- 2. *"Industrial Buildings: A Design Manual"*, Jurgen Axel Adam, Katharria Hausmann, Frank Juttner, Klauss Daniel, Birkhauser Publishers, 2004.
- 3. "Procs. of Advanced course on Industrial Structures", Structural Engineering Research Centre, Chennai, 1982.

Course Name:	Advanced Co	Advanced Concrete Technology						
Course Code:	CIV 315	Credit Structure :	L	Т	Р	С		
	017 313	Crean Structure :	3	0	0	3		

Course Description: To study the microstructure of concrete, strength and deformation characteristics using advanced techniques. To study concrete mix design, various mineral and chemical admixtures and durability characteristics from the point of advanced concrete technology. To study materials, mix proportioning and application of special concretes namely, HPC, SCC, GPC and HPFRC.

This course enables the students to study the microstructure of concrete, strength and deformation characteristics using advanced techniques. It emphasizes on properties of concrete making materials such as cement, aggregates and admixtures including tests to assess the properties of fresh and hardened concrete. The course will focus on concrete mix design, various mineral and chemical admixtures and durability characteristics from the point of advanced concrete technology. It also includes the requirements of materials, mix proportioning and application of special concretes namely, HPC, SCC, GPC and HPFRC. It will enable to study the concrete manufacturing processes, concreting methods and different special formworks

Text Book(s):

- 1. "Properties of Concrete", Neville A.M., Prentice Hall, 5th Edition 2012.
- 2. "Concrete Technology: Theory and Practice", Shetty, M.S., S. Chand and Co. Pvt Ld. Detri
- 3. "Concrete Technology", Santhakumar A.R., Oxford University Press India, 2006.

- 1. "Concrete Structure, Properties and Materials", Mehta, P.K. (1983), Prentice Hall, New Jersey, USA.
- 2. "High Performance Concrete", Pierre-Claude Aitcin, Taylor & Francis, 2011.
- 3. "Formwork for Concrete", Mary Krumboltz Hurd, American Concrete Institute, 2005.
- 4. "IS: 10262 (2009), Concrete Mix Proportioning Guideline", BIS, New Delhi

Course Name:	Industrial Was	Industrial Wastewater Treatment						
Course Code:	CIV 316	Cradit Structura :	L	Т	Р	C		
		Crean Structure.	3	0	0	3		

Course Description: Understand the industrial process, water utilization and waste water generation. Impart knowledge on selection of treatment methods for industrial wastewater. Acquire the knowledge on operational problems of common effluent treatment plants. Conversant about the polluting potential of major industries in the country and the methods of controlling the same

Reference Book(s):

- 1. "Industrial Water Pollution Control", Eckenfelder, W.W., McGraw-Hill
- 2. "Theories and practices of Industrial Waste Engineering", N.L. Nemerrow
- 3. "Wastewater engineering Treatment disposal reuse", Metcalf & Eddy, Tata McGraw Hill.
- 4. *"Industrial Waste Treatment: Contemporary Practice and Vision for the Future"*, Nelson Leonard Nemerow, Library of Congress Cataloging-in- Publication data.
- 5. "Theories and practices of industrial waste treatment", Nelson Leonard Nemerow, Library of Congress Cataloging-in-Publication data

Course Name:	Advanced	Advanced RCC structures					
Course Code:	CIV 317	Cradit Structure .	L	Т	Р	C	
Course Coue:		Crean Structure:	3	0	0	3	

Course Description: The objective of this course is to make students to learn principles of limit state design of Reinforced Concrete Structures to design structural frames, foundations and to do the reinforcement detailing.

The main objective of this course is to provide civil engineering students with the knowledge of designing complete building frames. This course is a second level course on design of reinforced concrete structures. The course exposes students to the theory of R.C. design and helps the student to understand the behavior of R.C member under different loading conditions. This course is a second level course on design of reinforced concrete structures. It deals with the load transfer path in frames and design of each structural component post the analysis of the frames. It also deals with the design of flat slabs of large span, design of combined foundations and mat foundations. The students having basic knowledge of structural analysis, soil mechanics and design of reinforced concrete structures can easily understand this course. This Course helps students to design framed buildings, flat slabs of large span, combined foundations and mat/raft foundations.

Text Book(s):

1. "Reinforced concrete Design", Unnikrishnan Pillai and Devdas Menon., The STMC Haws Hill Publishers Company Ltd., New Delhi, 2006

- 2. "Advanced Reinforced Concrete Design", P. C. Varghese, PHI Learning Private Ltd., New Delhi, 2011
- 3. "Design of Reinforced Concrete Foundations", P. C. Varghese, PHI Learning Private Ltd., New Delhi, 2010
- 4. "Advanced Reinforced Concrete Design", Krishna Raju. N., CBS Publishers & Distributors

1. "Reinforced Concrete Structures", Thomas Paulay, R. Park, John Wiley and sons New York.

Course Name:	Repair and Rehal	oilitation of Structures				
Course Code:	CIV 318	Cradit Structura .	L	Т	Р	С
Course Coue.	CIV 518	crean su acture.	3	0	0	3

Course Description: This course will help students learn how to identify various deterioration mechanisms or damage mechanisms in concrete structures. Use of various non-destructive, partially-destructive tools to assess the condition of the structure will be discussed. Tips on selecting measurable parameters that are useful in deciding the further repair and maintenance practices will be provided. Typical practices for near-surface repair, corrosion protection, structural strengthening, structural stabilization, etc. will be discussed in detail. At the end of the course students will be able to suggest evaluation and repair/retrofitting methods for extending the service life of concrete structures. Importance for preventive maintenance practices (instead of corrective maintenance practices) will be discussed throughout the coursework.

Text Book(s):

- 1. *"CPWD Handbook on Repair and Rehabilitation of RCC buildings"*, Govt of India Press, New Delhi, 2002.
- 2. "Learning from failures Deficiencies in Design, Construction and Service" Rand Centre (SDCPL), R.N. Raika, Raikar Bhavan, Bombay, 1987.

References book(s):

- 1. "Concrete Technology", Santhakumar A.R., Oxford University Press, New Delhi, 2007.
- 2. "FRP: Strengthened RC Structures", J.G. Teng, J.F. Chen, S.T. Smith, L. Lam, Wiley Publications
- 3. 440.2R-10/17: "Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures"

Course Name:	Matrix Methods	Matrix Methods of Structural Analysis						
Course Coder	CIV 210	Credit Structure	L	Т	Р	C		
Course Coue:	CIV 519	Crean Structure :	3	0	0	3		

Course Description: This is a second level course on structural analysis. Herein the concept of matrix method of structural analysis with application in various structural components will be discussed. This course will serve as a bridge between structural analysis 1 (the first course on structural analysis) and more advance topic such as finite element method (FEM).

Text Book(s):

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1. "Matrix Analysis of Structures", Asslam Kassimali, Brooks/Cole Publishing Co., U\$A, 1992

- 1. "Advanced Structural Analysis", Devdas Menon, Narosa Publishing House, 2009.
- 2. "*Structural Analysis: A Unified Classical and Matrix Approach*", Amin Ghali, Adam M Neville and Tom G Brown, Sixth Edition, 2007, Chapman & Hall.

Course Name:	Masonr	Masonry Structures				
Course Coder	CIV 320	Cradit Structure .	L	Т	Р	C
Course Coue:	CTV 520	Creati Structure :	3	0	0	3

Course Description: The objective of this course is to understand properties of masonry units, design criteria of various types of wall subjected to different load system and to provide knowledge in analysis and design of masonry elements. This course is a basic course on design of masonry structures. It deals with the properties of masonry units, strength properties, behaviour of masonry walls under different loading conditions. The course also deals with the design of masonry walls subjected to axial, eccentric and transverse load. The students having basic knowledge of structural analysis and strength of materials can easily understand this course. This Course helps students to understand the concept of analysis and design of masonry elements.

Text Book(s):

- 1. "Structural Masonry", Henry, A.W., Macmillan Education Ltd., 1990.
- 2. "Brick and Reinforced Brick Structures", Dayaratnam P, Oxford & IBH, 1987.

Reference Book(s):

- 1. IS 1905–1987 "Code of practice for structural use of un-reinforced masonry"- (3rd revision) BIS, New Delhi.
- 2. SP 20 (S&T) 1991, "Hand book on masonry design and construction (1st revision) BIS, New Delhi.

Course Name:	Reinforced	Reinforced Earth Structures					
Course Code:	CIV 321	Cradit Structura .	L	Т	Р	С	
Course Coue.	CIV 521	Crean Structure.	3	0	0	3	

Course Description: This course introduces the students to the different types of geosynthetics, their manufacturing technique, testing methods and their applications in different fields of Civil Engineering projects like retaining walls, slopes, foundations, pavements and drainage. Detailed design techniques and construction methods will be covered in the course.

Text Book(s):

1. "Designing with Geosynthetics", Robert M. Koerner, Pearson Prentice Hall, Upper Saddle River, New Jersey, United States, 2005.

Reference Book(s):

1. *"Geosynthetics and their applications"*, Sanjay Kumar Shukla, Thomas Telford Publishing, Thomas Telford Ltd, I Heron Quay, London E I4 4JD, 2002.

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Course Name:	Advanced Design of Steel Structures					
Course Code:	CIV 322	Cradit Structure .	L	Т	Р	C
Course Coue.		Crean Structure.	3	0	0	3

Course Description: The objective of this course is to make students to learn understand the plastic behavior of structures and the principles of plastic analysis of Structures as well as to expose students to design of steel trusses and gantry girder.

The main objective of this course is to provide civil engineering students with the knowledge of plastic analysis and behavior as well as design of steel structures. This course is a second level course on steel structures. It deals with the plastic behavior of structures, plastic analysis, and development of plastic hinges. It also deals with the design of steel trusses and gantry girders as per limit state of design following the Indian codal provisions. The students having basic knowledge of structural analysis and design of steel structures can easily understand this course. This Course helps students to design steel trusses for supporting the roof of industrial structures, railway stations and to design gantry girders used in factories and manufacturing industries to lift and move heavy machinery/equipment.

Text Book(s):

- 1. "Limit State Design of Steel Structures", Duggal S.K, Tata Mac Graw Hill, New Delhi, 2010.
- 2. "Design of Steel Structures", N. Subramanian, Oxford, 2008.
- 3. "Design of Reinforced Concrete Foundations", P. C. Varghese, PHI Learning Private Ltd., New Delhi, 2010
- 4. "Advanced Reinforced Concrete Design", Krishna Raju. N., CBS Publishers & Distributors

Reference Book(s):

1. "Limit State of Design of Steel Structures", Ramachandra, Standard Book House - 2012.

Course Name:	Design of Ret	Design of Retaining Structures					
Course Coder	CIV 323	Cradit Structure .	L	Т	Р	С	
Course Coue.	CTV 525	Crean Structure.	3	0	0	3	

Course Description: The objective of this course is to make students to learn principles of limit state design of retaining walls and water tanks and to do the reinforcement detailing.

The main objective of this course is to provide civil engineering students with the knowledge of designing earth and water retaining structures. This course is an advanced course on design of reinforced concrete structures. It deals with the design of cantilever and counterfort retaining walls with different backfill conditions. It also deals with the design of water tanks at ground level. The students having basic knowledge of structural analysis, soil mechanics and design of reinforced concrete structures can easily understand this course. This Course helps students to design different types of retaining walls of varying heights and backfill condition as well as to design water tanks at ground level.

Text Book(s):

- 1. "*Reinforced concrete Design*", Unnikrishnan Pillai and Devdas Menon., Tata McGraw Hill Publishers Company Ltd., New Delhi, 2006
- 2. "Advanced Reinforced Concrete Design", P. C. Varghese, PHI Learning Private La, New Delhi, 2011
- 3. "Reinforced Concrete Structures", B.C. Punmia, Laxmi Publishing Co.
- 4. "Advanced Reinforced Concrete Design", Krishna Raju. N., CBS Publishers & Distributors

1. "Reinforced Concrete Structures", Thomas Paulay, R. Park, John Wiley and sons New York.

Course Name:	Structur	Structural Dynamics					
Course Code	CIV 324	Cradit Structura .	L	Т	T P 0 0	С	
Course Coue.	CIV 524	Crean Structure.	3	0	0	3	

Course Description: The objective of this course is to make students to learn principles of vibration, structural dynamics and behaviour of structures under different types of dynamic loading.

The main objective of this course is to provide civil engineering students with the knowledge of structural dynamics and principles for analysis of structures under dynamic loading. This course is a basic course on analysis of structures under dynamic loading. It deals with the concept of degree of freedom, modelling of structures as single degree and multi degree of freedom system, free and forced vibration in structures and the concept of damping in structures. It also deals with the analysis of structural systems under various types of dynamic loading and introduces the concept of shear building. The students having basic knowledge of engineering mathematics and structural analysis can easily understand this course. This Course helps students to understand the behavior of structures under dynamic loading which will be useful in the analysis and design of structures subjected to wind and earthquake.

Text Book(s):

- 1. "Structural Dynamics", Mario Paz, CBS publishers.
- 2. "Structural Dynamics: Vibrations & Systems", M. Mukhopadhaya, Anne Books Pvt. Ltd.

Reference Book(s):

- 1. "Structural Dynamics", Clough & Penzien, Tata Mc Graw Hill.
- 2. "Dynamics of Structures Theory and Application to Earthquake Engineering", Anil K. Chopra, Pearson Education, 2nd Edition.

Course Name:	Stability	Stability of Structures					
Correct Corles	CIV 225	Credit Structure .	L	Т	P (С	
Course Coue:	CIV 525	Crean Structure :	3	0	0	3	

Course Description: This course deals with the buckling behavior of columns, beam column, frames and plates. The student should have prior knowledge of strength of material for this course.

This course consists beam column, Euler's differential equation, elastic buckling of bars and frame, inelastic buckling of bars, lateral buckling of beam, bending of thin plates, buckling of plates and critical load for various boundary conditions.

Text Book(s):

1. "Theory of Elastic Stability", Timoshenko. S. P and Gere. J. M, McGraw Hill Book Company, 1981.

- 1. "Principles of Structural Stability Theory", Alexandar Chajes, Prentice Hall, New Jersey, 1980.
- "Structural Stability of Columns and Plates", Iyenger, N. G. R., Affiliated East West Press Pre
- 3. "Buckling Strength of Metal Structures", Bleich F., McGraw Hill 1991.
- 4. "Stability Analysis and Design of Structures", Gambhir, Springer, New York, 2004.

Course Name:	Theory	of Elasticity				
Course Code:	CIV 326	Cradit Structura .	L	Т	P	С
Course Coue:	CIV 520	Crean Structure:	3	0	0	3

Course Description: The main objective of the course is to advance knowledge of mechanics of deformed bodies. This course also deals with polar coordinate system which will help in designing the various component.

The student should have a prior knowledge of basic mathematics, strength of material, solid mechanics.

This course consists basic concept of deformed bodies, equilibrium equation in 2D and 3D Cartesian coordinates, plane stress, plane strain, problems in 2D rectangular coordinate, solution by polynomials, problems in 2D polar coordinate, stress distribution, torsion of non-circular section, stress concentration, application to thin and thick cylinders under internal pressure.

Text Book(s):

1. "Theory of Elasticity and Plasticity", Timoshenko and Goodier, McGraw-Hill, 2006.

Reference Book(s):

- 1. "Computation Elasticity", Mohammed Amin, Narosa Publications, 2005.
- 2. "Plasticity for Structural Engineers", Chen and Han, Springer Verlag, 1998.
- 3. "Theory of Isotropic/Orthotropic Elasticity, An Introductory Primer", K. Baskar, T.K. Varadan, Anne books Pvt. Ltd., 2009.
- 4. "Theory of Plasticity", Chakrabarty. J., Elsevier Butterworth-Heinmann-UK, Third Edition, 2006.

Course Name:	Climate Change and	Climate Change and Sustainable Development					
Course Code	CIV 328	Cradit Structura .	L	Т	Р	C	
Course Coue:	CIV 520	Crean Structure :	3	0	0	3	

Course Description: This course deals with the introduction to Climatic change and Sustainable development, Life cycle Analysis and overview of key concepts in Climatic change and Sustainable development, Climate risks due to climate change, Climatic mitigations for sustainable development, Nexus of climate change and sustainable development, Tools for analysis and Development for Sustainable development, Climatic adaptations to reduce vulnerability of social and biological systems with concluding remarks. For doing this Course basic knowledge of Environmental Science is required.

Text Book(s):

1. "Climate Change and Sustainable Development", R.K. Pachauri, OXFORD University Press.

- 1. "Climate Change and Sustainable Development", Mohan Munasinghe.
- 2. "Biodiversity and sustainable Development", M.L. Narasaiah, Discovery publishing House, New Delhi.

Course Name:	Urban Flooding:	Analysis and Control	SENCY UNILED
Course Code:	CIV 329	Credit Structure :	RESTRATE 3 0 REALS

Course Description: This course helps the students to learn to identify causes of urban flooding, effective and efficient methodology to combat this anthropogenic phenomenon with technology enabled non-structural measures. Urban flooding models. Basic and practical knowledge of urban flood risk management in India; characteristics of urban flood (including inundation by flooding), countermeasures against urban flood. Case studies of National and International cities with reference to Initiatives, planning, design, execution, monitoring.

Text Book(s):

1. "Urban Drainage", Butler, D. and Davies, J.W., Spon Press, 2nd Edition. 2004.

Reference Book(s):

- 1. "Urban Hydrology, Hydraulics and Stormwater Quality Engineering Applications and Computer Modeling", Akan A.O and Hioughtalen R.J., John Wiley & Sons 2003.
- 2. "Urban Hydrology", Hall, M.J. Elsevier, 1984.
- 3. *"Training Module on Urban Risk Mitigation"*, Chandrani Bandyopadhyay, National Institute of Disaster Management, Ministry of Home Affairs, New Delhi, 2014.

Course Name:	Urban Air Pollution and Control							
Course Code:	CIV 330	Credit Structure :	L	Т	Р	С		
			3	0	0	3		

Course Description: The overall objective of the course is to provide understanding of sources and effects of air pollution, air pollutants and their effects, air pollution episodes, meteorology, plume behavior, windrose diagrams, air pollution control equipment for particulate matter & gaseous pollutants.

This Course helps student to assess impact of air pollution on environment and their control.

The students having good knowledge on air pollution can easily understand this Course.

Text Book(s):

1. "Air pollution and control", M N Rao, McGraw Hill Publication

Reference Book(s):

1. "Environment pollution and control Engineering", C S Rao, New age international publishers.

Course Name:	Urban Waste Management							
Course Code:	CIV 331	Credit Structure :	L	Т	Р	C		
			3	0	0	3		

Course Description: This Course helps student to deal with the identification, characterization and regulatory requirements for disposal of hazardous, non-hazardous and domestic wastes. Previous knowledge of soil mechanics and environmental engineering is helpful in pursuing the Course.

The Course includes causes and effects of subsurface contamination, waste disposal on land: waste management-recycling, composting, incineration and various disposal methods, characteristics of solid wastes; waste containment principles; site selection and geo-environmental investigations natural attenuation process and mechanism of attenuation, types of landfills; planning of landfills; design of lines.
and covers for landfills; environmental monitoring around landfills; detection, control and remediation of subsurface contamination; geotechnical re-use of solid waste materials.

It also includes application of geosynthetics in waste disposal design, types of geosynthetics, testing and evaluation; designing with geotextiles, geogrids, geonets and geomembranes, leachate collection and detection system, landfill construction etc.

Text Book(s):

- 1. Lakshmi Reddi, Hilary I. Inyang, "*Geoenvironmental Engineering: Principles and Applications*", Marcel Dekkar, New York.
- 2. George Tchobanoglous, Hilary Theisen, Samuel A Vigil, "Integrated Solid Waste Management: Engineering principles and management issues, Mc Graw Hill Education. Indian edition

Reference Book(s):

- 1. H.D. Sharma and K. Reddy, "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies".
- 2. R.N. Yong and H.R. Thomas, "Geoenvironmental Engineering contaminated ground: Fate of pollutants and remediation", Thomas Telford, London
- 3. George Tchobanoglous and Frank Kreith, *"Handbook of solid waste management"*, McGraw-Hill Handbook.
- 4. Municipal Solid waste management manual, Part II published under Swachh Bharat Mission, Central Public Health and Environmental Engineering Organization (CPHEEO), 2016, Ministry of Urban Development, Government of India.

Course Name:	Open Channel Flow					
Course Codes	CIV 332	Cradit Structura .	L	Т	Р	С
Course Coue:	017 332	Crean Structure :	3	0	0	3

Course Description: Introduction to kinds of open channel flows and properties like specific energy, force, etc. – Uniform flow – Gradually varied flow – Rapidly varied flow – Hydraulic Jumps – Turbines and Pumps. To describe the various types of flows in open channels. To describe velocity distribution across and along the channel. To understand hydraulic jumps. To understand the application of turbines and pumps

Text Book(s):

1. "Hydraulics and Fluid Mechanics Including Hydraulics Machines", P.N. Modi and S.M. Seth, Standard Book House, 2002

- 1. "A Textbook of Fluid Mechanics", R.K. Bansal, S. Chand
- 2. "Flow in open channels", K. Subramanya, Tata McGraw Hill



3.5 COURSES FOR OPEN ELECTIVES

Course Name:	Geographical Information Systems					
Course Coder	CIV 380	Cradit Structure :	L	Т	Р	С
Course Coue.	CIV 380	crean su acture.	3	0	0	3

Course Description: This course enables the students to explore the various ways in which remote sensing systems provide geospatial information that is relevant, accurate, timely, accessible and available in an appropriate format. Recent developments in Earth observation such as imaging radar, LIDAR and hyper-spectral sensors are increasing the wealth of information that can be generated from remotely sensed data sources. As a consequence, numerous new GIS applications that rely on advanced remotely sensed data sources have emerged at local, regional and global scales. Topics include the use of remote sensing data, platforms and sensors, photogrammetry, image interpretation and processing techniques, fundamentals of GIS and spatial data analysis and applications of remote sensing and GIS in environment and urban applications.

Text Book(s):

- 1. Lillesand, T.M. and Kieffer, R.W., "*Remote Sensing and Image Interpretation*", 5th Edition, Wiley, New York, 2003.
- 2. Chakraborty and Sahoo, "Fundamentals of Geographic Information Systems", Viva Books Private Limited, India, 2008.

Reference Book(s):

- 1. John R. Jensen, "Remote Sensing of the Environment", Prentice Hall, 2000.
- 2. Magwire, D. J., Goodchild, M.F. and Rhind, D. W., "Geographical Information Systems: Principles and Applications", Longman Group, U.K., 1991

Course Name:	Environmental	Impact Assessment				
Course Coder	CIV 280	Cradit Structure :	L	Т	Р	C
Course Coue.		Crean Structure.	3	0	0	3

Course Description: The main objective of this Course to assess the impact of any engineering projects on the environment. The students having basic concepts of pollution and environment can easily pursue this Course.

This Course introduces the methodology of environmental impact assessment (EIA) as a vital tool for sound environmental management and decision-making. The Course provides an overview of the concepts, methods, issues and various forms and stages of the EIA process. It examines the development of EIA overseas and in India. Different levels and systems of EIA are examined to highlight the diversity of approach and impact of the EIA process.

This Course helps student to assess impact of engineering projects on environment and to prepare EIA report on any projects.

Text Book(s):

1. Larry W Canter, "Environment impact Assessment", McGraw Hill Publication

Reference Book(s):

1. Jain R.K – Van, "Environment impact Analysis", Nostrand Reinhold Co

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Course Name:	Sustainable Material and Green Buildings						
Course Codor	CIV 281	Cradit Structure	L	Т	Р	С	
Course Coue:	CIV 201	Crean Structure :	3	0	0	3	

Course Description: The purpose of the Course is to provide an overview of emerging delivery systems for high performance green buildings and the basis on which their sustainability can be evaluated.

The Course deals with introduction and definition of sustainability, carbon cycle and the role of construction materials such as concrete and steel etc., CO_2 contribution from cement and other construction materials, construction materials and indoor air quality, no/low cement concrete, recycled and manufactured aggregate, role of QC and durability, life cycle and sustainability, components of embodied energy, calculation of embodied energy for construction materials, life cycle energy use, control of energy use in building, role of insulation and thermal properties of construction materials, influence of moisture content and modelling, performance ratings of green buildings, zero energy building etc.

The students having studied air pollution and water pollution can easily understand this Course.

Text Book(s):

1. Charles J. kibert, "Sustainable Construction: Green Building Design and Delivery", Wiley Publication

Reference Book(s):

1. Traci Rose Rider, "Understanding Green Building Guidelines: For Students and Young Professionals", W.W Norton and Company.

Course Name:	Construction Project Management						
Course Code:	CIV 381	CIV 281 Credit Structure	L	Т	Р	С	
	CIV 381	Crean Structure :	3	0	0	3	

Course Description: This Course is designed to give an idea of the management aspects of the construction projects.

The Course includes introduction to construction projects, stakeholders, phases in a project, Cost estimation from clients perspective, Project selection using time value of money concept, construction contract, cost estimate –contractors perspective, Project planning and network analysis-PERT,CPM, and Precedence Network, Resource scheduling, Time Cost trade off, Time -cost monitoring and control using S-curve and earned value analysis, Construction claims and disputes, and introduction to construction quality and safety.

Text Book(s):

1. KN Jha, "Construction Project Management – Theory and Practice", Pearson

- 1. Sengupta, B. and Guha, H, "Construction Management and Planning", Tata McGraw Hill, New Delhi.
- 2. Jebsen, J, "Cost and Optimisation Engineering", McGraw Hill, New York.
- 3. Moder, J.J. and Phillips, C.R., "Project Management with CPM and PERT".

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Course Name:	Hazardous Waste Treatment					
Course Code	CIV 282	Cradit Structure .	L	Т	Р	С
Course Coue.	CIV 202	Crean Structure.	3	0	0	3

Course Description: To understand the main sources form where waste is derived, to appreciate the problems associated with waste disposal, to analyse waste reduction methods during the production phase and during the disposal cycle of a product. To be aware of the move towards waste minimization techniques and the resulting overall benefits these will provide society. The student will acquire a range of practical skill and knowledge to be able to apply waste reduction methods in their own environment and also to an industrial/business enterprise.

Reference Book(s):

- 1. John Pichtel, "Waste Management Practices", CRC Press, Taylor and Francis Group 2005
- 2. LaGrega, M.D. Buckingham, P.L. and Evans, J.C. "Hazardous Waste Management", McGraw Hill International Editions, New York, 1994.
- 3. Richard J. Watts, "Hazardous Wastes Sources, Pathways, Receptors", John Wiley and Sons, New York, 1997.

Course Name:	Elements of Cons	truction Management				
Course Codes	CIV 283	Cradit Structure :	L	Т	Р	С
Course Coue:	CI V 203	Crean Structure :	3	0	0	3

Course Description: This course focusses on management aspects of construction project such as organization, quality management, safety and risk management.

This course will include Introduction to Construction Projects: Concept, Project Categories, Characteristic of projects, project life cycle phase, Project Management- Project Management Function, Role of Project Manager, Organizing for Construction - Principles of organization, type of organization structure. This will also include Project Feasibility Reports, Construction Quality, Inspection and Testing, Quality control, Quality Assurance, Total Quality Management, Critical factors of TQM, TQM in Projects, Benchmarking, concepts of quality policy, standards, manual, and Quality philosophy.

This course will also emphasize on Safety in Construction: Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report. Types of injuries, Factors affecting safety, Strategic Planning for safety provisions. Personal & Structural safety -Safety consideration during construction, demolition and during use of equipment. Recording injuries and accident indices. Risk and Decision Analysis, Risk mitigation, Decision tree analysis, Monte carlo simulations etc.

Text Book(s):

1. Kumar Neeraj Jha, "Construction Project Management", Pearson. Second Edition

- 1. David Gold Smith, "Safety Management in construction and Industry", Mc Graw Hill
- K N Vaid, "Construction Safety Management", NICMAR, Bombay 2.
- 3. N. Logothetis, "Management for Total Quality", Prentice Hall 2. David Gold Smith, REGISTRAR Management in construction and Industry", Mc Graw Hill

4. Guide, A., 2001. Project Management Body of Knowledge (PMBOK® GUIDE). InProject Management Institute

Course Name:	Systems Design for Environment and Sustainability						
Course Code:	CIV 382	Credit Structure L	Т	Р	С		
	CIV 382	crean su acture.	3	0	0	3	

Course Description: This course provides impetus in enhancing design thinking process among students for widening the boundaries of the objective of design so as to contribute positively to sustainable development. This course will discuss the Design approaches, methods and tools along with case examples with reference to Selection of resources with low environmental impact; Design of products with low environmental impact; and Product-Service System Design for eco-efficiency. This course has been designed to teach about environment, energy and economy through the use of case studies, computer software tools, and seminars from the point of view of sustainable development and changing societal, industrial demands. Case studies provide the basis for group projects as well as individual projects.

Reference Book(s):

- 1. Kostas Voudouris and Dimitra Voutsa, "Ecological Water Quality (Water Treatment and Reuse)"
- 2. Metcalf and Eddy, "Wastewater Engineering", McGraw Hill Publication.
- 3. Williams J. Palm, "MATLAB for Engineering Application", Tata McGraw Hill Publication.
- 4. S. A. Abbasi, "Application of GIS and Remote Sensing in Environmental Management", DPH Publications.
- 5. John Harte, "*Consider a Cylindrical Cow: More Adventures in Environmental Problem Solving*", Mill Valley, CA: University Science Books, 2001.
- 6. Fay, James A., and Dan S. Golomb, "*Energy and the Environment*", New York, NY: Oxford University Press, 2002
- 7. Etter, Dolores, "Introduction to MATLAB for Engineers and Scientists", Upper Saddle River, NJ: Prentice Hall, 1996
- 8. Etter, Dolores, David Kuncicky, and Holly Moore, *"Engineering Problem Solving with MATLAB"*, Upper Saddle River, NJ: Prentice Hall, 2006.
- 9. Howard S. Peavy, Donald R. Rowe, George Tchobanoglous, "*Environmental Engineering*", McGraw Higher Ed. ISBN: 9789351340263

Course Name:	Infrastructure Systems for Smart Cities						
Course Code	CIV 383	Cradit Structura :	L	Т	Р	С	
Course Coue:	01 v 303	Crean Structure :	3	0	0	3	

Course Description: This course helps the students to learn to identify urban problems, effective and feasible ways to coordinate urban technologies, various types of models and methods for effective implementation of smart cities concepts with new technologies for communication and dissemination. New forms of Urban Governance and Organization.

- 1. "A city for all: valuing differences and working with diversity", Jo Beall (1997), Zed books limited, London (ISBN: 1-85649-477-2).
- 2. "Inclusive and sustainable urban planning: a guide for Municipalities", UN-Hathat, Volume 3: Urban Development Planning (2007), United Nations Human Settlements Programme (ISBN: 978-92-1-132024-4).

- 3. Arup Mitra, "Insights into inclusive growth, employment and wellbeing in India", Springer (2013), New Delhi (ISBN: 978-81-322-0655-2).
- 4. "Urban Planning and cultural identity", William J. V. Neill (2004), Routledge, London (ISBN: 0-415-19747-3).
- 5. *"Remaking the city: Social science perspective on urban design",* John S. Pipkin, Mark E. La Gory, Judith R. Balu (Editors), State University of New York Press, Albany (ISBN: 0-87395-678-8).
- "Smart cities Ranking of European medium-sized cities", Giffinger, Rudolf, Christian Fertner, Hans Kramar, Robert Kalasek; Nataša Pichler-Milanovic, Evert Meijers, Vienna: Centre of Regional Science, (2007).
- "Draft Concept Note on Smart City Scheme", Government of India Ministry of Urban Development (https://www.smartcitiesoftomorrow.com/wp-content/uploads/2014/09/CONCEPT_NOTE_-3.12.2014__REVISED_AND_LATEST_.pdf)

Course Name:	Digital Land Sur	veying And Mapping				
Course Coder	CIV 226	Cradit Structure :	L	Т	Р	С
Course Coue.		Crean Structure.	2	0	0	2

Course Description: This course deals with the basics of digital surveying and mapping of earth surface using total station, GPS and mapping software. The course covers introduction to land surveying, fundamentals of total station and its working & measurements for land surveying. The course also exposes students to the fundamentals, working & measurements using GPS for land surveying. The course also covers the concept of mapping fundamentals, digital surveying procedure, working and data reduction.

Text Book(s):

1. P. K. Garg, "Digital Land Surveying and Mapping", New Age International Private Limited

Reference Book(s):

- 1. Jan Van Sickle, "GPS for Land Surveyors", 4th Edition, CRC Press
- 2. Christian Tiberius, Hans van der Marel, René Reudink and Freek van Leijen, "Surveying and Mapping", TU Delft OPEN, TU Delft Open Textbook, Delft University of Technology The Netherlands

Course Name:	Safety in Construction					
Course Code:		L	Т	Р	С	
Course Coue:		Crean Structure :	2	0	0	2

Course Description: Despite progress in safety equipment and training, the Construction industry bears the reputation of being incredibly dangerous to workers with high number of injuries and fatalities reported each year. To address the shortcomings and hazards at workplace, this course introduces latest safety and health regulations and the Indian Standards applicable to the construction industry. Topics include planning for safety, OSHA regulations, development of safe operating procedures, identification and containment of various hazards. The course will provide insights to plan, assess, analyze and manage the hazardous construction project sites.

Text Book(s):

1. Kwaku, A., Tenah, Jose, M. Guevara, "Fundamentals of Construction Management and Organization", Reston Publishing Co., Inc., Virginia, 1985.

- 2. Juran Frank, J.M. and Gryna, F.M, "Quality Planning and Analysis", Tata McGraw Hill, 1982.
- 3. Hutchins.G, "ISO 9000", Viva Books, New Delhi, 1993.
- 4. Clarkson H. Ogiesby, "Productivity Improvement in Construction", McGraw-Hill, 1989.
- 5. Jimmy W. Hinze, "Construction Safety", Prentice Hall Inc., 1997
- 6. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, "*Construction Safety and Health Management*", Prentice Hall Inc., 2001.

- 1. James, J.O Brian, "Construction Inspection Handbook Quality Assurance and Quality Control", Van Nostrand, New York, 1989.
- 2. "Hand Book on Construction Safety Practices", SP 70, BIS 2001

