## **Study & Evaluation Scheme**

## of

## Bachelor of Technology (Civil Engineering)

[Applicable w.e.f. Academic Session - 2020-21 till revised] [As per CBCS guidelines given by AICTE]



## **TEERTHANKER MAHAVEER UNIVERSITY**

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## TEERTHANKER MAHAVEER UNIVERSITY (Established under Govt. of U.P. Act No. 30, 2008) Delhi Road, Bagarpur, Moradabad (U.P.)

<u>Stua</u>	Study & Evaluation Scheme						
	<u>SUMMARY</u>						
Institute Name	Faculty of Engineering						
Programme	B.Tech (Civil Engineering)						
Duration	Four-year full time (Eight Semesters)						
Medium	English						
Minimum Required Attendance	75%						
	<u>Credits</u>						
Maximum Credits	180						
Minimum Credits Required for Degree	172						

		Assessmen	t:			
Evaluation			Internal	External	Total	
Theory			40	60	100	
Practical/ Dissertations/ Project Reports/ Viva-Voce			50	50	100	
Class Test-1	Class Test-2	Class Test-3	Assignment(s)	Total		
	Best two out of	hree		Participation		
10	10	10	10	10	40	
Duration of Examination			External	Intern	al	
Duration of Exa	Duration of Examination			1.5 Hours		

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation (i.e. both internal and external).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester. # Provision for delivery of 25% content through online mode.

# Policy regarding promoting the students from semester to semester & year to year. No specific condition to earn the credit for promoting the students from one semester to next semester.
# Maximum no of years required to complete the program: N+2 (N=No of years for program)

	Question Paper Structure					
1	The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.					
2	Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.					
3	The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.					
	IMPORTANT NOTES:					
1	The purpose of examination should be to assess the Course Outcomes (CO) that will ultimately lead to of attainment of Programme Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (reference to Bloom's Taxonomy).					
2	Case Study is essential in every question paper (wherever it is being taught as a part of pedagogy) for evaluating higher-order learning. Not all the courses might have case teaching method used as pedagogy.					
3	There shall be continuous evaluation of the student and there will be a provision of fortnight progress report.					

## **Program Structure-B.Tech- Civil Engineering**

### A. Introduction:

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewerage systems, pipelines, structural components of buildings, and railways. Employability, innovation, theory to practice connectedness is the central focus of B.Tech- Civil engineering curriculum. The curriculum is designed as such that the students can gain an in-depth mastery of the academic disciplines and applied functional areas necessary to meet the requirements of the industry.

Students will develop and gain various skills that are transferable within the engineering world and practical skills that are equally useful in plenty of other sectors. Problem-solving skills are honed, and their interpersonal and communication skills will also improve with the amount of team work that they will be required to do. Students will also learn how to better manage their time and resources and assess the risks involved in a certain project. Other useful skills that they will learn include design, leadership and organisational skills.

The institute emphasis on the following courses *balanced with core and elective courses*: The curriculum of B.Tech program emphasizes an intensive, flexible engineering education with 145 credits of core courses (all types), 23 credits of electives and 12 credits of field/internship projects. Total 180 credits are allotted for the B.Tech. degree.

The programme structure and credits for B.Tech are finalized based on the stakeholders' requirements and general structure of the programme. Minimum number of classroom contact teaching credits for the B.Tech. program will be 168 credits (one credit equals 1.0 hour) and Project/internship will be of 12 credits. However, the minimum number of the credits for award of B.Tech degree will be 172 credits. Out of 168 credits of classroom contact teaching, 74 credits are to be allotted for core courses (CC), 16 credits are allotted to Basic Science Courses (BSC), 15 credits are allotted to Engineering Science Courses (ESC), 04 credits are allotted to Mandatory Courses (MC), 06 credits are allotted to open elective courses (OEC), 14 credits are allotted to Humanities and Social Sciences including Management courses (HSMC), 17 credits are allotted to Professional Elective courses and rest of 22 credits for Laboratory courses. Credits distribution is given below in tabular form:

	B.Tech Civil Engin	neering: Four-Year (8-Semester) CBCS Programme	2			
	Bas	ic Structure: Distribution of Courses				
S.No.	Type of Course	Credit Hours	Total Credits			
1	BSC - Basic Science Courses	4 Courses of 4 Credits each (Total Credit Hrs. 4X4)	16			
2	ESC - Engineering3 Courses of 4 Credits each (Total Credit Hrs. 3X4)Science Courses1 Courses of 3 Credits each (Total Credit Hrs. 1X3)					
3	HSMC - Humanities and Social Sciences including Management courses	4 Courses of 3 Credits each (Total Credit Hrs. 4X3) 1 Course of 2 Credits each (Total Credit Hrs.1X2)	14			
4	PCC - Professional core courses	10 Courses of 3 Credits each (Total Credit Hrs. 10X3) 11 Courses of 4 Credits each (Total Credit Hrs. 11X4)	74			
5	PEC - Professional Elective courses	<ul><li>2 Courses of 4 Credits each (Total Credit Hrs. 2X4)</li><li>3 Course of 3 Credits each (Total Credit Hrs. 3X1)</li></ul>	17			
6	OEC - Open Elective courses	2 Course of 3 Credits each (Total Credit Hrs.2X3)	06			
7	Value Added Course (VAC)	6 Courses of 0 Credits each (Total Credit Hrs. 6X0)	0			
8	LC - Laboratory course	18 Courses of 1 Credits each (Total Credit Hrs. 18X1) 2 Courses of 2 Credits each (Total Credit Hrs. 2X2)	22			
9	MC-Mandatory Courses	1 Course of 3 Credits each (Total Credit Hrs.1X3) 1 Course of 1 Credits each (Total Credit Hrs.1X1)	04			
10	PROJ-Skill based practical training & Industrial Training Report & Viva Voce for Dissertation	1 Course of 5 Credits each (Total Credit Hrs. 1X5) 1 Course of 3 Credits each (Total Credit Hrs. 1X3) 2 Course of 2 Credits each (Total Credit Hrs. 2X2)	12			
11	MOOC-Optional (credits will consider only in case a student fails to secure minimum required credits for the award of degree)	4 Course of 0 Credits each (Total Credit Hrs. 4X0)				
		Total Credits	180			

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

## **B. Tech (Honours) Programme:**

A new academic programme B.Tech (Hons.) is introduced in order to facilitate the students to choose additionally the specialized courses of their choices and build their competence in a specialized area. The features of the new programme, include:

- 1. B.Tech Student in regular stream can opt for B.Tech (Hons.), provided he/she passed in all courses with minimum aggregate 75% marks upto the end of second semester.
- 2. For B. Tech (Hons), Student needs to earn additional 24 credits (over and above the required minimum 180 credits) relevant to her/his discipline as recommended by the faculty advisor.
- **3.** The students opting for this program have to take four additional courses of their specialization of a minimum of 2 credits each from 3rd to 8th semesters.

- **4.** The faculty advisor will suggest the additional courses to be taken by the students based on their choice and level of their academic competence.
- **5.** The list of such additional courses offered by the NPTEL will be approved by the Honourable Vice Chancellor in the beginning of the academic year to facilitate the registration process.
- 6. The student can also opt for post graduate level courses.
- 7. The students have to submit the NPTEL course completion certificate to exam division for considering as B.Tech (Hons)
- \* Student should have to take permission of registration for the B.Tech. (Hons.) degree from

Honourable Vice Chancellor in starting of third semester.

## C. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his/her target number of credits as specified by the AICTE/UGC and adopted by our University.

The following is the course module designed for the B.Tech program:

• *Program Core Course (PCC):* Core courses of B.Tech program will provide a holistic approach to engineering education, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish technical knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.

The core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the society at large.

A wide range of core courses provides groundwork in the basic civil engineering disciplines: surveying, transportation engineering, structural engineering, geotechnical engineering, environmental engineering, hydraulic engineering, etc.

We offer core courses in semester III, IV, V, VI, VII &VIII during the B.Tech (Civil) program. There will be 3 or 4 credits for each core course offered depending upon the course content.

- *HSMC (Humanities and Social Sciences including Management courses):* As per the AICTE guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the *Humanities and Social Sciences including Management courses* are actually Ability Enhancement Compulsory Course (AECC) which is designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture. We offered four HSMCs of 3& 2 credits in I, II, IV, VI semesters.
- *Skill Enhancement Course:* This course may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge. We offer one SECs course as Lab- one each in VII Semester. One SEC will carry 2 credits each.
- Open Elective Course (OEC): Open Elective is an interdisciplinary additional subject that is compulsory in a program. The score of Open Elective is counted in the overall aggregate marks under Choice Based Credit System (CBCS). Each Open Elective paper will be of 3 Credits in VII and VIII semesters. Each student has to take Open/Generic Electives from department other than the parent department. Core / Discipline Specific Electives will not be offered as Open Electives.

- *Mandatory Course (MC):* This is a compulsory course that does not have any choice and will be of 2& 3 credits. Each student of B.Tech Program has to compulsorily pass the Survey Camp & Environmental Studies and acquire 2 & 3 credits respectively.
- *Value Added Course (VAC):* A Value-Added Course is a non-credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be four courses of Aptitude in Semester III, IV, V & VI semesters and two courses of Soft Skills in V &VI Semesters and will carry no credit, however, it will be compulsory for every student to pass these courses with minimum 45% marks to be eligible for the certificate. These marks will not be included in the calculation of CGPI. Students have to specifically be registered in the specific course of the respective semesters.
- **Professional Elective courses (PEC):** The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain like thermo-fluids, designing, industrial, production management etc. It will be covered in two semesters (VII &VIII) of fourth year of the program relevant to chosen disciplines of core courses of the program. The student will have to choose any five theories out of the given list of specialization offered. Each theory of 3 & 4 credits.

PO – 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO – 2	<b>Problem analysis&amp; Solving:</b> Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO – 3	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems:</b> 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	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO – 6	<b>Social Interaction &amp; effective citizenship:</b> 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	<b>Environment and sustainability:</b> 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	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

#### **D. Program Outcomes for Engineering:**

PO – 9	Attitude (Individual and team work): Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
	Communication: Communicate effectively on complex engineering activities with the
PO – 10	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 clean instructions.
	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the
PO 11	engineering and management principles and apply these to one's own work, as a
10-11	member and leader in a team, to manage projects and in multidisciplinary
	environments.
	Life-long learning: Recognize the need for, and have the preparation and ability to
PO – 12	engage in independent and life-long learning in the broadest context of technological
	change.
	Entrepreneurship: An Entrepreneurship cut across every sector of human life
DO 12	including the field of engineering, engineering entrepreneurship is the process of
PO13	harnessing the business opportunities in engineering and turning it into profitable
	commercially viable innovation.
	Interpersonal skills: Interpersonal skills involve the ability to communicate and build
PO14	relationships with others. Effective interpersonal skills can help the students during the
	job interview process and can have a positive impact on your career advancement.
	Technology savvy/usage: Being technology savvy is essentially one's skill to be
DO 15	smart with technology. This skill reaches far beyond 'understanding' the concepts of
PO15	how technology works and encompasses the 'utilization' of such modern technology
	for the purpose of enhancing productivity and efficiency.

## E. Programme Specific Outcomes (PSOs)

The learning and abilities or skills that a student would have developed by the end of four-year **B.Tech Program:** 

<b>PSO</b> – 1	Understanding and Remembering fundamental concepts of assigned courses of each semester.
<b>PSO – 2</b>	<b>Designing,</b> supervising, testing and evaluating foundations and superstructures for residences, public buildings, industries, irrigation structures, powerhouses, highways, railways, airways, docks and harbours.
<b>PSO – 3</b>	<b>Designing</b> building by survey, map and plan layouts for buildings, structures and alignments for canals and roads.
<b>PSO</b> – 4	<b>Analyzing</b> water resources hydrological systems to estimate safe and assured withdrawals, and specify, design, and evaluate water conveying systems, hydraulic machines and surge systems.
<b>PSO – 5</b>	Specifying, selecting and formulating environmental engineering systems.

## F. Pedagogy & Unique practices adopted:

"Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will emphasize on experiential learning.

• *Audio-Visual Based Learning:* These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through video lectures. In fact, many teachers give examples from movies during their discourses. Making students learn few important

theoretical concepts through Audio visual Aids is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting *Audio-Visual Based Learning* wherever possible.

- *Field / Live Projects*: The students, who take up experiential projects in companies, where senior executives with a stake in teaching guide them, drive the learning. All students are encouraged to do some live project other than their regular classes.
- *Industrial Visits:* Industrial visit are essential to give students hand-on exposure and experience of how things and processes work in industries. Our institute organizes such visits to enhance students' exposure to practical learning and work out for a report of such a visit relating to their specific topic, course or even domain.
- *MOOCs:* Students may earn credits by passing MOOCs as decided by the college. Graduate level programs may award Honors degree provided students earn pre-requisite credits through MOOCs.

University allows students to undertake additional subjects/course(s) (In-house offered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

Keeping this in mind, University proposed and allowed a maximum of two credits to be allocated for each MOOC courses. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through only NPTEL could be given 2 credits for each MOOC course.

For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the College from time to time.

- a) This is recommended for every student to take at least one MOOC Course throughout the programme.
- **b)** There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department being members of the Committee.
- c) The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalize a list of courses to be offered with 2 credits defined for each course and the mode of credit consideration of the student. The complete process shall be obtained by the College before end of June and end of December for Odd and Even semester respectively of the year in which the course is being offered. In case of MOOC course, the approval will be valid only for the semester on offer.
- **d)** Students will register for the course and the details of the students enrolling under the course along with the approval of the Vice Chancellor will be forwarded to the Examination department within fifteen days of start of the semester by the Coordinator MOOC through the Principal of the College.
- e) After completion of MOOC course, Student will submit the photo copy of Completion certificate of MOOC Course to the Examination cell as proof.
- f) Marks will be considered which is mentioned on Completion certificate of MOOC Course.
- **g)** College will consider the credits only in case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree.
- Special Guest Lectures (SGL) & Extra Mural Lectures (EML): Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry we organize such lectures, as part of lecture-

series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and insights.

- *Student Development Programs (SDP):* Harnessing and developing the right talent for the right industry an overall development of a student is required. Apart from the curriculum teaching various student development programs (training programs) relating to soft skills, interview skills, SAP, Advanced excel training etc. that may be required as per the need of the student and industry trends, are conducted across the whole program. Participation in such programs is solicited through volunteering and consensus.
- *Industry Focused programs:* Establishing collaborations with various industry partners to deliver the programme on sharing basis. The specific courses are to be delivered by industry experts to provide practice-based insight to the students.
- *Special assistance program for slow learners & fast learners:* There is a provision of identify slow learners; develop the mechanism to correcting knowledge gap through result analysis of various class tests. Extra classes will be arranged for slow learners and facilitate them with required study material. There are some terms of advance topics what learning challenging it will be provided to the fast learners.
- *Induction program:* Every year 3 weeks induction program is organized for 1<sup>st</sup> year students to make them familiarize with the entire academic environment of university including Curriculum, Classrooms, Labs, Faculty/ Staff members, Academic calendar and various activities.
- **Mentoring scheme:** There is Mentor-Mentee system. One mentor lecture is provided per week in a class. Students can discuss their problems with mentor who is necessarily a teaching faculty. In this way, student's problems or issues can be identified and resolved.
- Extra-curricular Activities: organizing& participation in extracurricular activities will be mandatory to help students develop confidence & face audience boldly. It brings out their leadership qualities along with planning & organizing skills. Students undertake various cultural, sports and other competitive activities within and outside then campus. This helps them build their wholesome personality.
- Career & Personal Counseling: Identifies the problem of student as early as possible and gives time to discuss their problems individually as well as with the parents. Counseling enables the students to focus on behavior and feelings with a goal to facilitate positive change. Its major role lies in giving: Advice, Help, Support, Tips, Assistance, Guidance. Strategies: a) Once in a week the counselors meet the students in order to inquire about problems. b) Available 24x7 on SOS basis.
- Participation in Workshops, Seminars & writing & Presenting Papers: Departments plan to organize the workshops, Seminars & Guest lecturers time to time on their respective topics as per academic calendar. Students must have to attend these programs. These participations would be count in the marks of general Discipline & General Proficiency which is the part of course scheme as noncredit course.
- Formation of Student Clubs, Membership & Organizing & Participating events: Every department has the departmental clubs with the specific club name. The entire student's activity would be performed by the club. One faculty would be the coordinator of the student clubs & students would be the members with different responsibility.
- Capability Enhancement & Development Schemes: The Institute has these schemes to enhance the capability and holistic development of the students. Following measures/ initiatives are taken up from time to time for the same: Career Counseling, Soft skill development, Remedial Coaching, Bridge Course, Language Lab, Yoga and Meditation, Personal Counseling

- Library Visit & Utilization of E-Learning Resources: Student can visit the library from morning 10 AM to evening 8 PM. Library created its resources Database and provided Online Public Access Catalogue (OPAC) through which users can be accessed from any of the computer connected in the LAN can know the status of the book. Now we are in process to move from OPAC to KOHA.
  - a) Institute Library & Information is subscribing online e-books and e-journals databases (DELNET and EBSCO host E-databases) as per the requirement of the institute and fulfilling AICTE norms. IP based access is given to all computers connected on campus LAN to access e-journals.
  - **b)** For the effective utilisation of resources, Information Literacy training programs are conducted to the staff and students.
  - c) Wi-Fi enabled campus
  - d) Regular addition of latest books and journals
  - e) Well maintained e-library to access e-resources

## **Study & Evaluation Scheme**

S. Category		Course Code	Course	I	Periods		Credit	<b>Evaluation Scheme</b>			
No	curregory	course coue		L	T	Р	crean	Internal	External	Total	
1	BSC-1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100	
0		EAS112	Engineering Physics	2	1		4	40	(0)	100	
2	BSC-2	EAS113	Engineering Chemistry	3	1	-	4	40	60	100	
<b>`</b>	ESC 1	EEE117	Basic Electrical Engineering	2	1		4	40	(0)	100	
3	ESC-1	EEC111	Basic Electronics Engineering	3	1	-	4	40	60	100	
4	MC-1	TMU101	Environmental Studies	2	1	-	3	40	60	100	
5	HSMC-1	TMUGE101	English Communication- I	2	-	2	3	40	60	100	
(		EAS162	Engineering Physics (Lab)			2	1	50	50	100	
6	LC-I	EAS163	Engineering Chemistry (Lab)	-	-	2	1	50		100	
_		EEE161	Basic Electrical Engineering (Lab)							100	
7	LC-2	EEC161	Basic Electronics Engineering (Lab)	-	-	2	1	50	50	100	
0		EME161	Engineering Drawing (Lab)			4	2	50	50	100	
ð	LC-3	EME162	Workshop Practice (Lab)	-	-	4	2	50	50	100	
9	DGP-1	EGP111	Discipline & General Proficiency	-	-	-	-	100	-	100	
			Total	13	4	10	22	350	450	800	

## **B.Tech (Civil Engineering)-Semester I**

<i>S</i> .	Categorv	Course Code	Course	Periods		Credit	Eval	uation Scheme			
No	- magery	comse coue		L	T	P	0.0000	Internal	External	Total	
1	BSC-3	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100	
2	DSC 4	EAS212	Engineering Physics	2 1	1		4	40	(0)	100	
2	BSC-4	EAS213	Engineering Chemistry	3	1	-	4	40	60	100	
2	ESC 2	EEE217	Basic Electrical Engineering	2	3 1		4	40	(0)	100	
3	ESC-2	EEC211	Basic Electronics Engineering	3	1	-	4	40	60	100	
4	ESC-3	ECS212	Computer System & Programming in C++	3	-	-	3	40	60	100	
5	HSMC-2	TMUGE201	English Communication- II	2	-	2	3	40	60	100	
(	LC-4	EAS262	Engineering Physics (Lab)			2	1	50	50	100	
0		EAS263	Engineering Chemistry (Lab)	-   -	-	2	1				
_		EEE261	Basic Electrical Engineering (Lab)								100
	LC-5	EEC261	Basic Electronics Engineering (Lab)	-	-	2	1	50	50	100	
8	LC-6	ECS262	Computer System &Programming in C++ (Lab)	-	-	2	1	50	50	100	
0		EME261	Engineering Drawing (Lab)			4	2	50	50	100	
9	LU-/	EME262	Workshop Practice (Lab)	-	-	4	2	50	50	100	
10	DGP-2	EGP211	Discipline & General Proficiency	-	-	-	-	100	-	100	
			Total	14	3	12	23	400	500	900	

## **B.Tech (Civil Engineering)-Semester II**

<i>S</i> .	Catagom	Course	Course	P	erio	ds	Evaluation Scheme					
No	Calegory	Code	Course			P	Credit	Internal	External	Total		
1	PCC-1	ECE311	Fluid Mechanics	3	1	-	4	40	60	100		
2	PCC-2	ECE312	Surveying	3	1	-	4	40	60	100		
3	PCC-3	ECE313	Building Materials& Construction	3	-	-	3	40	60	100		
4	PCC-4	ECE314	Concrete Technology	3	1	-	4	40	60	100		
5	ESC-4	EME311	Engineering Mechanics	3	1	-	4	40	60	100		
6	LC-8	ECE360	Surveying (Lab)	-	-	2	1	50	50	100		
7	LC-9	ECE361	Fluid Mechanics (Lab)	-	-	2	1	50	50	100		
8	LC-10	ECE362	Building Planning and Drawing using CAD (Lab)	-	-	2	1	50	50	100		
9	LC-11	ECE363	Materials Testing (Lab)			2	1	50	50	100		
10	DGP-3	EGP311	Discipline & General Proficiency	-	-	-	-	100	-	100		
			Total	15	4	8	23	400	500	900		

## **B.Tech (Civil Engineering)-Semester III**

# Following additional Course for Lateral Entry Students with B.Sc./Polytechnic background to be taken in III semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100
2		TMU101	Environmental Studies	2	1	-	-	40	60	100

#### Value Added Course:

It is an audit course. The performance of the student in this course will not be counted in the overall result however the student has to pass it compulsorily with 45% marks.

1	VAC-1	TMUGA-301	Foundation in Quantitative Aptitude	2	1	-	-	40	60	100
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<i>S</i> .	Catagowy	Course	Course	P	erio	ds		Evaluatio	n Scheme	
No	Culegory	Code	Course	L	T	P	Credit	Internal	External	Total
1	PCC-5	ECE411	Geoinformatics	3	1	-	4	40	60	100
2	PCC-6	ECE412	Mechanics of Solids	3	1	-	4	40	60	100
3	PCC-7	ECE413	Engineering Geology & Soil Mechanics	3	1	-	4	40	60	100
4	PCC-8	ECE414	Transportation Engineering	3	-	-	3	40	60	100
5	HSMC-3	TMUGE401	English Communication- III	2	-	2	3	40	60	100
6	LC-12	ECE461	Geoinformatics (Lab)	-	-	2	1	50	50	100
7	LC-13	ECE462	Mechanics of Solids (Lab)	-	-	2	1	50	50	100
8	LC-14	ECE463	Engineering Geology & Soil Mechanics (Lab)	-	-	2	1	50	50	100
9	LC-15	ECE464	Transportation Engineering (Lab)	-	-	2	1	50	50	100
10	DGP-4	EGP411	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	14	3	10	22	400	500	900

## **B.Tech (Civil Engineering)-Semester IV**

\*Skill based Training/Internship of 4 weeks duration from a reputed Industry/organization after completion of 4<sup>th</sup> semester end-semester examination.

# Following additional Courses for Lateral Entry Students with B.Sc./Polytechnic background to be taken in IV semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100
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#### \*Value Added Course:

1	VAC-2	TMUGA-401	Analytical Reasoning	2	1	-	-	40	60	100
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<i>S</i> .	Catagory	Course	~	Pe	erioa	ls		Evaluatio	on Scheme	
No	Cutegory	Code	Course	L	T	P	Credit	Internal	External	Total
1	PCC-9	ECE511	Steel Structure-I	3	1	-	4	40	60	100
2	PCC-10	ECE512	Geotechnical Engineering	3	-	-	3	40	60	100
3	PCC-11	ECE513	Structural Analysis-I	3	1	-	4	40	60	100
4	PCC-12	ECE514	RCC Structure-I	3	1	-	4	40	60	100
5	PCC-13	ECE515	Hydrology & Irrigation Engineering	3	-	-	3	40	60	100
6	LC-16	ECE562	Geotechnical Engineering (Lab)	-	-	2	1	50	50	100
7	LC-17	ECE563	Structural Analysis-I (Lab)	-	-	2	1	50	50	100
8	MC-2	ECE564	Survey Camp	-	-	-	1	50	50	100
9	PROJ-1	ECE592	Skill based Practical Training & Presentation	-	-	-	2	50	50	100
10	DGP-5	EGP511	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	15	3	4	23	400	500	900

## B.Tech (Civil Engineering)-Semester V

## \*Value Added Course:

1	VAC-3	TMUGA-501	Modern Algebra and Data Management	2	1	-	-	40	60	100
2	VAC-4	TMUGS-501	Managing Self	2	1	-	-	50	50	100

1	MOOC-1	MOOC01	MOOC Program -I (Optional)	-	-	-	2	-	100	100
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<i>S</i> .	Catal	Course	Comme	P	eriods			Evaluatio	n Scheme	
No	Category	Code	Course	L	Т	Р	Credit	Internal	External	Total
1	PCC-14	ECE611	Steel Structure-II	3	1	-	4	40	60	100
2	PCC-15	ECE612	Public Health & Environmental Engineering	3	-	-	3	40	60	100
3	PCC-16	ECE613	Structural Analysis-II	3	-	-	3	40	60	100
4	PCC-17	ECE614	Estimation & Costing	2	1	-	3	40	60	100
5	PCC-18	ECE615	RCC Structure- II	3	1	-	4	40	60	100
6	HSMC-4	TMUGE601	English Communication- IV	2	-	2	3	40	60	100
7	HSMC-5	EHM613	Human values & Professional Ethics	2	-	-	2	40	60	100
8	LC-18	ECE661	Public Health & Environmental Engineering (Lab)	-	-	2	1	50	50	100
9	LC-19	ECE662	Estimation & Costing (Lab)	-	-	2	1	50	50	100
10	DGP-6	EGP611	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	18	3	6	24	380	520	900

## **B.Tech (Civil Engineering)-Semester VI**

\*Industrial Training of 6 weeks duration from a reputed Industry/organization after completion of  $6^{\text{th}}$  semester end-semester examination.

## \*Value Added Course:

1	VAC-5	TMUGA-601	Advance Algebra and Geometry	2	1	-	-	40	60	100
2	VAC-6	TMUGS-601	Managing Work and Others	2	1	-	-	50	50	100

1	MOOC-2	MOOC02	MOOC Program –II (Optional)	-	-	-	2	-	100	100
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S.	Catagon	Course		Course		Peri	ods		Evaluatio	n Scheme	
•	Calegory	Code		Course	L	T	Р	Credit	Internal	External	Total
1	PCC-19	ECE711	Adva Desi	anced Computer Aided gn (CAD)	3	-	-	3	40	60	100
2	PEC-1		ective	Program Elective-I	3	-	-	3	40	60	100
3	PEC-2		gram El	Program Elective-II	3	-	-	3	40	60	100
4	PEC-3		Pro	Program Elective-III	3	1	-	4	40	60	100
5	OEC-1		Open Flective	Open Elective-I	3	-	-	3	40/50	60/50	100
6	LC-20	ECE761	Anal	ysis & Design (Lab)	-	-	2	1	50	50	100
7	PROJ-2	ECE792	Indu Prese	strial Training & entation	-	-	-	2	50	50	100
8	PROJ-3	ECE798	Proje	ect Work Phase-1	-	-	10	5	100	-	100
9	DGP-7	EGP711	Disc Profi	ipline & General	-	-	-	-	100	-	100
			Tota	l	15	1	12	24	400/410	400/390	800

## **B.Tech (Civil Engineering)-Semester VII**

1	MOOC-3	MOOC03	MOOC Program –III (Optional)	-	-	-	2	-	100	100
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S.	~	Course		~	]	Period	S		Evaluatio	on Scheme	
No	Category	Code		Course	L	Т	Р	Credit	Internal	External	Total
1	PCC-20	ECE811	Project	Planning & Control	3	-	-	3	40	60	100
2	PCC-21	ECE812	Design	of Hydraulic Structures	3	-	-	3	40	60	100
3	PEC-4		ram tive	Program Elective-IV	3	-	-	3	40	60	100
4	PEC-5		Prog Elect	Program Elective-V	3	1	-	4	40	60	100
5	OEC-2		Open Elective	Open Elective-II	3	-	-	3	40/50	60/50	100
6	PROJ-4	ECE898	Project	Work Phase –II	-	-	6	3	50	50	100
7	DGP-8	EGP811	Discipli Proficie	ne & General ncy	-	-	-	-	100	-	100
				Total	15	1	6	19	250/260	350/340	600

## **B.Tech (Civil Engineering)-Semester VIII**

1	MOOC-4	MOOC04	MOOC Program –IV (Optional)	-	-	-	2	-	100	100
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## **ELECTIVE COURSES OFFERED**

S.No	Code	Course				Credit
Sem	ester VII- P	rogram Elective I-(Remote Sensing and Transportation Engi	neer	ing)	-An	y one
1	ECE712	Introduction to Remote Sensing	3	0	0	3
2	ECE713	Pavement Design	3	0	0	3
3	ECE715	Transportation Systems and Planning	3	0	0	3
4	ECE717	Introduction to GIS	3	0	0	3
5	ECE718	Railway and Airport Engineering	3	0	0	3
	Sei	nester VII- Program Elective II– (Structural Engineering)- Ar	iy on	e		
6	ECE719	Earthquake Resistant Structures	3	0	0	3
7	ECE720	Advanced Concrete Design	3	0	0	3
8	ECE721	Pre-stressed Concrete	3	0	0	3
9	ECE722	Finite Element Method	3	0	0	3
10	ECE723	Building Maintenance & Repair			0	3
11	ECE724	Groundwater Management	3	0	0	3
Semester VII- Program Elective III-(Management) - Any one						
12	EHM731	Principle of Management	3	1	0	4
13	EHM735	Industrial Sociology	3	1	0	4
14	EHM734	Engineering and Managerial Economics	3	1	0	4
15	ECE734	34 Solid and HazardousWaste Management		1	0	4
16	ECE735	Disaster Management	3	1	0	4
Sem	ester VIII- ]	Program Elective IV– (Environmental and Geotechnical Engi	neei	ring)	) -An	y one
17	ECE813	Rock Mechanics	3	0	0	3
18	ECE815	Bridge Engineering	3	0	0	3
19	ECE816	Environmental Impact Assessment and Management	3	0	0	3
20	ECE817	Plastic Analysis of Steel Structures	3	0	0	3
21	ECE818	Advanced Foundation Design	3	0	0	3
		Semester VIII- Program Elective V-(Any one)				
22	ECE831	Machine learning & Data Analytics	3	1	0	4
23	EHM832	Total Quality Management	3	1	0	4
24	EHM833	Entrepreneurship	3	1	0	4
25	ECE834	Marine Structures & Airport Engineering	3	1	0	4

<u>Course</u> <u>Code:</u> EAS116	B.Tech- Semester-I Engineering Mathematics-I	L-3 T-1 P-0 C-4			
Course Outcomes:	On completion of the course, the students will be :				
CO1.	<b>Understanding</b> the concepts of eigenvalues and eigenvectors, Optimization & derivatives of functions of several variables, partial and total differentiation, implicit functions.				
CO2.	Understanding the concepts of curl and divergence of vector field.				
CO3.	<b>Understanding</b> of Green's theorem, Gauss Theorem, and Stokes theorem.				
<u>CO4.</u>	Applying the concept of Leibnitz's theorem for successive derivatives.				
CO5.	Analyzing the intangibility of a differential equation to find the optimal solution of first order first degree equations.				
CO6.	<b>Evaluating</b> the double integration and triple integration using Cartesian, polar co-ordinates and the concept of Jacobian of transformation.				
Course Content:					
Unit-1:	<ul> <li>Determinants- Rules of computation; Linear Equations and Cramer's rule.</li> <li>Matrices: Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem (without proof); Eigen values and Eigen vectors; Complex and Unitary matrices.</li> </ul>	8 Hours			
Unit-2:	<b>Differential Equation</b> First order first degree Differential equation: variable separable, Homogeneous method, Linear differential equation method, Exact Differential equation.				
Unit-3:	<b>Differential Calculus:</b> Leibnitz theorem; Partial differentiation; Euler's theorem; Change of variables; Expansion of function of several variables, Jacobians, Error function.	8 Hours			
Unit-4:	<b>Multiple Integrals:</b> Double integral, Triple integral, Beta and Gamma functions; Dirichlet theorem for three variables, Liouville's Extension of Dirichlet theorem.	8 Hours			
Unit-5:	Vector Differentiation: Vector function, Differentiation of vectors, Formulae of Differentiation, Scalar and Vector point function, Geometrical Meaning of Gradient, Normal and Directional Derivative, Divergence of a vector function, Curl of a vector Vector Integration: Green's theorem, Stokes' theorem; Gauss' divergence theorem.	8 Hours			
<u>Text Books:</u>	<ol> <li>Grewal B.S., <i>Higher Engineering Mathematics</i>, Khanna Publishers.</li> </ol>				
<u>Reference</u> <u>Books:</u>	<ol> <li>Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.</li> <li>Piskunov N, Differential &amp; Integral Calculus, Moscow Peace Publishers.</li> <li>Narayan Shanti, A Text book of Matrices, S. Chand</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>				
<u>Additional</u> <u>electronics</u> <u>reference</u> <u>material:</u>	<ol> <li>https://www.youtube.com/watch?v=EGnl8WyYb3o</li> <li>https://www.youtube.com/watch?v=ksS_yOK1vtk&amp;list=PLbRMh DVUMngfIrZCNOyPZwHUU1pP66vQW</li> </ol>				

Course	B.Tech- Semester-I	L-3
Code:	Engineering Physics	T-1
EAS112	Engineering Tuysies	P-0 C 4
Course		C-4
Outcomes :	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> the basic concepts of interference, diffraction and polarisation.	
CO2.	Understanding the concept of bonding in solids and semiconductors.	
CO3.	Understanding the special theory of relativity.	
CO4.	<b>Applying</b> special theory of relativity to explain the phenomenon of length contraction, time dilation, mass-energy equivalence etc.	
<u>CO5.</u>	Applying the concepts of polarized light by the Brewster's and Malus Law	
Course Content:		
Unit-1:	<b>Interference of Light:</b> Introduction, Principle of Superposition, and Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.	8 Hours
Unit-2:	<b>Diffraction</b> : Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. <b>Single slit diffraction</b> : Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. <b>Resolving Power</b> : Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.	8 Hours
Unit-3:	<b>Polarization:</b> Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.	8 Hours
Unit-4:	<b>Elements of Material Science:</b> Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. <b>Hall Effect:</b> Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.	8 Hours
Unit-5:	<b>Special Theory of Relativity:</b> Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.	8 Hours
<u>Text</u> Books:	1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.	
Reference Books:	<ol> <li>F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw- Hill.</li> <li>Concept of Modern Physics, Beiser, Tata McGraw-Hill.</li> <li>R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>electronics</u> <u>reference</u> <u>material:</u>	<ol> <li>https://www.youtube.com/watch?v=toGH5BdgRZ4&amp;list=PLD9DDF BDC338226CA</li> <li>https://www.youtube.com/watch?v=CuqsU7B1MtU</li> </ol>	

	B.Tech- Semester-I	L-0
<u>Course Code:</u> EAS162	<b>Engineering Physics (Lab)</b>	T-0 P-2 C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding of the operation of various models of optical devices.	
CO2.	Understanding types of Semiconductors using Hall experiments.	
соз.	Applying the concept of interference, polarization & dispersion in optical devices through Newton's ring, Laser, polarimeter & spectrometer.	
CO4.	<b>Applying</b> the concept of resonance to determine the AC frequency using sonometer &Melde's apparatus.	
<u>CO5.</u>	Applying the concept of resolving & dispersive power by a prism.	
LIST OF FYPFRIMENTS:	Note: Select any ten experiments from the following list:	
1	To determine the wavelength of monochromatic light by Newton's ring.	
2	To determine the wavelength of monochromatic light by Michelson- Morley experiment.	
3	To determine the wavelength of monochromatic light by Fresnel's Bi-prism.To determine the Planck's constant using LEDs of different colours.	
4	To determine the Planck's constant using LEDs of different colours.	
5	To determine the specific rotation of cane sugar solution using Polarimeter	
6	To verify Stefan's Law by electrical method	
7	To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up	
8	To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.	
9	To compare Illuminating Powers by a Photometer.	
10	To determine the frequency of A.C. mains by means of a Sonometer.	
11	To determine refractive index of a prism material by spectrometer	
12	To determine the Flashing & Quenching of Neon bulb.	
13	Determination of Cauchy's constant by using spectrometer.	
14	To study the PN junction characteristics	
15	To determine the resolving power and dispersive power by a prism	
16	To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode	
17 Study the characteristics of LDR		
18	To study the characteristics of a photo-cell.	
Books:	<ol> <li>B.Sc.Practical Physics, Gupta and Kumar, PragatiPrakashan.</li> <li>B.Sc. Practical Physics, C.L. Arora, S. Chand &amp; Company Pvt. Ltd.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<b>Evaluation Schem</b>	e of Practical Examination:	

## **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)			ON THE DAY OF EXAM (15 MARKS)		TOTAL	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> EAS113	B.Tech- Semester-I Engineering Chemistry	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the concept of softening & purification of water.	
CO2.	<b>Understanding</b> calorific value& combustion, analysis of coal, Physical & Chemical properties of hydrocarbons & quality improvements.	
СОЗ.	<b>Understanding</b> the concept of lubrication, Properties of Refractory & Manufacturing of cements.	
CO4.	<b>Applying</b> the conceptsof the mechanism of polymerization reactions, Natural and synthetic rubber& vulcanization.	
CO5.	Applying the conceptsof spectroscopic & chromatographic techniques.	
Course Content:		
Unit-1:	Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgonetc	8 Hours
Unit-2:	<b>Fuels and Combustion:</b> Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.	8 Hours
Unit-3:	Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. Cement and Refractories: Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, Refractories. Introduction, classification and properties of refractories	8 Hours
Unit-4:	<b>Polymers:</b> Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.	8 Hours
Unit-5:	<ul> <li>A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.</li> <li>B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.</li> </ul>	8 Hours

<u>Text Books:</u>	1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Morrison &amp; Boyd, Organic Chemistry, Prentice Hall</li> <li>Barrow Gordon M., Physical Chemistry, McGraw-Hill.</li> <li>Manahan Stanley E., Environmental Chemistry, CRC Press</li> <li>*Latest editions of all the suggested books are recommended</li> </ol>	
<u>Additional</u> <u>electronics</u> <u>reference</u> material:	1. https://www.youtube.com/watch?v=RV-OyRTaIOI         2. https://www.youtube.com/watch?v=phhfkikb6Lw	

	B.Tech- Semester-I	L-0			
<u>Course Code:</u> EAS163	<b>Engineering Chemistry (Lab)</b>	Т-0 Р-2			
~		C-1			
Course Outcomes:	On completion of the course, the students will be :				
CO1.	Understanding the concepts of Hardness of water.				
CO2.	Analyzing& estimating of various parameters of water.				
соз.	Analyzing of Calorific value of Solid fuel by Bomb calorimeter & Liquid Fuels by Junkers Gas Calorimeter.				
CO4.	CO4. Analyzing of open & closed Flash point of oil by Cleveland & Pensky's Martens apparatus.				
CO5.	Analyzing of viscosity of lubricating oil using Redwood Viscometer.				
LIST OF EXPERIMENTS: Note: Select any ten experiments from the following list					
1	Determination of Total Hardness of a given water sample.				
2 Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate					
3	To determine the pH of the given solution using pH meter and pH- metric titration				
4	Determination of dissolved oxygen content of given water sample				
5	To find chemical oxygen demand of waste water sample by potassium dichromate				
6	Determination of free chlorine in a given water sample				
7	To determine the chloride content in the given water sample by Mohr's method				
8	To prepare the Bakelite resin polymer				
9	To determine the concentration of unknown sample of iron spectrophotometrically				
10	To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer				
11	To determine the flash & fire point of a given lubricating oil				
12	Determination of calorific value of a solid or liquid fuel.				
13	Determination of calorific value of a gaseous fuel				
14	Determination of % of $O_2$ , $CO_2$ , % CO in flue gas sample using Orsat apparatus.				
15	Proximate analysis of coal sample.				

## **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	ARKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech-Semester-I	L-3
<u>Course Code:</u> EEE117	<b>Basic Electrical Engineering</b>	T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> the basics of Network, AC Waveform and its characteristics.	
CO2.	<b>Understanding</b> the basic concept of Measuring Instruments, Transformers & three phase Power systems.	
СО3.	Understanding the basic concepts of Transformer.	
CO4.	<b>Understanding</b> the basic concept of power measurement using two wattmeter methods.	
CO5.	<b>Applying</b> the concept of Kirchhoff's laws and Network Theorems to analyze complex electrical circuits.	
Course Content:		
Unit-1:	<b>D.C. Network Theory:</b> Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.	8 Hours
Unit-2:	<b>Steady State Analysis of A.C. Circuits:</b> Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.	8 Hours
Unit-3:	<ul> <li>Basics of Measuring Instruments: Introduction to wattmeter &amp; Energy meter extension range of voltmeter and ammeter.</li> <li>Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase power, power measurement using two wattmeter methods.</li> </ul>	8 Hours
Unit-4:	<b>Single phase Transformer:</b> Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.	8 Hours
Unit-5:	<b>Electrical machines:</b> DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)	8 Hours
<u>Text Books:</u>	1. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill	
<u>Reference</u> <u>Books:</u>	<ol> <li>Fitzgerald A.E &amp; Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.</li> <li>A Grabel, Basic Electrical Engineering, McGraw Hill.</li> <li>Cotton H., Advanced Electrical Technology, Wheeler Publishing.</li> <li>Del Toro, Principles of Electrical Engineering, Prentice-Hall International.</li> <li>W.H. Hayt&amp; J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>electronics</u> <u>reference</u> <u>material:</u>	<ul> <li>https://nptel.ac.in/courses/108/108/108108076/</li> <li>https://sites.google.com/tmu.ac.in/dr-garima-goswami/home</li> </ul>	

Course Code:	B.Tech- Semester-I	L-0 T-0
EEE161	Basic Electrical Engineering (Lab)	P-2 C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the concepts of Kirchoff& Voltage law.	
CO2.	Understanding the concepts of dc network theorem.	
СО3.	Analyzing the energy by a single-phase energy meter.	
CO4.	Analyzing the losses and efficiency of Transformer on different load conditions.	
CO5.	Analyzing the electrical circuits using electrical and electronics components on bread board.	
LIST OF EXPERIMENTS:	Note: Select any ten experiments from the following list	
1	To verify the Kirchhoff's current and voltage laws.	
2	To study multimeter.	
3	To verify the Superposition theorem	
4	To verify the Thevenin's theorem.	
5	To verify the Norton's theorem.	
6	To verify the maximum power transfer theorem	
7	To verify current division and voltage division rule.	
8	To measure energy by a single-phase energy meter	
9	To measure the power factor in an RLC by varying the capacitance	
10	To determine resonance frequency, quality factor, bandwidth in series resonance	
11	To measure the power in a 3-phase system by two-wattmeter method	
12	To measure speed for speed control of D.C. Shunt Motor	
13	To determine the efficiency of single-phase transformer by load test.	

#### **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

## **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE		ON THE DAY	Y OF EXAM	TOTAL		
SEMESTER (35 MARKS)		(15 MA	RKS)			
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech- Semester-I	L-3
<u>Course Code:</u> EEC111	<b>Basic Electronics Engineering</b>	T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> the concepts of electronic components like diode, BJT & FET.	
CO2.	<b>Understanding</b> the applications of pn junction diode as clipper, clamper, rectifier & regulator whereas BJT & FET as amplifiers	
CO3.	<b>Understanding</b> the functions and applications of operational amplifier-based circuits such as differentiator, integrator, and inverting, non-inverting, summing & differential amplifier.	
CO4.	<b>Understanding</b> the concepts of number system, Boolean algebra and logic gates.	
C05.	Applying the knowledge of series, parallel and electromagnetic circuits.	
Course Content:		
Unit-1:	<b>p-n Junction:</b> Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator	8 Hours
Unit-2:	<b>Bipolar Junction Transistor (BJT):</b> Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between $\alpha$ , $\beta \& \gamma$ , Biasing of transistors: Fixed bias, emitter bias, potential divider bias	8 Hours
Unit-3:	<b>Field Effect Transistor (FET):</b> Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.	8 Hours
Unit-4:	<b>Operational Amplifier (Op-Amp):</b> Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.	8 Hours
Unit-5:	<b>Switching Theory:</b> Number system, conversion of bases (decimal, binary, octal and hexadecimalnumbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.	8 Hours
<u>Text Books:</u>	1. Robert Boylestad& Louis Nashelsky, Electronic Circuit and Devices, Pearson India.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Sedra and Smith, Microelectronic Circuits, Oxford University Press.</li> <li>Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.</li> <li>Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.</li> <li>*Latest editions of all the suggested books are recommended</li> </ol>	
<u>Additional</u> <u>electronics</u> <u>reference</u> <u>material:</u>	1. https://www.youtube.com/watch?v=USrY0JspDEg         2. https://www.youtube.com/watch?v=Hkz27cFW4Xs	

	B.Tech- Semester-I	L-0
<u>Course Code:</u> EEC161	<b>Basic Electronics Engineering (Lab)</b>	1-0 P-2
		C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the implementation of diode-based circuits.	
CO2.	<b>Understanding</b> the implementation of Operational amplifier-based circuits.	
СОЗ.	Analyzing the characteristics of pn junction diode & BJT.	
CO4.	<b>Analyzing</b> the different parameters for characterizing different circuits like rectifiers, regulators using diodes and BJTs.	
CO5.	Analyzing the truth tables through the different type's adders.	
LIST OF EXPERIMENTS:	Note: Minimum eight experiments should be performed-	
1	To study the V-I characteristics of p-n junction diode.	
2	To study the diode as clipper and clamper	
3	To study the half-wave rectifier using silicon diode.	
4	To study the full-wave rectifier using silicon diode.	
5	To study the Zener diode as a shunt regulator.	
6	To study transistor in Common Base configuration & plot its input/output characteristics	
7	To study the operational amplifier in inverting & non-inverting modes using IC 741.	
8	To study the operational amplifier as differentiator & integrator.	
9	To study various logic gates & verify their truth tables.	
10	To study half adder/full adder & verify their truth tables	

#### **Evaluation Scheme of Practical Examination:**

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM		
SEMESTER (35 MARKS)		(15 MA	ARKS)	TOTAL		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)
					· · · · · · · · · · · · · · · · · · ·	

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech- Semester-I	L-2
Course Code: TMU101	<b>Environmental Studies</b>	T-1 P-0 C-3
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> environmental problems arising due to constructional and developmental activities.	
CO2.	<b>Understanding</b> the natural resources and suitable methods for conservation of resources for sustainable development.	
СОЗ.	<b>Understanding</b> the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance.	
CO4.	<b>Understanding</b> the types and adverse effects of various environmental pollutants and their abatement devices.	
C05.	<b>Understanding</b> Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management.	
Course Content:		
Unit-1:	Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development. <b>Ecology and Environment</b> : Concept of an Ecosystem-its structure and functions, Energy Flow in an Ecosystem, FoodChain, FoodWeb, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.	8 Hours
Unit-2:	Natural Resources: Renewable & Non-Renewable resources; Landre sources and landuse change; Land degradation, Soil erosion & desertification. Deforestation: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. Energy Resources: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies. Biodiversity: Hot SpotsofBiodiversityinIndiaandWorld,Conservation,ImportanceandFa ctorsResponsibleforLossofBiodiversity,BiogeographicalClassification of India	8 Hours
Unit-3:	<b>Environmental Pollutions:</b> Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies	8 Hours
Unit-4:	Environmental policies & practices: Climate change & Global Warming (Green house Effect),Ozone Layer -Its Depletion and Control Measures, Photo chemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context Human population growth; impacts on environment, human health &	8 Hours
Unit-5:	welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study	8 Hours

	1. Visit to an area to document environmental assets;
	river/forest/flora-fauna etc.
	2. Visit to a local polluted site:
Field Work:	urban/rural/industrial/agricultural.
	3. Study of common plants, insects, birds & basic principles of
	identification.
	4. Study of simple ecosystem; pond, river etc.
	1. "Environmental Chemistry". De. A. K., New Age
<u>Text Books:</u>	Publishers Pvt.Ltd.
	1. "Biodiversity and Conservation",
	Bryant, P. J., Hypertext Book
<b>Reference</b>	2. "Textbook of Environment Studies", Tewari, Khulbe&Tewari,I.K.
<u>Books:</u>	Publication
	*Latest editions of all the suggested books are recommended.
<u>Additional</u>	
<u>electronics</u>	1. https://www.youtube.com/watch?v=8tamtocnHb8
reference	2. https://www.youtube.com/watch?v=YlE1DDo25IQ
<u>material:</u>	

	B.Tech- Semester-I	L-2
Course Code: TMUGE101	<b>English Communication – I</b>	T-0 P-2 C-3
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Remembering and understanding</b> of the basic of English grammar and vocabulary.	
CO2.	Understanding of the basic Communication process.	
СО3.	Applying correct vocabulary and tenses in sentences construction.	
CO4.	Analyzing communication needs and developing communication strategies using both verbal & non-verbal method.	
CO5.	Drafting applications in correct format for common issues.	
CO6.	Developing self-confidence.	
Course Content:		
Unit-1:	<ul> <li>Introductory Sessions</li> <li>Self-Introduction</li> <li>Building Self Confidence: Identifying strengths and weakness, reasons Failure, strategies to overcome Fear of Failure</li> <li>Importance of English Language in present scenario (Practice: Self-introduction session)</li> </ul>	6 Hours
Unit-2:	Basics of Grammar • Parts of Speech • Tense • Subject and Predicate • Vocabulary: Synonym and Antonym (Practice: Conversation Practice)	12 Hours
Unit-3:	Basics of Communication         • Communication: Process, Types, 7Cs of Communication,         Importance & Barrier         • Language as a tool of communication         • Non-verbal communication: Body Language         • Etiquette & Manners         • Basic Problem Sounds         (Practice: Pronunciation drill and building positive body language)	10 Hours
Unit-4:	<ul> <li>Application writing</li> <li>Format &amp; Style of Application Writing</li> <li>Practice of Application writing on common issues.</li> </ul>	8 Hours
Unit-5:	Value based text reading: Short Story (Non- detailed study) • Gift of Magi - O. Henry	4 Hours
Text Books:	1. Singh R.P., An Anthology of Short stories, O.U.P. New Delhi.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Kumar, Sanjay. &amp;PushpLata. "Communication Skills" New Delhi: Oxford University Press.</li> <li>Carnegie Dale. "How to win Friends and Influence People" New York: Simon &amp; Schuster.</li> <li>Goleman, Daniel. "Emotional Intelligence' Bantam Book.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	

	1. https://www.youtube.com/watch?v=4XEa-8HD3lE
Additional	2. https://www.youtube.com/watch?v=sb6ZZ2p3hEM&feature=youtu.be
electronics	3. https://www.youtube.com/watch?v=Df3ysUkdB38
reference	4. https://www.youtube.com/watch?v=0LdYaj3jcws
<u>material:</u>	5. https://www.youtube.com/watch?v=64XIkMqPm_8
	6. https://www.youtube.com/watch?v=_vS6O8YlMq0
	1. Language Lab software.
	2. The content will be conveyed through Real life situations, Pair
Mathadalagu	Conversation, Group Talk and Class Discussion.
Methodology:	<b>3.</b> Conversational Practice will be effectively carried out by Face to Face
	& Via Media (Telephone, Audio-Video Clips)
	4. Modern Teaching tools (PPT Presentation, Tongue-Twisters &
	Motivational videos with sub-titles) will be utilized

## **Evaluation Scheme**

Internal Evaluation			External Evaluation		Total Marks
40 Marks			60 Ma	100	
20 Marks (Best 2 out of Three CTs) (From Unit- II, IV & V)	10 Marks (Oral Assignments) (From Unit I & III)	10 Marks (Attendance)	40 Marks (External Written Examination) (From Unit II, IV & V)	20 Marks (External Viva)* (From Unit -1 & III)	100

## \*Parameters of External Viva

Content	Body Language	Confidence	Question Responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising

a) One Faculty teaching the class

**b**) One examiner nominated by University Examination cell.

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

	B.Tech- Semester-I			
<u>Course Code:</u> EME161	<b>Engineering Drawing (Lab)</b>			
		C-2		
Course Outcomes:	On completion of the course, the students will be :			
CO1.	Understanding the concepts of Engineering Drawing.			
CO2.	<b>Understanding</b> how to draw and represent the shape, size & specifications of physical objects.			
СО3.	Applying the principles of projection and sectioning.			
CO4.	Applying the concepts of development of the lateral surface of a given object.			
CO5.	<b>Creating</b> isometric projection of the given orthographic projection.			
LIST OF EXPERIMENTS:	All to be performed			
1	To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.			
2	To draw the types of lines and conventions of different materials.			
3	To draw and study dimensioning and Tolerance			
4 To construction geometrical figures of Pentagon and Hexagon				
5	To draw the projection of points and lines			
6	6 To draw the Orthographic Projection of given object in First Angle			
7	To draw the Orthographic Projection of given object in Third Angle			
8	To draw the sectional view of a given object			
9	To draw the development of the lateral surface of given object			
10 To draw the isometric projection of the given orthographic projection				

#### **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

## **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.
	B.Tech- Semester-I	L-0	
Course Code:	Workshon Practice (Lah)	T-0	
EME162	workshop I factice (Lab)	P-4	
Course		<b>U-2</b>	
Outcomes:	On completion of the course, the students will be :		
<u>CO1</u>	Understanding the concepts to prepare simple wooden joints using		
	wood working tools.		
CO2.	<b>Applying</b> the techniques to produce fitting jobs of specified dimensions.		
CO3.	Applying the concepts to prepare simple lap, butt, T and corner joints		
	using arc welding equipment.		
CO4.	Applying the concepts of black smithy and lathe machine to produce		
<u> </u>	Creating core and moulds for casting		
	Perform any ten experiments selecting at least one from		
LIST OF Perform any ten experiments selecting at least one from EXPERIMENTS: each shop			
	Comparting Shop:		
	1 To prepare half-lap corner joint		
1	2 To prepare mortise & tenon joint		
	3. To prepare a cylindrical pattern on woodworking lathe.		
	Fitting Bench Working Shop:		
2	1. To prepare a V-joint fitting		
	2. To prepare a U-joint fitting		
	3. To prepare a internal thread in a plate with the help of tapping		
	process		
	Black Smithy Shop:		
3	1. To prepare a square rod from given circular rod		
	2. To prepare a square U- shape from given circular rod		
	Welding Shop:		
	1. To prepare a butt and Lap welded joints using arc welding		
4	machine.		
	2. To prepare a Lap welded joint Gas welding equipment.		
	3. To prepare a Lap welded joint using spot welding machine		
	Sheet-metal Shop:		
5	1. To make round duct of GI sheet using 'soldering' process.		
	2. To prepare a tray of GI by fabrication		
	Machine Shop:		
	1. To study the working of basic machine tools like Lattle life, Shaper m/a. Drilling m/a and Grinding m/a		
(	Shaper II/c, Drilling II/c and Grinding II/c.		
0	2. To perform the following operations on Centre Latte:		
	2 To perform the operations of drilling of making the holes or the		
	given metallic work piece (M S) by use of drilling mechine		
	given metanic work-piece (ivi.5.) by use of drifting machine.		
7	1 To prepare core as per given size		
/	2. To prepare a mould for given size.		
	2. To prepare a mouto for given casting.		

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

There shall be continuous evaluation of the student on the following broad parameters:

- **1.** Observance of dress code.
- 2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course	B.Tech- Semester-II					
Code:	Engineering Methometics II	T-1 P 0				
EAS211	Engineering Wathematics-II	1-0 C-4				
Course						
Outcomes :	On completion of the course, the students will be :					
CO1.	<b>Understanding</b> the concepts of the wave, diffusion and Laplace equations & Fourier series.					
CO2.	Understanding the methods of separation of variables.					
соз.	<b>Understanding</b> the concepts of Fourier series' representation of single variable function.					
CO4.	<b>Applying</b> Laplace transform to determine the complete solutions of linear ODE.					
CO5.	<b>Applying</b> the method of variations of parameters to find solution of equations with variable coefficients.					
Course Content:						
Unit-1:	<b>Differential Equations:</b> Linear Differential Equation, Linear Differential Equation with constant coefficient: Complementary functions and particular integrals, Linear Differential Equation with variable coefficient: Removal method, changing independent variables, Method of variation of parameters, Homogeneous Linear Differential Equation, Simultaneous linear differential equations.	8 Hours				
Unit-2:	Series Solutions: PowerSeries solutions of ODE, Ordinary Point, Singular Points, Frobenius Method. Special Functions: Legendre equation and Polynomial, Legendre Function, Rodrigue's formula, Laplace definite integral for first and second kind, Bessel equation and Polynomial, Bessel Function, Orthogonal properties and Recurrence Relation for Legendre and Bessel function.	8 Hours				
Unit-3:	<b>Partial differential equations</b> –Method of separation of variables for solving partial differential equations; Wave equation up to two dimensions; Laplace equation in two-dimensions; Heat conduction equations up to two-dimensions: Equations of transmission Lines.	8 Hours				
Unit-4:	<b>Fourier Series:</b> Periodic functions, Trigonometric series; Fourier series; Dirichlet's conditions, Determination of Fourier coefficient by Euler's formulae; Fourier series for discontinuous functions, Even and odd functions, Half range sine and cosine series.	8 Hours				
Unit-5:	Laplace Transform: Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Diratch delta function; Laplace transform of periodic functions; Convolution theorem.	8 Hours				
<u>Text</u> <u>Books:</u>	1. Das H.K., Engineering Mathematics Vol-II, S. Chand.					
Reference Books: Additional	<ol> <li>Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.</li> <li>Piskunov N, Differential &amp; Integral Calculus, Moscow Peace Publishers.</li> <li>Narayan Shanti, A Text book of Matrices, S. Chand</li> <li>Bali N.P., Engineering Mathematics-II, Laxmi Publications.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>					
<u>electronics</u> <u>reference</u> <u>material:</u>	<ol> <li>https://www.youtube.com/watch?v=luJMl37-nso</li> <li>https://www.youtube.com/watch?v=NdouX5-KD6Y</li> </ol>					

Course	B.Tech- Semester-II					
Code: EAS212	<b>Engineering Physics</b>	T-1 P-0 C-4				
Course Outcomes :	On completion of the course, the students will be :					
CO1.	<b>Understanding</b> the basic concepts of interference, diffraction and polarisation.					
CO2.	Understanding the concept of bonding in solids and semiconductors.					
CO3.	Understanding the special theory of relativity.					
CO4.	Applying special theory of relativity to explain the phenomenon of length contraction, time dilation, mass-energy equivalence etc.					
CO5.	Applying the concepts of polarized light by the Brewster's and Malus Law.					
Content:						
Unit-1:	<b>Interference of Light:</b> Introduction, Principle of Superposition, and Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.	8 Hours				
Unit-2:	<b>Diffraction</b> : Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. <b>Single slit diffraction</b> : Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. <b>Resolving</b> <b>Power</b> : Rayleigh's criterion of resolution, resolving power of diffraction grating and talascope					
Unit-3:	<b>Polarization:</b> Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.					
Unit-4:	Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi- Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. Hall Effect: Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility					
Unit-5:	<b>Special Theory of Relativity:</b> Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.					
<u>Text</u> <u>Books:</u>	1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.					
<u>Reference</u> <u>Books:</u>	<ol> <li>F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw- Hill.</li> <li>Concept of Modern Physics, Beiser, Tata McGraw-Hill.</li> <li>R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>					
Additional	<b>1.</b> https://www.youtube.com/watch?v=toGH5BdgRZ4&list=PLD9DDF					
<u>electronics</u> <u>reference</u> <u>material:</u>	BDC338226CA 2. https://www.youtube.com/watch?v=CuqsU7B1MtU					

	B.Tech- Semester-II	L-0			
<u>Course Code:</u> EAS262	<b>Engineering Physics (Lab)</b>	T-0 P-2 C-1			
Course Outcomes:	On completion of the course, the students will be :				
CO1.	Understanding of the operation of various models of optical devices.				
CO2.	Understanding types of Semiconductors using Hall experiments.				
соз.	<b>Applying</b> the concept of interference, polarization & dispersion in optical devices through Newton's ring, Laser, polarimeter & spectrometer.				
CO4.	Applying the concept of resonance to determine the AC frequency sing sonometer & Melde's apparatus.				
CO5.	Applying the concept of resolving & dispersive power by a prism.				
LIST OF EXPERIMENTS:	Note: Select any ten experiments from the following list:				
1	To determine the wavelength of monochromatic light by Newton's ring.				
2	2 To determine the wavelength of monochromatic light by Michelson- Morley experiment.				
3	To determine the wavelength of monochromatic light by Fresnel's Bi-prism.To determine the Planck's constant using LEDs of different colours.				
4	To determine the Planck's constant using LEDs of different colours.				
5	To determine the specific rotation of cane sugar solution using Polarimeter				
6	To verify Stefan's Law by electrical method				
7	To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up				
8	To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.				
9	To compare Illuminating Powers by a Photometer.				
10	To determine the frequency of A.C. mains by means of a Sonometer.				
11	To determine refractive index of a prism material by spectrometer				
12	To determine the Flashing & Quenching of Neon bulb.				
13	Determination of Cauchy's constant by using spectrometer.				
14	To study the PN junction characteristics				
15	To determine the resolving power and dispersive power by a prism				
16	To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode				
17	Study the characteristics of LDR				
18	To study the characteristics of a photo-cell.				
<u>Books:</u>	<ol> <li>B.Sc. Practical Physics, Gupta and Kumar, PragatiPrakashan.</li> <li>B.Sc. Practical Physics, C.L. Arora, S. Chand &amp; Company Pvt. Ltd.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>				

## **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY	Y OF EXAM	τοτλι
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech- Semester-II	L-3
<u>Course Code:</u> FAS213	Engineering Chemistry	T-1 P-0
LAS215	Engineering Chemistry	C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the concept of softening & purification of water.	
CO2.	<b>Understanding</b> calorific value& combustion, analysis of coal, Physical & Chemical properties of hydrocarbons & quality improvements.	
СОЗ.	<b>Understanding</b> the concept of lubrication, Properties of Refractory & Manufacturing of cements.	
CO4.	<b>Applying</b> the concepts of the mechanism of polymerization reactions, Natural and synthetic rubber& vulcanization.	
CO5.	Applying the concepts of spectroscopic & chromatographic techniques.	
Course Content:		
Unit-1:	Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgonetc	8 Hours
Unit-2:	<b>Fuels and Combustion:</b> Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.	8 Hours
Unit-3:	Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. Cement and Refractories: Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, Refractories. Introduction, classification and properties of refractories.	8 Hours
Unit-4:	<b>Polymers:</b> Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.	8 Hours
Unit-5:	<ul> <li>A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.</li> <li>B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.</li> </ul>	8 Hours
Text Books:	1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Morrison &amp; Boyd, Organic Chemistry, Prentice Hall</li> <li>Barrow Gordon M., Physical Chemistry, McGraw-Hill.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>electronics</u> <u>reference</u> <u>material:</u>	<ol> <li>https://www.youtube.com/watch?v=RV-OyRTaIOI</li> <li>https://www.youtube.com/watch?v=phhfkikb6Lw</li> </ol>	

	B.Tech- Semester-II	L-0
Course Code: EAS263	<b>Engineering Chemistry (Lab)</b>	T-0
EA5203		C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the concepts of Hardness of water.	
CO2.	Analyzing& estimating of various parameters of water.	
СОЗ.	<b>Analyzing</b> of Calorific value of Solid fuel by Bomb calorimeter & Liquid Fuels by Junkers Gas Calorimeter.	
CO4.	<b>Analyzing</b> of open & closed Flash point of oil by Cleveland &Pensky's Martens apparatus.	
CO5.	Analyzing of viscosity of lubricating oil using Redwood Viscometer.	
LIST OF EXPERIMENTS:	Note: Select any ten experiments from the following list	
1	Determination of Total Hardness of a given water sample.	
2	Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate	
3	To determine the pH of the given solution using pH meter and pH- metric titration	
4	Determination of dissolved oxygen content of given water sample	
5	To find chemical oxygen demand of waste water sample by potassium dichromate	
6	Determination of free chlorine in a given water sample	
7	To determine the chloride content in the given water sample by Mohr's method	
8	To prepare the Bakelite resin polymer	
9	To determine the concentration of unknown sample of iron spectrophotometrically	
10	To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer	
11	To determine the flash & fire point of a given lubricating oil	
12	Determination of calorific value of a solid or liquid fuel.	
13	Determination of calorific value of a gaseous fuel	
14	Determination of % of O <sub>2</sub> , CO <sub>2</sub> , % CO in flue gas sample using Orsat apparatus.	
15	Proximate analysis of coal sample.	

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

B.Tech (CE) Syllabus Applicable w.e.f. Academic Session 2020-21

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech-Semester-I	L-3
<u>Course Code:</u> EEE217	<b>Basic Electrical Engineering</b>	T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> the basics of Network, AC Waveform and its characteristics.	
CO2.	<b>Understanding</b> the basic concept of Measuring Instruments, Transformers & three phase Power systems.	
CO3.	Understanding the basic concepts of Transformer.	
CO4.	<b>Understanding</b> the basic concept of power measurement using two wattmeter methods.	
C05.	<b>Applying</b> the concept of Kirchhoff's laws and Network Theorems to analyze complex electrical circuits.	
Course Content:		
Unit-1:	<b>D.C. Network Theory:</b> Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.	8 Hours
Unit-2:	<b>Steady State Analysis of A.C. Circuits:</b> Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.	8 Hours
Unit-3:	<b>Basics of Measuring Instruments:</b> Introduction to wattmeter & Energy meter extension range of voltmeter and ammeter. <b>Three Phase A.C. Circuits:</b> Line and phase voltage/current relations; three phase power, power measurement using two wattmeter methods.	8 Hours
Unit-4:	<b>Single phase Transformer:</b> Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.	8 Hours
Unit-5:	<b>Electrical machines:</b> DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)	8 Hours
<u>Text Books:</u>	1. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill	
<u>Reference</u> <u>Books:</u>	<ol> <li>Fitzgerald A.E &amp; Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.</li> <li>A Grabel, Basic Electrical Engineering, McGraw Hill.</li> <li>Cotton H., Advanced Electrical Technology, Wheeler Publishing.</li> <li>Del Toro, Principles of Electrical Engineering, Prentice-Hall International.</li> <li>W.H. Hayt&amp; J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> electronics <u>reference</u> <u>material:</u>	<ol> <li>https://nptel.ac.in/courses/108/108/108076/</li> <li>https://sites.google.com/tmu.ac.in/dr-garima-goswami/home</li> </ol>	

<u>Course Code:</u> EEE261	B.Tech- Semester-II Basic Electrical Engineering (Lab)			
Course Outcomes:	On completion of the course, the students will be :			
CO1.	Understanding the concepts of Kirchoff& Voltage law.	L		
CO2.	Understanding the concepts of dc network theorem.			
CO3.	Analyzing the energy by a single-phase energy meter.	1		
CO4.	Analyzing the losses and efficiency of Transformer on different load conditions.			
CO5.	Analyzingthe electrical circuits using electrical and electronics components on bread board.			
LIST OF EXPERIMENTS:	Note: Select any ten experiments from the following list			
1	To verify the Kirchhoff's current and voltage laws.			
2	To study multimeter.			
3	To verify the Superposition theorem			
4	To verify the Thevenin's theorem.			
5	To verify the Norton's theorem.			
6	To verify the maximum power transfer theorem			
7	To verify current division and voltage division rule.			
8	To measure energy by a single-phase energy meter			
9	To measure the power factor in an RLC by varying the capacitance			
10	To determine resonance frequency, quality factor, bandwidth in series resonance			
11	To measure the power in a 3-phase system by two-wattmeter method			
12	To measure speed for speed control of D.C. Shunt Motor			
13	To determine the efficiency of single-phase transformer by load test.			

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

## **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	ARKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

	B.Tech- Semester-II		
<u>Course Code:</u> EEC211	<b>Basic Electronics Engineering</b>	T-1 P-0 C-4	
Course Outcomes:	On completion of the course, the students will be :		
CO1.	<b>Understanding</b> the concepts of electronic components like diode, BJT & FET.		
CO2.	<b>Understanding</b> the applications of pn junction diode as clipper, clamper, rectifier & regulator whereas BJT & FET as amplifiers		
соз.	<b>Understanding</b> the functions and applications of operational amplifier-based circuits such as differentiator, integrator, and inverting, non-inverting, summing & differential amplifier.		
CO4.	<b>Understanding</b> the concepts of number system, Boolean algebra and logic gates.		
CO5.	<b>Applying</b> the knowledge of series, parallel and electromagnetic circuits.		
Course Content:			
Unit-1:	<b>p-n Junction:</b> Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator	8 Hours	
Unit-2:	<b>Bipolar Junction Transistor (BJT):</b> Basic construction, transistor action; CB, CE and CCconfigurations, input/output characteristics, Relation between $\alpha$ , $\beta \& \gamma$ , Biasing of transistors: Fixed bias, emitter bias, potential divider bias	8 Hours	
Unit-3:	<b>Field Effect Transistor (FET):</b> Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.	8 Hours	
Unit-4:	<b>Operational Amplifier (Op-Amp):</b> Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.	8 Hours	
Unit-5:	<b>Switching Theory:</b> Number system, conversion of bases (decimal, binary, octal and hexadecimalnumbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.	8 Hours	
<u>Text Books:</u>	1. Robert Boylestad& Louis Nashelsky, Electronic Circuit and Devices, Pearson India.		
<u>Reference</u> <u>Books:</u>	<ol> <li>Sedra and Smith, Microelectronic Circuits, Oxford University Press.</li> <li>Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.</li> <li>Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.</li> </ol>		
Additional electronics reference material:	<ol> <li>https://www.youtube.com/watch?v=USrY0JspDEg</li> <li>https://www.youtube.com/watch?v=Hkz27cFW4Xs</li> </ol>		

	B.Tech- Semester-II	L-0
<u>Course Code:</u> EEC261	<b>Basic Electronics Engineering (Lab)</b>	1-0 P-2
~		C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the implementation of diode-based circuits.	
CO2.	<b>Understanding</b> the implementation of Operational amplifier-based circuits.	
CO3.	Analyzing the characteristics of pn junction diode & BJT.	
CO4.	<b>Analyzing</b> the different parameters for characterizing different circuits like rectifiers, regulators using diodes and BJTs.	
CO5.	Analyzing the truth tables through the different type's adders.	
LIST OF EXPERIMENTS:	Note: Minimum eight experiments should be performed-	
1	To study the V-I characteristics of p-n junction diode.	
2	To study the diode as clipper and clamper	
3	To study the half-wave rectifier using silicon diode.	
4	To study the full-wave rectifier using silicon diode.	
5	To study the Zener diode as a shunt regulator.	
6	To study transistor in Common Base configuration & plot its input/output characteristics	
7	To study the operational amplifier in inverting & non-inverting modes using IC 741.	
8	To study the operational amplifier as differentiator & integrator.	
9	To study various logic gates & verify their truth tables.	
10	To study half adder/full adder & verify their truth tables	

## **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

## **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	ARKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## External Evaluation (50 marks)

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Course Code:	Course Code: B.Tech Semester-II		
ECS212	Computer System & Programming in C++	P-0 C-3	
Course Outcomes:	On completion of the course, the students will be :		
CO1.	Understanding the concept of various components of computer system		
CO2.	Understanding the Object-Oriented Programming Language concepts.		
соз.	Analyzing basic mathematical problem and their solutions through programming		
CO4.	Applying the concepts of programming solutions for distinct problems		
CO5.	Applying the concepts of scalable solutions through function		
Course			
Unit-1:	<ul> <li>Problem Solving: Phases of problem solving, Algorithms, Structure Chart, Flow chart, Practice of solving Sequence Problems, Selection Problems, Repetition problem.</li> <li>Statements for problem solving: if, switch, while, for, do, break, continue, go to statements.</li> </ul>	8 Hours	
Unit-2:	Concepts in Computer Application: Generations, Characteristic and Application of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory. Translators: Assembler, Compiler, and Interpreter; Number System: Decimal, Octal, Binary and Hexadecimal &their Conversions; Various Codes: BCD, ASCII and EBCDIC and Gray Code.	8 Hours	
Unit-3:	Concepts in Operating System: Purpose, Services, Types, Functions. Data Communication & Networks: Types, Topology, IP address classes. C++ Basics: Data types, Variables, Constants, Keywords, Identifiers, Types of Operators, Memory Allocation operators, Expressions, Pre-processor directives, Introduction to Array, Pointers, Structures and Strings.	8 Hours	
Unit-4:	<ul> <li>Functions: Scope of variables; Parameter passing; Default arguments;</li> <li>Inline functions; Recursive functions; Pointers to functions.</li> <li>C++ Classes and Data Abstraction: Class Structure, Objects; this pointer;</li> <li>Friend function; Static class members; Constructors and Destructors; Data abstraction.</li> <li>Inheritance: Types, Access to the base class members; Virtual base class.</li> </ul>	8 Hours	
Unit-5:	<b>Polymorphism:</b> Function overloading; Operator overloading; Static Binding andDynamic bindings; Virtual function: Definition, Call mechanism, Pure virtual functions; Virtual destructors; Abstract Classes. C++ I/O: Stream classes hierarchy; Stream I/O; File streams; Overloading << and >> operators; File Modes, Reading and Writing to a file; Formatted I/O.	8 Hours	
<u>Text Books:</u>	1. BjarneStroutrup, The C++ Programming Languge, Adison Wesley.		
<u>Reference</u> <u>Books:</u>	<ol> <li>Beginning C++, The Complete Language, Horton,SPD/WROX</li> <li>Programming with C++, Radhaganesan, Scitech</li> <li>Projects using C++, Varalaxmi, Scitech</li> <li>Object Oriented modelling &amp; Design, RumBaugh, PHI</li> </ol>		
Additional	1. https://www.youtube.com/watch?v=I.ZFoktwiars&list=PI.mn4vlk-		
electronics	B4KrM9uOEdvPIVFUkU3jNc6D2		
<u>reference</u> <u>material:</u>	2. https://www.youtube.com/watch?v=XTiIiI- LOY8&list=PLJvIzs_rP6R73WlvumJvCQJrOY3U5zq1j		

<u>Course Code:</u> ECS262	B.Tech - Semester-II Computer System & Programming in C++ (Lab)			
Course Outcomes:	On completion of the course, the students will be :			
CO1.	<b>Understanding</b> the concepts of execution to programs written in C language.			
CO2.	Applying to prepare programming solutions for specific problems.			
CO3.	Applying to prepare scalable solutions through functions.			
CO4.	<b>Applying</b> basic elements of a C program including arithmetic and logical operators, functions, control structures, and arrays			
CO5.	Analyzing basic mathematical problem and their solutions through programming.			
LIST OF EXPERIMENTS:	Note: Minimum 15 experiments should be performed from the following:			
1	Write a Program (WAP) to calculate Sum & average of N numbers.			
2	WAP to convert integer arithmetic to a given number of day and month.			
3	WAP to find maximum and minimum out of 3 numbers a, b & c.			
4	WAP to find factorial of positive integer.			
5	WAP to find sum of series up to n number, 2+5+8++n.			
6	WAP to print all the number between 1 to 100 which are dividing by 7.			
7	WAP to generate Fibonacci series up to n.			
8	WAP to calculate area of circle using Functions.			
9	WAP to calculate factorial of given number using Recursion function.			
10	WAP to find whether number is prime or not.			
11	WAP to find that the enter character is a letter or digit.			
12	WAP to find addition of two matrix of n*n order.			
13	WAP to find multiplication of two matrix of n*n order.			
14	WAP to find even or odd up to a given limit n.			
15	WAP to find whether a given no is palindrome or not.			
16	WAP to Swap two numbers using third Variable and without using third variable.			
17	WAP to Swap two numbers using call by value and call by reference.			
18	WAP illustrating overloading of various operators.			
19	WAP illustrating use of Friend			
20	WAP illustrating use of Inline Function.			
21	WAP illustrating use of destructor and various types of constructor.			
22	WAP illustrating various forms of Inheritance.			
23	WAP illustrating use of virtual functions, virtual Base Class.			

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Course Code: TMUGE201	B.Tech - Semester-II English Communication – II	L-2 T-0 P-2 C-3
Course Outcomes:	On completion of the course, the students will be :	
C01.	<b>Remembering &amp; understanding</b> the basics of English Grammar and Vocabulary.	
CO2.	Understanding the basics of Listening, Speaking & Writing Skills.	
СО3.	Understanding principles of letter drafting and various types of formats.	
CO4.	<b>Applying</b> correct vocabulary and grammar in sentence construction while writing and delivering presentations.	
CO5.	Analyzingdifferent types of listening, role of Audience & Locale in presentation.	
CO6.	Drafting Official Letters, E-Mail & Paragraphs in correct format.	
Course Content:		
Unit-1:	<ul> <li>Functional Grammar</li> <li>Prefix, suffix and One words substitution</li> <li>Modals</li> <li>Concord</li> </ul>	10 Hours
Unit-2:	<ul> <li>Listening Skills</li> <li>Difference between listening &amp; hearing, Process and Types of Listening</li> <li>Importance and Barriers to listening</li> </ul>	04Hours
Unit-3:	<ul> <li>Writing Skills</li> <li>Official letter and email writing</li> <li>Essentials of a paragraph,</li> <li>Developing a paragraph: Structure and methods</li> <li>Paragraph writing (100-120 words)</li> </ul>	12 Hours
Unit-4:	<ul> <li>Strategies &amp; Structure of Oral Presentation</li> <li>Purpose, Organizing content, Audience &amp; Locale, Audio- visual aids, Body langauge</li> <li>Voice dynamics: Five P's - Pace, Power, Pronunciation, Pause, and Pitch.</li> <li>Modes of speech delivery and 5 W's of presentation</li> </ul>	8 Hours
Unit-5:	Value based text reading: Short Essay (Non- detailed study) How should one Read a book? - Virginia Woolf	6 Hours
<u>Text Books:</u>	1. Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	
<u>Reference</u> <u>Books:</u>	<ol> <li>Nesfield J.C. "English Grammar Composition &amp; Usage" Macmillan Publishers</li> <li>Sood Madan "The Business letters" Goodwill Publishing House, New Delhi</li> <li>Kumar Sanjay &amp;Pushplata "Communication Skills" Oxford University Press, New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronics</u> <u>Reference</u> <u>Material</u>	<ol> <li>https://www.youtube.com/watch?v=A0uekze2GOU</li> <li>https://www.youtube.com/watch?v=JIKU_WT0Bls</li> <li>https://www.youtube.com/watch?v=3Tu1jN65slw</li> <li>https://youtu.be/sb6ZZ2p3hEM</li> </ol>	

	5 https://youtu.be/yV6-cgShhac					
	Chttrael/wenterhologAvYrrOOpDr					
	0. https://youtu.be/cc4yAwOQSBK					
	7. https://youtu.be/yY6-cgShhac					
	8. https://youtu.be/84qoeCofXXQ					
	9. https://www.youtube.com/watch?v=-9MXmxLisI8&t=28s					
	1. Words and exercises, usage in sentences.					
	2. Language Lab software.					
	3. Sentence construction on daily activities and conversations.					
	4. Format and layout to be taught with the help of samples and					
	preparing letters on different subjects.					
Methodologies	5. JAM sessions and Picture presentation.					
:	6. Tongue twisters, Newspaper reading and short movies.					
	7. Modern Teaching tools (PPT Presentation, Tongue-					
	Twisters& Motivational videos with sub-titles) will be					
	utilized.					
	<b>8.</b> Text reading: discussion in detail, critical appreciation by					
	reading the text to develop students' reading habits with voice					
	modulation.					

## **Evaluation Scheme**

In	ternal Evaluatio	n	External E	valuation	Total Marks
	40 Marks		60 Marks		
20 Marks (Best 2 out of Three	10 Marks (Oral		40 Marks (External Written	20 Marks	
CTs)	Assignments)	10 Marks	Examination)	(External Viva)*	100
(From Unit- I, III & V)	(From Unit- II &IV)	(Attendance)	(From Unit-1, III & V)	(From Unit- II & IV)	100

## \*Parameters of External Viva

Content	Body Language	Communication skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising a) One Faculty teaching the class

**b)** One examiner nominated by University Examination cell.

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

	B.Tech- Semester-II	L-0			
<u>Course Code:</u> EME261	<b>Engineering Drawing (Lab)</b>	1-0 P-4 C-2			
Course Outcomes:	On completion of the course, the students will be :				
CO1.	Understanding the concepts of Engineering Drawing.				
CO2.	<b>Understanding</b> how to draw and represent the shape, size & specifications of physical objects.				
CO3.	Applying the principles of projection and sectioning.				
CO4.	<b>Applying</b> the concepts of development of the lateral surface of a given object.				
CO5.	<b>Creating</b> isometric projection of the given orthographic projection.				
LIST OF EXPERIMENTS:	All to be performed				
	To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per				
1	the standard dimensions.				
2	To draw the types of lines and conventions of different materials.				
3	To draw and study dimensioning and Tolerance				
4	To construction geometrical figures of Pentagon and Hexagon				
5	To draw the projection of points and lines				
6	To draw the Orthographic Projection of given object in First Angle				
7	To draw the Orthographic Projection of given object in Third Angle				
8 To draw the sectional view of a given object					
9	To draw the development of the lateral surface of given object				
10	To draw the isometric projection of the given orthographic projection.				

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

## **Evaluation scheme:**

PRACTICA	L PERFORMA SEMESTER	NCE & VIVA DU	ON THE DAY	Y OF EXAM	τοται	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

	B.Tech- Semester-II	L-0
<u>Course Code:</u> EME262	Workshop Practice (Lab)	T-0 P-4 C-2
Course Outcomes:	On completion of the course, the students will be :	
C01.	<b>Understanding</b> the concepts to prepare simple wooden joints using wood working tools.	
CO2.	<b>Applying</b> the techniques to produce fitting jobs of specified dimensions.	
СОЗ.	<b>Applying</b> the concepts to prepare simple lap, butt, T and corner joints using arc welding equipment.	
CO4.	<b>Applying</b> the concepts of black smithy and lathe machine to produce different jobs.	
CO5.	Creating core and moulds for casting.	
LIST OF	Perform any ten experiments selecting at least one from	
<b>EXPERIMENTS:</b>	each shop	
1	<ul> <li>Carpentry Shop:</li> <li>1. To prepare half-lap corner joint.</li> <li>2. To prepare mortise &amp;tenon joint.</li> <li>3. To prepare a cylindrical pattern on woodworking lathe.</li> </ul>	
2	<ul> <li>Fitting Bench Working Shop:</li> <li>1. To prepare a V-joint fitting</li> <li>2. To prepare a U-joint fitting</li> <li>3. To prepare a internal thread in a plate with the help of tapping process</li> </ul>	
3	<ul><li>Black Smithy Shop:</li><li>1. To prepare a square rod from given circular rod</li><li>2. To prepare a square U- shape from given circular rod</li></ul>	
4	<ul> <li>Welding Shop:</li> <li>1. To prepare a butt and Lap welded joints using arc welding machine.</li> <li>2. To prepare a Lap welded joint Gas welding equipment.</li> <li>3. To prepare a Lap welded joint using spot welding machine</li> </ul>	
5	<ul><li>Sheet-metal Shop:</li><li>1. To make round duct of GI sheet using 'soldering' process.</li><li>2. To prepare a tray of GI by fabrication</li></ul>	
6	<ul> <li>Machine Shop:</li> <li>1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c.</li> <li>2. To perform the following operations on Centre Lathe: Turning, Step turning, Taper turning, Facing, Grooving and Knurling</li> <li>3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.</li> </ul>	
7	<ul><li>Foundry Shop:</li><li>1. To prepare core as per given size.</li><li>2. To prepare a mould for given casting.</li></ul>	

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICA	AL PERFORMA SEMESTER	NCE & VIVA DU (35 MARKS)	ON THE DAY (15 MA	Y OF EXAM ARKS)	TOTAL	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

<u>Course</u> <u>Code:</u> ECE311	B.Tech (Civil)- Semester-III Fluid Mechanics	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Understanding</b> flow systems involving pipes, valves, fittings, and pumps for Newtonian fluids.	
<b>CO2.</b>	Understanding&solving hydrostatic problems	
<u> </u>	Analyzing the pressure distribution for incompressible fluids.	
CO4.	problems	
CO5.	Analyzing the performance characteristics and operational constraints of the appropriate kind of pumps, turbines	
Course Content:		
Unit-1:	Fluid and continuum, Physical properties of fluids, Rheology of fluids. Pressure-density-height relationship, manometers, pressure transducers, pressure on plane and curved surfaces, center of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.	8 Hours
Unit-2:	<b>Types of fluid flows:</b> Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and ir-rotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three-dimensional flows, streamlines, continuity equation for 3D and 1D flows, circulation, stream function and velocity potential. Dimensional analysis, important dimensionless numbers and their significance.	8 Hours
Unit-3:	<b>Potential Flow:</b> source, sink, doublet and half-body. Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturi meter and bend meter, Hot-wire anemometer and LDA, notches and weirs, momentum equation and its application to pipe bends. Similarity Laws: geometric, kinematics and dynamic similarity.	8 Hours
Unit-4:	Equation of motion for laminar flow through pipes, Stokes' law, transition from laminar to turbulent flow, turbulent flow, types of turbulent flow, isotropic, homogenous turbulence, scale and intensity of turbulence, measurement of turbulence, eddy viscosity, mixing length concept and velocity distribution inturbulent flow over smooth and rough surfaces, resistance to flow, minor losses, pipe in series and parallel, power transmission through a pipe, siphon, water hammer.	8 Hours
Unit-5:	Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer, laminar sub-layer, separation and its control, Drag and lift, drag on a sphere, a two- dimensional cylinder, and an airfoil, Magnus effect. Introduction to compressible flow.	8 Hours
<u>Text Books:</u>	<ol> <li>V Gupta and S K Gupta, "Fluid Mechanics and its Applications", Wiley Eastern Ltd</li> <li>Som and Biswas, "Introduction to Fluid Mechanics and Machines", Mc Graw Hill Publications</li> <li>Bansal R K , "Fluid Mechanics and Hydraulic Machines", Laxmi Publications</li> <li>Modi and Seth, "Hydraulics andFluid Mechanics including Hydraulic Machines", Standard Book House.</li> </ol>	

<u>Reference</u> <u>Books:</u>	<ol> <li>Grade.R J and A G Mirajgaonkar ,"Engineering Fluid Mechanics (Including Hydraulic Machines) Nemchand and Bros, Roorkee,</li> <li>V Gupta and S K Gupta, "Fluid Mechanics and its Applications", Wiley Eastern Ltd</li> <li>Som and Biswas, "Introduction to Fluid Mechanics and Machines", Mc Graw Hill Publications</li> <li>Bansal R K ,"Fluid Mechanics and Hydraulic Machines", Laxmi Publications</li> </ol>	
	*Latest editions of all the suggested books are recommended.	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=F_7OhKUYV5c&list=PL3F50D04B70 A5B935&ab_channel=nptelhrd https://www.youtube.com/watch?v=buKTOE9dOII&list=PL3F50D04B70A5B 935&ab_channel=nptelhrd	

<u>Course Code:</u> ECE361	B.Tech (Civil)- Semester-III Fluid Mechanics (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding different types of flow.	
CO2.	Verifying Bernoulli's theorem.	
CO3.	Measuring the velocity of flow at different points in a pipe.	
CO4.	Calibration of an orifice meter and venturimeter and to study the variation of the co-efficient of discharge with the Reynolds number.	
CO5.	Determining the surface tension of given fluid and determination of head loss for a sudden enlargement and sudden contraction.	
Experiments:	Note: Minimum ten experiments should be performed:	
Experiment-1:	To verify the momentum equation using the experimental set-up on impact of jet.	
Experiment-2:	To determine the coefficient of discharge of an orifice of a given shape. Also determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.	
Experiment-3:	To calibrate an orifice meter and study the variation of the co-efficient of discharge with the Reynolds number.	
Experiment-4:	To calibrate a venturimeter and study the variation of the co-efficient of discharge with the Reynolds number.	
Experiment-5:	To study the flow behavior in pipe bend.	
Experiment-6:	To study different types of flow.	
Experiment-7:	To verify the Bernoulli's theorem.	
Experiment-8:	To determine Meta-centric height of a given ship model.	
Experiment-9:	To measure the velocity of flow at different points in a pipe.	
Experiment-10:	To study the losses due to friction in a pipe.	
Experiments- 11:	To study the flow of fluid through porous medium.	
Experiment-12:	To determine the surface tension of given fluid.	
Experiment-13:	To determine the head loss for a sudden enlargement.	
Experiment-14:	To determine the head loss for a sudden Contraction	

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE ON THE DAY OF EXAM (15						
	SEMESTER	(35 MARKS)		MAR	KS)	TOTAL
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	INTERNAL (50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course</u> <u>Code:</u> ECE312	B.Tech (Civil) - Semester-III Surveying	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be:	
C01.	<b>Understanding</b> the different methods and techniques of surveying and their application in surveying.	
CO2.	Applying modern surveying techniques, skills and tools to solve surveying problems.	
CO3.	Analyzing the angles and distances in the field.	
<b>CO4.</b>	Analysing topography of the area using contour maps.	
CO5.	Creating Plan, Orientation and maps.	
Course Content:		
Unit-1:	<b>Basics of surveying:</b> Importance of surveying; Examples from different fields; Classification of surveys -Plane and Geodetic Surveying; Control Points; Methods of locating a point; Principles of surveying, errors in measurements, Surveying instruments, Indian topographic maps, Scale of the map, Numbering system of toposheets.	8 Hours
Unit-2:	Linear measurements: Chain surveying, Direct and indirect methods, Chain and tape measurements, Accessories for chaining, Linear measurement with chain and tape, Errors in chaining, Tape corrections, Obstacles to chaining Measurement of angles and directions: Bearings and angles, compass surveying, types of compass, temporary adjustments of compass, magnetic bearings, Magnetic declination and its variations; Use and adjustment of compass, Calculations of included angles from bearings and from bearing to included angles.	8 Hours
Unit-3:	Levelling: Definition; Terms used in levelling; Types of levelling; Level and setting up of level; Dumpy level – Its construction & working, Temporary adjustment of a dumpy level; Methods of levelling - Rise and fall method & Height of collimation method. Traversing: Methods of traversing, plotting of traverse surveying, closing error, Balancing the traverse - Bowditch's method, transit method, graphical method and the axis method. Traverse computation; Computation of coordinates - latitude and departure; Omitted Measurements-Consecutive coordinates & numerical problems.	8 Hours
Unit-4:	<ul> <li>Theodolite Surveying: Theodolites- types, uses, methods of observation and booking of data.</li> <li>Temporary and permanent adjustments, Measurement of horizontal and vertical angles using it</li> <li>Contouring: Definition and characteristics of contours; Methods of contouring, Interpolation of contours; Use of contour maps</li> </ul>	8 Hours
Unit-5:	<b>Plane Table Surveying:</b> Description of Plane Table equipment& accessories; Temporary adjustments, Setting up of plane table; Different methods of Plane Table Surveying; Advantages and disadvantages of Plane Table surveying, Methods of plane table surveying-Radiation, Intersection and traversing.	8 Hours
Text Books:	<ol> <li>Punamia B. C. et al: "Surveying", Laxmi Publications Delhi</li> <li>Duggal S K. "Surveying Vol. I, II", McGraw Hill Publications.</li> </ol>	

<u>Reference</u> <u>Books:</u>	<ol> <li>Subramanian. R. "Surveying &amp; Leveling", Oxford University Press</li> <li>Chandra A. M. "Plane Surveying", New Age International</li> <li>Chandra A. M. "Higher Surveying", New Age International</li> <li>Venkatramaih C. "Text Book of Surveying", University Press</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=chhuq_t40rY&list=PL20A0651466E8A776& ab_channel=nptelhrd	

<u>Course Code:</u> ECE360	B.Tech (Civil)- Semester-III Surveying (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	On completion of the course, the students will be:	
C01.	Demonstrating knowledge of various surveying methods.	
CO2.	Conducting a chain survey and compass survey.	
соз.	Determining angles and distances in the field using compass and theodolite.	
CO4.	Applying modern surveying techniques, Conduct levelling survey and be able to do RL calculations.	
CO5.	Creating topography of the area cross section using contour maps.	
Experiments:	Note: Minimum Nine experiments should be performed:	
Experiment-1:	To prepare conventional symbol chart based on the study of topographical maps.	
Experiment-2:	To locate offset along a chain line.	
Experiment-3:	Plotting of Building Block by offset with the help of chain surveying.	
Experiment-4:	To determine the magnetic bearing of a line in an open traverse using prismatic compass/surveyor compass.	
Experiment-5:	To measure bearings of a closed traverse by prismaticcompass/surveyor compass and to adjust the traverse by graphical method.	
Experiment-6:	To find out reduced levels of given points using Dumpy level/ Tilting level.	
Experiment-7:	To locate the objects from a single station by radiation method using Plane table.	
Experiment-8:	To locate the objects by Intersection method using Plane table.	
Experiment-9:	To determine the close traversing using Plane table.	
Experiment-10:	To study parts and to carry out temporary adjustment of theodolite.	

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICA	AL PERFORMA SEMESTER	NCE & VIVA DU (35 MARKS)	URING THE	ON THE DAY (15 MA	Y OF EXAM ARKS)	TOTAL
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course</u> <u>Code:</u> ECE313	B.Tech (Civil)- Semester-III Building Materials & Construction	L-3 T-0 P-0 C-3		
Course Outcomes	On completion of the course, the students will be:			
CO1.	Selecting appropriate material for construction of buildings.			
CO2.	Designing and testing the material either in laboratory or in the field before their actual use at the site.			
СОЗ.	Identifying the methods for defect and preservation of timber.			
CO4.	Analyzing dampness and its preventive measures.			
CO5.	Demonstrating the manufacturing of clay bricks in kiln, work at site for shallow foundation, beams ad columns at nearby site.			
Course Content:				
Unit-1:	Classification and properties of Engineering Materials: Stones: Properties of stones, classification of rocks, sources of stones, quarrying of stones, tests for stones Bricks: Manufacturing process of clay bricks, classification of clay bricks, Properties of clay bricks, Composition of brick earth. Tiles: Properties, types and uses Lime: Properties of limes.	8 Hours		
Unit-2:	<b>Cement</b> : Chemical composition, Properties of good cement, Uses and tests of cement <b>Cement Concrete</b> : Properties, Constituents of concrete, their properties, tests on concrete <b>Timber</b> : Classification and identification of timber, Fundamental Engineering Properties of timber, Seasoning of timber, Defects in timber.	8 Hours		
Unit-3:	Asphant. Properties and uses of Brunnen and Tail         Ferrous metals: Desirable properties of cast iron and reinforcing steel         Non-Ferrous Metals: Brief discussion on properties and uses of Aluminum         Glass: Ingredients, properties types and use in construction         Gypsum: properties and uses of gypsum.	8 Hours		
Unit-4:	Masonry: Definition and types of masonry, Rubble masonry and ashlar masonry Damp proofing: Causes and effects of damp proofing, methods of damp prevention, Termite treatment in buildings: termite and its treatment Partition wall, Cavity wall, Bricks and stone masonry construction.	8 Hours		
Unit-5:	<ul> <li>Foundation: Definition and purpose, Types of foundation</li> <li>Shallow Foundation: Definition, purposes and need, types of shallow foundation-spread, combined and raft footings</li> <li>Doors, Windows and Roofs: Location and size of doors, types of doors and Windows, size specifications for windows. Roof and its type.</li> <li>Ventilation and Air conditioning: its purposes and necessity.</li> </ul>	8 Hours		
<u>Text</u> <u>Books:</u>	<ol> <li>Duggal S K, "Building Materials", New Age International.</li> <li>Punmia B.C., "A Text Book of Building Construction", Laxmi Publications, Delhi</li> </ol>			
<u>Reference</u> <u>Books:</u>	<ol> <li>Varghese P.C., "Building Materials", PHI.</li> <li>Varghese P.C, "Building Construction", PHI.</li> <li>SoniS.K., "Building Materials and Construction", S K Kataria&amp; Sons, New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>			

Additiona       Image: Material       https://www.youtube.com/watch?v=EIDXE28_8eQ&list=PL8BA090E69BF         Electronic       01BC2&ab_channel=nptelhrd       01BC2&ab_channel=nptelhrd	
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<u>Course Code:</u> ECE362	B.Tech (Civil)- Semester-III Building Planning and Drawing Using CAD (Lab)					
Course Outcomes:	On completion of the course, the students will be:					
CO1.	Preparing the SITE-PLAN of a purposed residential building.					
CO2.	Preparing the ELEVATION & SECTION of the given model by using Autodesk Revit Architecture.					
CO3.	Creating a PLAN of a given 2B.H.K (Bedroom, Hall & Kitchen) model.					
CO4.	Creating of an ELEVATION & SECTION of the given 2 B.H.K (Bedroom, Hall & Kitchen) plan.					
CO5.	Creating the 2D &3D model of the given 2B.H.K (Bedroom, Hall & Kitchen) plan.					
<b>Experiments:</b>	Note: All experiments should be performed:					
Experiment-1:	To create a PLAN of a given 2B.H.K (Bedroom, Hall & Kitchen) model.					
Experiment-2:	To create an ELEVATION & SECTION of the given 2 B.H.K (Bedroom, Hall & Kitchen) plan.					
Experiment-3:	To create the TOP & SIDE view of the given dining table.					
Experiment-4:	To create the ONE-POINT Perspective View of the given modular kitchen.					
Experiment-5:	To create the ELEVATION of a building by TWO-POINT Perspective View.					
Experiment-6:	To prepare the SITE-PLAN of a purposed residential building.					
Experiment-7:	To create a 2D plan of 2B.H.K (Bedroom, Hall & Kitchen) with complete interior i.e table, chair, bed, sofaetc					
Experiment-8:	To create the 3D model of the given 2B.H.K (Bedroom, Hall & Kitchen) plan.					
Experiment-9:	To create the 3D model of 2B.H.K (Bedroom, Hall & Kitchen) plan on Autodesk Revit Architecture.					
Experiment-10:	To prepare the ELEVATION & SECTION of the given model by using Autodesk Revit Architecture.					
	1. "Auto CAD", Auto Desk, Reference Guide, CADD CENTRE.					
Reference	2. "Revit Architecture", Auto Desk, Reference Guide, CADD					
Books:	CENTRE.					
	* Latest editions of all the suggested books are recommended.					

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

## **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course</u> <u>Code:</u> ECE314	B.Tech (Civil)- Semester-III Concrete Technology	L-3 T-1 P-0 C-4		
Course Outcomes:	On completion of the course, the students will be:			
C01.	Understanding the functional role of ingredients of concrete.			
CO2.	Outlining the importance of testing of cement and its properties.			
CO3.	Designing different grades of concrete.			
CO4.	Summarizing the concept of workability and testing of concrete.			
CO5.	Applying fundamental knowledge in the fresh and hardened properties of concrete.			
Course Content:				
Unit-1:	Cements & Admixtures: Portland cement – chemical composition, Hydration, Setting of cement; Structure of hydrate cement; Tests of physical properties; Different grades of cement; Admixtures. – Mineral and chemical admixtures.	8 Hours		
Unit-2:	<b>Aggregates:</b> Classification of aggregate; Particle shape & texture; Bond; Strength & other mechanical properties of aggregate – Specific gravity, Bulk density, Porosity, Adsorption & Moisture content; Bulking of sand; Deleterious substance in aggregate; Soundness of aggregate; Alkali aggregate reaction; Thermal properties; Sieve analysis; Fineness modulus; Grading curves –Grading of fine & coarse Aggregates; Gap graded aggregate; Maximum aggregate size.	8 Hours		
Unit-3:	<ul> <li>Fresh Concrete: Workability; Factors affecting workability; Measurement of workability by different tests; Setting times of concrete; Segregation &amp; bleeding; Mixing and vibration of concrete; Steps in manufacture of concrete; Quality of mixing water.</li> <li>Special Concretes: Light weight aggregates; Light weight aggregate concrete; Cellular concrete; No-fines concrete; High density concrete; Fibre-reinforced concrete (F.R.C.); Different types of fibres; Factors affecting properties of F.R.C.; Applications of F.R.C.; Polymer concrete – Types, Properties and Applications; High performance concrete; Self consolidating</li> </ul>			
Unit-4:	<ul> <li>concrete; SIFCON.</li> <li>Hardened Concrete: Water /Cement ratio; Curing; Abram's Law; Nature of strength of concrete; Maturity concept; Strength in tension &amp; compression; Factors affecting strength.</li> <li>Mix Design: Factors in the choice of mix proportions; Durability of concrete; Quality Control of concrete – Statistical methods; Acceptance criteria; Proportioning of concrete mines hyperprises methods.</li> </ul>			
Unit-5:	Testing of Hardened Concrete: Tests for Compression, Tension, Flexure,         Splitting; Nondestructivetesting methods; Codal provisions for NDT.         Creep & Shrinkage: Creep and its Nature; Factors influencing creep; Relation         between creep & time; Effects of creep; Shrinkage and types of shrinkage.			
<b>Text</b> Books:	1. Shetty M.S., "Concrete Technology", S.Chand& Co.			
Reference Books:	<ol> <li>Gambhir M.L., "Concrete Technology", Tata Mc. Graw Hill Publishers, New Delhi.</li> <li>Santha Kumar. A.R., "Concrete Technology", Oxford University Press, New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>			

Course	B. Tech (Civil)- Semester-III				
<u>Code:</u> EME311	Engineering Mechanics	P-0			
~		C-4			
Course Outcomes:	On completion of the course, the students will be :				
C01.	<b>Understanding</b> the system of forces, free body diagrams and resultant of forces and/or moments.				
CO2.	<b>Applying</b> the laws of mechanics to determine efficiency of simple machines with consideration of friction.				
CO3.	Analyzing the loads and support reactions on a structural member.				
<b>CO4.</b>	Analyzing the planner areas and location of their centroid.				
CO5.	<b>Evaluating</b> the internal reactions in a beam; draw correct shear-force and bending moment diagrams.				
Course Content:					
Unit-1:	Force systems and analysis: Concepts of force and force systems; Resultant of force systems; Determination of Resultant of coplanar, concurrent force system; Resolution and composition of forces; Resultant of coplanar and non-concurrent force system Equilibrium: Concepts of equilibrium; Types of loads; Types of supports; Conditions of equilibrium for coplanar force system; Body constraints and free body diagrams; Moments of a force; Moment and arm of a couple; Beam reactions;	8 Hours			
Unit-2:	Friction: Introduction; Definitions; Types of Friction; Coulomb's law of friction; Angle of Repose; simple cases of equilibrium of bodies involving dry fiction.	8 Hours			
Unit-3:	Shear Force and Bending Moment Definitions- Types of beams; Conception of shear Force and Bending Moment- Sign conventions- Sagging and hogging moments- shear force and bending moment diagrams for cantilevers and simply supported beams subjected to point load, uniformly distributed loads	8 Hours			
Unit-4:	Properties of Section Centroid: Centre of gravity and Centroid; Centroid of plane areas; Centroid of Composite areas; some cases of location of centroid of common areas. Moment of Inertia: Area Moment of Inertia; Parallel axis theorem; Perpendicular axis theorem; Polar moment of inertia; Moment of inertia of composite sections; Radius of gyration.	8 Hours			
Unit-5:	Trusses: Introduction; Simple Trusses; Types of Trusses; Assumptions; Determination of Forces in simple trusses members; Methods of joints. Torsion: Introduction; pure torsion; Theory of pure torsion; assumptions in theory of pure torsion; Torsional moment of resistance; polar modulus of shafts of circular section; power transmitted by a circular shaft; Shear stress and twist due to torque.	8 Hours			
<u>Text</u> <u>Books:</u>	<ol> <li>Bansal R. K., "A Text book of Engineering Mechanics", Laxmi Publications.</li> <li>Kumar D. S., "A Text book of Engineering Mechanics", S. K. Kataria&amp; Sons.</li> <li>Kumar K. L., "Engineering Mechanics", Tata McGraw Hill Publication.</li> <li>Khurmi R. S., "Engineering Mechanics", S. Chand Publications.</li> </ol>				
Reference Books:	<ol> <li>S. Ramamrutham, "Strength of materials", Dhanpat Rai Publishing company</li> <li>Singer F.L "Engineering Mechanics Statics and Dynamics", Harper International edition</li> </ol>				
	* Latest editions of all the suggested books are recommended.				
Additional Electronic Reference <u>Material</u>	<u>nttps://www.youtube.com/watch?v=nGtv1NtNwnk&amp;list=PLOSWwFv98rfKXq</u> 2KBphJz95rao7q8PpwT&ab_channel=NPTEL-NOCIITM				

<u>Course Code:</u> ECE363	B.Tech (Civil)- Semester-III Material Testing (Lab)					
Course Outcomes:	On completion of the course, the students will be:					
C01.	Demonstrating knowledge of properties of various building materials.					
CO2.	Determining the setting time, specific gravity and compressive strength of Cement.					
СОЗ.	Determining the flakiness and elongation index, specific gravity and compressive strength of aggregate.					
CO4.	Determining Workability of the concrete.					
CO5.	Designing Concrete Mix.					
<b>Experiments:</b>	Note: Minimum ten experiments should be performed-					
Experiment-1:	To measure dimensions of bricks and determine the water absorption capacity brick.					
Experiment-2:	To determine the efflorescence and compressive strength of bricks.					
Experiment-3:	To determine the normal consistency of cement.					
Experiment-4:	To determine the initial and final setting time of cement.					
Experiment-5:	To determine the specific gravity and fineness of cement.					
Experiment-6:	To determine the soundness and fineness of cement.					
Experiment-7:	To determine the compressive strength of cement.					
Experiment-8:	To determine the flakiness and elongation index of aggregates.					
Experiment-9:	To determine bulking of fine aggregates and silt content of a fine aggregate sample.					
Experiment-10:	To determine the water absorption and specific gravity of aggregates.					
Experiments-11:	To determine the Workability of concrete by slump cone and Vee-bee consist meter.					
Experiment-12:	To determine the compressive strength and split tensile strength of concrete.					
Experiment-13:	Concrete Mix design by IS code method as per 10262-2007 & 456-2000.					
Experiment-14:	Nondestructive Testing - Rebound Hammer test.					

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal
	Value Added Course										
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Course Code:	B.Tech Semester-III	L-2 T-1									
TMUGA-301	Foundation in Quantitative Aptitude	P-0 C-0									
Course Outcomes:	On completion of the course, the students will be :										
CO1.	Solving complex problems using Criss cross method, base method and square techniques.										
CO2.	Applying the arithmetical concepts of Average, Mixture and Allegation.										
C03.	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.										
CO4.	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.										
Course											
Content:	Sneed calculations										
Unit-1:	Squares till 1000,square root, multiplications: base 100, 200 300 etc., 11-19, crisscross method for 2X2, 3X3, 4X4, 2X3, 2X4 etc., cubes, cube root	3 Hours									
Unit-2:	<b>Percentages</b> Basic calculation, ratio equivalent, base, change of base, multiplying factor, percentage change, increment, decrement, successive percentages, word problems	5 Hours									
Unit-3:	<b>Profit Loss Discount</b> Basic definition, formula, concept of mark up, discount, relation with successive change, faulty weights	5 Hours									
Unit-4:	<b>SI and CI</b> Simple Interest, finding time and rate, Compound Interest, difference between SI and CI, Installments	4 Hours									
Unit-5:	Averages Basic Averages, Concept of Distribution, Weighted Average, equations	3 Hours									
Unit-6:	Mixtures and allegations Mixtures of 2 components, mixtures of 3 components, Replacements	5 Hours									
Unit-7:	Blood relations Indicating type, operator type, family tree type	3 Hours									
Unit-8:	Direction sense Simple statements, shadow type	2 Hours									
<u>Reference</u> <u>Books:</u>	<ul> <li>R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude</li> <li>R2:-Quantitative Aptitude by R.S. Agrawal</li> <li>R3:-M Tyra: Quicker Maths</li> <li>R4:-Nishith K Sinha:- Quantitative Aptitude for CAT</li> <li>R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com</li> <li>R6:-Logical Reasoning by Nishith K Sinha</li> <li>R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal</li> <li>* Latest editions of all the suggested books are recommended.</li> </ul>										

<u>Course Code:</u> ECE411	B.Tech (Civil)- Semester-IV Geoinformatics	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be:	
C01.	<b>Understanding</b> basic concepts and practices of remote sensing and Geographic Information Systems (GIS).	
CO2.	<b>Understanding</b> the role of complex network systems that handles Geo-information.	
CO3.	Applying GIS analysis to address geospatial problems.	
CO4.	Analysing the primary data using a Global Positioning System (GPS).	
CO5.	<b>Applying</b> the knowledge to use advance surveying tools such as total station and EDM instruments.	
Course Content:		
Unit-1:	<ul> <li>Photogrammetry: Introduction, Aerial photographs, Type of aerial photographs; Comparison of Aerial photograph and Map; Advantages and limitation of air photo interpretation.</li> <li>Stereoscopic vision: Different types of stereoscopes; Stereo model.</li> <li>Visual Interpretation: Elements of visual interpretation; uses of photogrammetry.</li> </ul>	8 Hours
Unit-2:	<b>Remote Sensing:</b> Introduction; Energy in electromagnetic waves; Electromagnetic spectrum; Interaction of EMR with atmosphere; Interaction of EMR with earth's surface, Ideal remote sensing system <b>Data Acquisition System:</b> sensors, and platforms; Resolution concept in remote sensing. Application of remote sensing in civil engineering.	8 Hours
Unit-3:	<b>Geographical Information System:</b> Definition, terminology and data types, Map projection and Co-ordinate system, basic components of GIS, Raster & Vector data formats; Capabilities/Functionalities of GIS; Map Overlay Analysis; Data Quality; Sources of errors in GIS; Applications of GIS: Selective GIS Software	8 Hours
Unit-4:	<b>Global Positioning Systems:</b> Introduction, Components of GPS- Satellite Constellation, Operational Control Segment, User Segment; GPS Instrumentation, Satellite Ranging, Satellite Communication, GPS Codes, Pseudo Range, Advantages of GPS over Conventional Surveying methods, GPS Coordinates system, , Applications of GPS.	8 Hours
Unit-5:	<b>Electromagnetic Distance Measurement (EDM):</b> Introduction; Electromagnetic waves; Basic definitions, carrier waves, Methods of Modulation; Electro Optical EDM Instruments - Geodimeters, Infrared EDM Instruments-Distomats; Microwave EDM Instruments- Tellurometers; Total Station and its uses.	8 Hours
<u>Text Books:</u>	1. Duggal S K, "Surveying", Tata McGraw Hill Publications	
<u>Reference Books:</u>	<ol> <li>Clark D, "Plane and Geodetic Surveying, Vols. I and II", C.B.S. Publishers and Distributions, Delhi.</li> <li>M L Jhanwar&amp; T S Chouhan, "Remote Sensing &amp; Photogrammetry", VigyanPrakashan, Jhodhpur</li> <li>Wolf P R., "Elements of Photogrammetry", McGraw-Hill Book Company</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Electronic</u> <u>reference</u> <u>material :</u>	<ol> <li><u>https://www.youtube.com/watch?v=DlgMi7b0P7k</u></li> <li><u>https://www.youtube.com/watch?v=1zwg-siuvuc</u></li> <li><u>https://www.youtube.com/watch?v=-5dfbW57EwE</u></li> <li><u>https://www.youtube.com/watch?v=08wH5k4uJ3s</u></li> <li><u>https://www.youtube.com/watch?v=KyGwfjvuJBc</u></li> </ol>	
<u>Course Code:</u> <u>Course Code</u> :		L-0 T-0

ECE461	B.Tech (Civil)- Semester-IV	P-2 C-1
	<b>Geoinformatics (Lab)</b>	
<b>Course outcomes</b>	On completion of the course, the students will be to :	
CO1.	<b>Understanding</b> and impart the knowledge of basic principles of surveying, different types of surveying and applications.	
CO2.	Analysing and preparing a map or a plan to represent an area on a horizontal plan.	
CO3.	Analysing the concepts and fundamentals of GIS.	
CO4.	Analysing the relative position of any object or point of the earth.	
CO5.	<b>Creating</b> various methods through the knowledge of modern science and the technology and use them in the field.	
Experiments:	Note: Minimum ten experiments should be performed:	
Experiment-1:	To read and study toposheet of Survey of India	
<b>Experiment-2:</b>	To study conventional sign and symbols on a map	
Experiment-3:	To conduct precise levelling using auto level	
Experiment-4:	Fly levelling using auto level	
Experiment-5:	To determine the height of an object using digital theodolite	
Experiment-6:	To calculate the internal angle in close traverse using digital theodolite	
Experiment-7:	To study the various components of GPS in field	
Experiment-8:	To locate and track the position of an object using GPS	
Experiment-9:	Demonstration & determination of horizontal and vertical distances using total station	
Experiment-11:	To determine the horizontal and vertical angles and to compute the area using total station	
Experiment-11:	To measure the distances using EDM	

### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	RKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE412	B.Tech (Civil)- Semester-IV Mechanics of Solids	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Understanding</b> the behaviour of materials under different stress and strain conditions.	
CO2.	Understanding the concept of Hoop and Longitudinal stresses.	
СОЗ.	<b>Applying</b> bending moment, Shear force, bending stress and Shear tress distribution diagrams for beams.	
CO4.	<b>Analyzing</b> solid mechanics problems using classical methods and energy methods.	
CO5.	<b>Evaluating</b> the deflection for beams under different loading condition.	
Course		
Content:		
Unit-1:	Simple Stresses and Strains Definitions; Elastic, plastic and rigid materials; Stress, strain-Tensile and compressive stresses; Shear stresses; Elastic Limit- Hooke's Law-Stress-Strain curve for mild steel- Yield point- Modulus of Elasticity-Modular ratio; Modulus of rigidity; Bars of varying sections; Lateral Strain; Poisson ratio; volumetric strain; Bulk modulus; Relation between the elastic constants. Strain energy; stresses due to various types of axial loads-gradually applied load suddenly applied and impact loads.	8 Hours
Unit-2:	Shear Force, Bending Moment and Axial force Conception of shear Force and Bending Moment- Sign conventions- Sagging and hogging moments- shear force and bending moment diagrams for simply supported beams and overhanging beams, Beams subjected to various types of loading- point load, distribution loads, couples, Maximum bending moment for a beam, point of contra flexure, Inter relation between Shear force and bending moment diagrams.	8 Hours
Unit-3:	<b>Stresses in Beams</b> Definitions- Pure or Simple bending- Theory of simple bending- Neutral axis- Bending stress- Bending stress distribution- Moment of resistance, Derivation of Bending Equation-Assumption in the theory of bending- section Modulus, Section modulus for different shapes of beam sections- Rectangular, Circular, L and T section; Shear stress distribution for a beam section for Rectangular, I and T Section.	8 Hours
Unit-4:	<ul> <li>Direct and Bending stresses Introduction-Stress distribution for an eccentrically loaded rectangular and circular section; the middle third rule; Core or Kernel of a section.</li> <li>Thin cylinders &amp; spheres: Introduction, difference between thin walled and thick-walled pressure vessels. Thin walled spheres and cylinders, hoop and longitudinal stresses and strains, volumetric strain.</li> </ul>	8 Hours
Unit-5:	<b>Deflection of Beams</b> Derivation of differential equation of moment curvature relation, Differential equation relating deflection and moment shear and load, Deflection of simply supported and overhanging beams subjected to point and uniformly distributed loads using Macaulay's method; Boundary conditions. <b>Principal stresses and strains-</b> Determination of normal stress, tangential stress, Principal stresses, Principal planes and obliquity by analytical method.	8 Hours
<u>Text Books:</u>	<ol> <li>S.Ramamrutham&amp;Narain"Strength of Materials", Dhanpat Rai Publishing Company.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Timoshenko S, D.H.Yσung, "Elements of Strength of Materials", East West Press.</li> </ol>	

	2. Kazami S.M.A., "Mechanics of Solids", McGraw Hill	
	<ul><li>3. Rajput R.K, "Strength of Materials: Mechanics of Solids", S. Chand Limited.</li></ul>	
	*Latest editions of all the suggested books are recommended.	
	1. <u>https://www.youtube.com/watch?v=aQf6Q8t1FQE</u>	
	2. <u>https://www.youtube.com/watch?v=DRM1n5I-jkY</u>	
<b>Electronic</b>	3. <u>https://www.youtube.com/watch?v=f08Y39UiC-o</u>	
<u>reference</u>	4. <u>https://www.youtube.com/watch?v=T5CVUyKL8D0</u>	
<u>material :</u>	5. <u>https://www.youtube.com/watch?v=hYGOs7skoS0</u>	
	6. <u>https://www.youtube.com/watch?v=xqrVFypkbAA</u>	

<u>Course Code:</u> ECE462	B.Tech (Civil)- Semester-IV Mechanics of Solids (Lab)	L-0 T-0 P-2 C-1
Course outcomes	On completion of the course, the students will be able to :	
CO1.	<b>Understand</b> ing the basic experiments on bending, torsion, compression and hardness test.	
CO2.	<b>Understanding</b> the adequacy of mechanical and structural elements under different loads is essential for the design and safe evaluation of any kind of structure.	
соз.	<b>Understanding</b> the theory of elasticity including strain/displacement and Hooke's law relationships	
CO4.	<b>Evaluating</b> the allowable loads and associated allowable stresses before mechanical failure	
CO5.	Analyzing the stress, strain, and deflection suffered by bi-dimensional (and simple tri-dimensional) structural elements when subjected to different loads (e.g. normal, shear, torsion, bending and combined loads).	
<b>Experiments:</b>	Note: Minimum ten experiments should be performed:	
Experiment-1:	To determine the tensile strength of given mild steel sample.	
<b>Experiment-2:</b>	To determine the modulus of rigidity of a given mild steel sample.	
Experiment-3:	To determine the hardness of mild steel sample using Rockwell Hardness Testing Machine.	
Experiment-4:	To determine the stiffness of given helical spring.	
Experiment-5:	To determine the bending stress on simple supported beam.	
Experiment-6:	To determine the compressive strength of wood.	
Experiment-7:	To determine the shearing strength of given mild steel sample.	
Experiment-8:	To determine the impact value of given mild steel sample. (Izod test)	
Experiment-9:	To determine the impact value of given mild steel sample. (Charpy test)	
Experiment-11:	To conduct torsion test on mild steel to find out modulus of rigidity.	
Experiment-12:	To determine the hardness of mild steel sample using Brinell Hardness Testing Machine	

### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	ARKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course</u> <u>Code:</u> ECE413	B.Tech (Civil)- Semester-IV Engineering Geology & Soil Mechanics	L-3 T-3 P-1 C-4
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Understanding</b> the role of geology in the site selection, design and construction.	
CO2.	<b>Understanding</b> the soil and rocks using basic classification system for construction upon it.	
соз.	<b>Understanding</b> the structure present in rock and to apply ground improvement techniques.	
CO4.	<b>Applying</b> index properties of soil viz., moisture content, specific gravity, elastic limit, plastic limit, shrinkage limit and sieve analysis.	
CO5.	Analyzing and understand soil characterization and the Unified Soil Classification System	
Course Content:		
Unit-1:	<ul> <li>General Geology: Definition and scope of geology, its importance to Civil Engineers.</li> <li>Minerals: Physical properties of minerals and their occurrence and uses, physical properties of some common minerals viz., quartz, feldspar, muscovite, biotite, talc, gypsum, calcite, bauxite, hematite, pyrite, chalcopyrite, pyrolusite, galena &amp; graphite</li> <li>Rocks: Definition; Origin; Structure; Texture and classification of Igneous, sedimentary andmetamorphic rocks, Suitability of these rocks as engineering materials.</li> </ul>	8 Hours
Unit-2:	Geological processes: Weathering of rocks, agents of weathering, products of weathering, Erosion by running water, and winds and their engineering importance, Introduction of Engineering Seismology: Earthquakes and its causes, basic terminology, Earthquakes and its measurements, Seismic Zoning map of India Landslides: Definition, causes and effects. Types of landslides, Preventive measures	8 Hours
Unit-3:	Soil Mechanics: Introduction, Soil- physical properties, Soil formation; Soil profile Classification of soils: Necessity, Indian and unified classification Laboratory tests of Index properties of soil: Determination of water content, specific gravity and grain size distribution for coarse grained and fine-grained soils, Atterberg's limits- liquid limit and plastic limit.	8 Hours
Unit-4:	<ul> <li>Engineering properties of rocks: Introduction, Rocks as material for construction; Properties of building stones &amp; road materials</li> <li>Laboratory testing of rocks: compressive strength, absorption value, density, abrasive resistance, and durability.</li> <li>Improvement of sites: grouting, backfilling &amp; reinforcement, rock bolting</li> <li>Dams and Reservoirs: Geological study for selecting site for dam and reservoir</li> <li>Bridges and highways construction: Geological investigations</li> <li>Tunnels through rocks: Definition, Geological background for selecting a site for a tunnel.</li> <li>Structural Geology: Stratification, dip, strike, Faults, folds, joints and</li> </ul>	8 Hours
Unit-5:	theirengineering importance. <b>Geophysical Methods of Groundwater exploration:</b> Resistivity & seismic methods <b>Groundwater:</b> Mode of occurrence; Water bearing qualities of rocks – aquifer, aquifuges, and aquitard, types of aquifer & their functions, engineering considerations for groundwater.	8 Hours

<u>Text</u> <u>Books:</u>	<ol> <li>Singh Parbin, "Engineering and General Geology", K Kataria&amp; Sons, New Delhi.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Legeet, "Geology and Engineering", McGraw Hill Book Company.</li> <li>Blyth, "Geology for Engineers", ELBS.</li> <li>Krynine and Judd, "Engineering Geology and Geotechniques", McGraw Hill Book Company.</li> </ol>	
	*Latest editions of all the suggested books are recommended.	
	1. <u>https://www.youtube.com/watch?v=I6Kz8afBCuE&amp;feature=youtu.be</u>	
	2. <u>https://www.youtube.com/watch?v=S9ty-</u>	
	ta1wyI&list=PLesoWsbw80A4gTaIVB0ADJ0DGsCecdsd8	
	3. <u>https://www.youtube.com/watch?v=2n-njAQSpEY</u>	
<b>Electronic</b>	4. <u>https://www.youtube.com/watch?v=uffAEjkZMs0</u>	
<u>reference</u>	5. <u>https://www.youtube.com/watch?v=FSEtD73ibJY</u>	
<u>material :</u>	6. <u>https://www.youtube.com/watch?v=WrVL_KoTQeo</u>	
	7. <u>https://www.youtube.com/watch?v=jAdLrzJAUFA</u>	
	8. <u>https://www.youtube.com/watch?v=yGy9znirumw</u>	

<u>Course Code:</u> ECE463	B.Tech (Civil)- Semester-IV Engineering Geology & Soil Mechanics (Lab)				
Course outcomes	On completion of the course, the students will be able to:				
CO1.	Understanding the concept of minerals and rocks.				
CO2.	Understanding various physical and chemical properties of rocks.				
CO3.	Analysing the shear strength parameters for field conditions.				
CO4.	Analysing the Characteristics and classifying soils.				
CO5.	Creating topographical map for various contour map.				
Experiments:	Note: Minimum ten experiments should be performed:				
	Engineering Geology				
Experiment-1:	To identify minerals based on their physical properties.				
Experiment-2:	To identify rocks based on their physical properties.				
Experiment-3:	To draw topographical map from the given contour map.				
Experiment-4:	To determine the strike & dip of rock formation using geological map.				
Experiment-5:	To draw geological section from the given map.				
Experiment-6:	Study of different types of faults and folds through models.				
	Soil Mechanics				
Experiment-7:	To determine the particle size distribution in a soil sample (Sieve Analysis).				
Experiment-8:	To determine the moisture content of soil by pycnometer method.				
Experiment-9:	To determine the specific gravity of soil sample by pycnometer method				
Experiment-10:	To determine the liquid limit of a given soil sample.				
Experiment-11:	To determine the Shrinkage limit of a given soil sample				
Experiment-12:	To determine the plastic limit of a given soil sample.				

### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE414	B.Tech (Civil)- Semester-IV Transportation Engineering			
Course Outcomes:	On completion of the course, the students will be:			
CO1.	Understanding the geometric design of highway components.			
CO2.	<b>Understanding</b> the components and layout of stations, yards, and signalling, interlocking and control systems.			
CO3.	Understanding various components of docks and harbours.			
CO4.	<b>Applying</b> the characteristics of traffic for the design of signals, intersections and rotaries.			
CO5.	Analysing the railway track geometrically.			
Course				
Content:	Highway Engineering			
Unit-1:	Introduction: Role of Transportation, Modes of Transportation, History of road development, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan, Road types and pattern. Geometric Design: Cross sectional elements, camber, shoulder, sight distance, horizontal curves, super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves.	8 Hours		
Unit-2:	<b>Traffic Engineering:</b> Traffic characteristic, volume studies, speed study, capacity, density, traffic control devices, signs, signals, design of signals, Island, Intersection at grade and grade separated intersections, design of rotary intersection.			
Unit-3:	Kallway EngineeringIntroduction: Role of railways in transportation; Comparison of railway and highway transportation; Development of railway systems with particular reference to India; Classification of railways- Permanent way – Components and their functions – Rail joints – Welding of Rails – Creep of Rails –Rail fixtures & Fastenings.Track Geometric Design – Points & Crossings – Track drainage – Layout of Railway stations and yards – Signals – Interlocking – Track circuiting – Track Maintenance.	8 Hours		
Unit-4:	Airport Engineering Introduction; National and International Organizations; Aircraft Characteristics, Factors for Site Selection, General Layout of an Airport. Obstructions, Imaginary Surfaces. Runway Design: Wind Rose Diagram, Basic Runway Length, Corrections, Geometric Design Elements, Parking of aircrafts; Navigational aids.	8 Hours		
Unit-5:	Harbour and Docks Types – layout and planning principles – Break waters – Docks – Wharves and Quays – Transit sheds – Ware houses – Navigational Aids	8 Hours		
<u>Text Books:</u>	<ol> <li>S.K.Khanna&amp;C.E.G.Justo, "Highway Engineering", Nemchand&amp; Bros.</li> </ol>			
<u>Reference</u> <u>Books:</u>	<ol> <li>S.P.Bindra, "Highway Engineering", Dhanpat Rai &amp; Sons. Dr.L.R.Kadyali, "Traffic Engineering &amp; Transportation Planning", Khanna Publications.</li> <li>Virendhra Kumar &amp; StatishChandhra, "Air Transportation Planning &amp; Design", Gal Gotia Publishers.</li> </ol>			

	<b>3.</b> Robert M. Horonjeff, "Planning and Design of Airports",Mc Graw Hill Publications,	
	*Latest editions of all the suggested books are recommended.	
<u>Electronic</u> <u>reference</u> <u>material :</u>	1.       https://www.youtube.com/watch?v=9XIjqdk69O4         2.       https://www.youtube.com/watch?v=zDTXbiEUIPI         3.       https://www.youtube.com/watch?v=5N9x7aTOMKI         4.       https://www.youtube.com/watch?v=5QZ3eozyQfU         5.       https://www.youtube.com/watch?v=M72YQyeCW_I         6.       https://www.youtube.com/watch?v=Jht88rcspuM         7.       https://www.youtube.com/watch?v=3EZ3fos25UU         8.       https://www.youtube.com/watch?v=D1sniVDnKc4	

<u>Course Code:</u> ECE464	B.Tech (Civil)- Semester-IV Transportation Engineering (Lab)				
Course outcomes	On completion of the course, the students will be able to:				
CO1.	Understanding the safe working temperature of volatile pavement material.				
CO2.	Analysing various properties of pavement material like hardness, toughness etc.				
CO3.	Analysing the various type of pavement materials.				
CO4.	Analysing the quality control tests on pavements and pavement materials.				
CO5.	Analysing the various flexible pavement.				
Experiments:	Note: Minimum ten experiments should be performed:				
Experiment-1:	Crushing Value Test of Aggregate				
Experiment-2:	Impact Value Test of Aggregate				
Experiment-3:	Los Angeles Abrasion Value of Aggregate				
Experiment-4:	Specific Gravity and Water absorption test of Aggregates				
Experiment-5:	Soundness Test of aggregates				
Experiment-6:	Shape Test (Flakiness Index, Elongation Index) of Aggregate				
Experiment-7:	Stripping Value				
Experiment-8:	Penetration Test				
Experiment-9:	Softening point test				
Experiment-10:	Flash and fire point test				
Experiment-11:	Ductility test				
Experiment-12:	Viscosity Test				

### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	
SEMESTER (35 MARKS)				(15 MA	RKS)	TOTAL
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	INTERNAL (50 MARKS)

#### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Course Code: TMUGE401	B. Tech (Civil)- Semester-IV English Communication- III	L-2 T-0 P-2 C-3
Course	On completion of the course, the students will be	
<b>Outcomes:</b>	On completion of the course, the students will be :	
CO1.	Understanding knowledge of grammar to face competitive exams.	
CO2.	Understanding advance English language by using variety of words i.e.	
	idioms and phrase in variety of sentences in functional context.	
CO3.	Understanding listening for effective communication.	
<b>CO4</b> .	Applying their English grammar knowledge in day to day context.	
CO5.	Applying writing and comprehensive skills in English.	
CO6.	AnalyzingComprehending & enriching their vocabulary through prescribed text.	
Course		
Content:		
Unit-1:	<ul> <li>English Grammar &amp; Vocabulary</li> <li>Correction of Common Errors (with recap of English Grammar with its usage in practical context.)</li> <li>Synthesis: Simple, complex and compound sentence</li> <li>Commonly used Idioms &amp; phrases (Progressive learning whole semester)</li> </ul>	14 Hours
Unit-2:	<ul> <li>Speaking Skills</li> <li>Art of public speaking</li> <li>Common conversation</li> <li>Extempore</li> <li>Power Point Presentation (PPt) Skills: Nuances of presenting PPTs</li> </ul>	10 Hours
Unit-3:	<ul> <li>Comprehension Skills</li> <li>Strategies of Reading comprehension: Four S's</li> <li>How to solve a Comprehension (Short unseen passage: 150-200 words)</li> </ul>	6 Hours
Unit-4:	<ul><li>Professional Writing</li><li>Preparing Notice, Agenda &amp; Minutes of the Meeting</li></ul>	7 Hours
Unit-5:	<ul><li>Value based text reading: Short story</li><li>The Barber's Trade Union - Mulk Raj Anand</li></ul>	3 Hours
Text Books:	1. Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	
<u>Reference</u> <u>Books:</u>	<ol> <li>Wren &amp; Martin "High School English Grammar and Composition" S.Chand&amp;Co.Ltd., New Delhi.</li> <li>Kumar Sanjay &amp;Pushplata "Communication Skills" Oxford University Press, New Delhi.</li> <li>Agrawal, Malti "Professional Communication" KrishanaPrakashan Media (P) Ltd. Meerut.</li> </ol>	
	*Latest editions of all the suggested books are recommended.	
Additional	1-https://www.youtube.com/watch?v=dpYltVtsS_Q	
<u>Electronics</u>	2- https://www.youtube.com/watch?v=Z8HttKW8jVE	
<u>Material</u>	4-https://www.youtube.com/watch?v=En9-8xWYWqk 5-https://www.youtube.com/watch?v=aUEpmAo0OvM	
<u>Methodology:</u>	<ol> <li>Idiom &amp; Phrases and exercises, usage in sentences.</li> <li>Language Lab software.</li> <li>Power Point presentation.</li> <li>Newspaper reading, short articles from newspaper to comprehend and short movies.</li> <li>Modern Teaching tools (PPT Presentation &amp; Motivational videos with sub-</li> </ol>	

<ul><li>titles) will be utilized.</li><li>6. Text reading: discussion in detail, Critical appreciation by reading the text to develop students' reading habits with voice modulation.</li></ul>	
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## **Evaluation Scheme**

Internal Evaluation			External Eva	luation	Total Marks
40 Marks		60 Mark	S		
20 Marks (Best 2 out of Three CTs) (From Unit- I, III, IV & V)	10 Marks (Oral Assignments) (Unit -II)	10 Marks (Attendance)	40 Marks (External Written Examination) (From Unit-1, III, IV & V)	20 Marks (External Viva)* (Unit -II)	100

### **\*Parameters of External Viva**

Content	Body Language	Communication skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising *a*) One Faculty teaching the class

*b)* One examiner nominated by University Examination cell.

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

L-0

**T-0** 

**P-0** 

**C-0** 

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

	Value Added Course		
Course Code:	B.Tech Semester-IV	L-2 T-1	
TMUGA-401	Analytical Reasoning	P-0 C-0	
Course Outcomes:	On completion of the course, the students will be :		
CO1.	Applying the arithmetical concepts in Ratio Proportion Variation.		
CO2.	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.		
CO3.	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.		
CO4.	Examining the optimized approach to solve logs and Surds.		
Course			
Content:			
Unit-1:	<b>Ratio, proportions and variations</b> Concept of ratios, proportions, variations, properties and their applications	5 Hours	
Unit-2:	<b>Time and Work</b> Same efficiency, different efficiency, alternate work, application in Pipes and Cisterns	6 Hours	
Unit-3:	<b>Time Speed Distance</b> Average speed, proportionalities in Time, Distance, trains, boats, races, circular tracks	6 Hours	
Unit-4:	Logs and Surds Concept and properties of logs, surds and indices	4 Hours	
Unit-5:	<b>Coding and decoding</b> Sequential coding, reverse coding, abstract coding	3 Hours	
Unit-6:	Syllogisms Two statements, three statements	4 Hours	
Unit-7:	Venn diagram Basic concept and applications	2 Hours	
<u>Reference</u> <u>Books:</u>	<ul> <li>R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude</li> <li>R2:-Quantitative Aptitude by R.S. Agrawal</li> <li>R3:-M Tyra: Quicker Maths</li> <li>R4:-Nishith K Sinha:- Quantitative Aptitude for CAT</li> <li>R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com</li> <li>R6:-Logical Reasoning by Nishith K Sinha</li> <li>R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal</li> </ul> * Latest editions of all the suggested books are recommended.		

<u>Course</u> <u>Code:</u> ECE511	Course Code: ECE511B.Tech (Civil)- Semester-VCourseSteel Structure-ICourseOn completion of the course, the students will be a				
Course Outcomes:	On completion of the course, the students will be :				
CO1.	Remembering role of steel as structural material.				
CO2.	Understanding the behavior and properties of structural steel members.				
CO3.	Applying the relevant industry codes of practice.				
<b>CO4.</b>	Analyzing the different design philosophies.				
CO5.	<b>Evaluating and</b> designing different structural member's life tension, members, beams, compression and bending.				
Course Content:					
Unit-1:	<b>Introduction:</b> Steel as structural material; various grades of structural steel; Properties of variousrolled steel sections; Structural pipes; Introduction to various Codes - IS: 800, 875, 808, 816 etc.;Philosophy of limit state design- limits state of strength & serviceability Structural Fasteners;Riveted & bolted connections & their advantages and disadvantages; Welded connection; Types ofweld - butt & filled welds; IS Code requirements.	8 Hours			
Unit-2:	<b>Design of tension members:</b> Types of members; Net sectional area of plates, net effective areas for angles and tees in tension, permissible stresses, design of members subjected to axial tension				
Unit-3:	<b>Design of compression members:</b> Effective length of columns, slenderness ratio, permissible Stresses, Design of compression members. Design of axially loaded built up columns. Design of lacings & battens. Column splices.	8 Hours			
Unit-4:	<b>Design of flexural members: Beams</b> Bending stress, shear stress, bearing stress, deflection, design of laterally supported beam, web crippling, web buckling, Built-up beams, design of symmetrically plated beams.	8 Hours			
Unit-5:	<b>Design of column bases and footings:</b> Slab base, gusseted base, moment resistant bases for columns, attached base plate with initially tensioned bolts, attached base with un-tensioned bolts.	8 Hours			
<u>Text Books:</u>	<ol> <li>Duggal S K., "Design of Steel Structures", McGraw Hill Publications.</li> </ol>				
<u>Reference</u> <u>Books:</u>	<ol> <li>Shiyeker M R, "Limit state design in Structural Steel", PHI Learning Pvt. Ltd.</li> <li>Dayaratnam P., "Design of Steel Structure", S Chand Publishers.</li> <li>Raghupathi M., "Design of steel Structure", Tata McGraw Hill.</li> <li>Teaching Resource for Structural Steel Design, INSDAG Kolkata.</li> <li>S.Punmia B C, Ashok Kumar Jain &amp;Arun Kumar Jain, "Comprehensive Design of Steel Structures", Laxmi publication.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>				
<u>Electroonic</u> <u>Reference</u> <u>Material:</u>	https://www.digimat.in/nptel/courses/video/105105162/L01.html				

<u>Course Code:</u> ECE512	Course Code:       B.Tech (Civil)- Semester-V         ECE512       Geotechnical Engineering         Course       On completion of the course, the students will be :			
Course Outcomes:	On completion of the course, the students will be :			
C01.	Remembering basic geotechnical concepts.			
CO2.	Understanding the properties of soil.			
CO3.	Applying the procedure to find out the bearing capacity of soil.			
CO4.	<b>Analyzing</b> the soil including sub surface soil and apply them for the classification of soil.			
CO5.	<b>Evaluating</b> the strength of the soil.			
Course				
Content:				
Unit-1:	<b>Permeability and seepage</b> : Introduction, Hydraulic Gradient, Laminar & turbulent flow, Darcy's law, Discharge and seepage velocities, methods of determination of coefficients of permeability of soils, laboratory and field permeability tests, factors affecting permeability, surface tension and capillary phenomenon in soil, shrinkage and swelling of soil, seepage through soil, Flow nets and their properties, Laplace equation and its significance, Flow potential, seepage through earth dams, methods of dewatering, design of filters. <b>Stress distribution in soils</b> : Introduction, Boussinesq's and Westergaard's equation for vertical pressure due to point loads and uniformly distributed loads. Point load, Line loads, strip loads.	8 Hours		
Unit-2:	<ul> <li>Compressibility &amp; Consolidation:</li> <li>Consolidation Introduction, Consolidation&amp; its principle,</li> <li>Consolidation test, determination of pre-consolidation pressure and its significance, time factor and coefficient of consolidation, secondary compression, consolidation settlement and its rates.</li> <li>Compaction of soils: Definition, consolidation and compaction, objectives, compactivity effort, Laboratory compaction, Standard Proctor test, Modified Proctor test, IS compaction tests Field compaction and equipment, Factors influencing compaction, Effect of compaction on soil properties, Compaction specifications and field control.</li> </ul>	8 Hours		
Unit-3:	<ul> <li>Shear strength of soil: Introduction, Coulomb Equation, Methods of determining Shear strength parameters, Mohr Circle of stress, Mohr-coulomb failure theory, Peak and residual shear strengths, Laboratory and field measurement of shear strength of soil, Direct, Triaxial and Unconfined compression tests, vane shear tests.</li> <li>Bearing capacity of soils: Bearing capacity criteria and factors affecting it, Modes of shear failure, Theories of Bearing capacity, Foundation Pressures, Permissible settlements, Allowable bearing pressure, Field tests to estimate bearing capacity</li> </ul>	8 Hours		
Unit-4:	<b>Shallow foundations</b> : Introduction, Types of shallow foundations, selection of type of foundation, location and depth of foundation, causes of settlement, settlement analysis, Design of shallow foundations, design of combined footings, Mat foundations. <b>Deep foundations</b> : Classification of Piles, uses of piles, selection of piles & installation of piles, calculation of bearing capacity of a singlepile.	8 Hours		
Unit-5:	Lateral Earth Pressure: Limit analysis and Limit Equilibrium methods, Earth pressure at rest, Rankine's states of Plastic equilibrium, Earth pressure theories, Graphical methods to determine magnitude and location of resultant earth pressure; Concept of Arching of soils and braced cuts. Stability of slopes: Short and long-term failures, causes of failure, factor of safety, Concept of slope stability analysis.	8 Hours		
<u>Text Books:</u>	1. Ranjan Gopal and Rao A.S.R. – "Basic and Applied Soil Mechanics.			

<u>Reference</u> <u>Books:</u>	<ol> <li>Narasinga Rao, B.N.D, "Soil Mechanics &amp; Foundation Engineering", John Wiley&amp;Sons, Wiley India Pvt. Ltd., Daryaganj, New Delhi – 110 002.</li> <li>Das Brij Mohan – "Geotechnical Engineering", CENGAGE Learning.</li> <li>Khan I.H. – "Text Book of Geotechnical Engineering".</li> <li>V N S Murthy, "Soil Mechanics and Foundation Engineering", CBS Publ. &amp; Distributors P Ltd.</li> <li>Raj P. Purushottam–"Soil Mechanics and Foundation Engineering", Pearson Education in South Asia, New Delhi.</li> </ol>				
	*Latest editions of all the suggested books are recommended.				
Electroonichttps://www.youtube.com/watch?v=3tabkv8lxBgReferencehttps://www.youtube.com/watch?v=eqbOPTmUU0A					

<u>Course Code:</u> ECE562	B.Tech (Civil)- Semester-V Geotechnical Engineering (Lab)		
Course Outcomes:	On completion of the course, the students will be :		
CO1.	<b>Understanding</b> the procedure for collection of soil samples for testing in the lab.		
CO2.	<b>Determining</b> the index properties of soil.		
CO3.	<b>Determining</b> the engineering properties of soil.		
CO4.	Identifying soil based on standard practice.		
CO5.	<b>Classifying</b> the soil based on standard geotechnical engineering practice.		
<b>Experiments:</b>	Note: Minimum ten experiments should be performed-		
Experiment-1:	To determine the moisture content of soil using Hydrometer.		
Experiment-2:	To determine the Shrinkage limit of the given Soil Sample.		
Experiment-3:	To determine the optimum moisture content (OMC) of soil by Standard Proctor Test (Compaction Test)		
Experiment-4:	To determine the permeability of the soil by constant head test (Lab Permeability Test).		
Experiment-5:	To determine the permeability of the soil by falling head test (Lab Permeability Test).		
Experiment-6:	To determine the density of soil in the field (In situ Density - Sand Replacement).		
Experiment-7:	To determine the penetration value of the soil (Dynamic core Penetration Test).		
Experiment-8:	To determine the shear strength of soft clay in the field (Vane Shear Test).		
Experiment-9:	To determine the compressive strength of the soil (Unconfined Compression Test).		
Experiment-10:	To determine the shear strength of soil in the laboratory (Triaxial Shear Test).		

### **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Course Code: ECE513	B.Tech (Civil)- Semester-V Structural Analysis-I	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
C01.	<b>Remembering</b> the classification and basic concepts of civil engineering structures.	
CO2.	Understanding the behavior of determinate structures.	
СО3.	<b>Applying</b> the techniques to draw ILD for of statically determinate structures.	
CO4.	<b>Analyzing</b> the determinate structures by Slope Deflection and Moment Distribution Method.	
CO5.	<b>Evaluating</b> the displacements of statically determinate structures by strain energy methods.	
Course Content:		
Unit-1:	Introduction- Classification of Structures, statically determinate and indeterminate structures, Condition of equilibrium, compatibility conditions, degrees of freedom per node, Static and Kinematic indeterminacy for beams, trusses and building frames. <b>Fixed beams &amp; continuous beams</b> Analysis of fixed beams, Continuous beams- Clapeyron's theorem of three moments, fixed ends of continuous beams, supports at different level.	8 Hours
Unit-2:	<b>ILD for statically determinate beams</b> -ILD of support reaction, shear force and moment bending moment for beams subjected to udl and several point loads, criteria for maximum effects, ILD for statically determinate trusses.	8 Hours
Unit-3:	<b>Slope Deflection Method</b> - Continuous beams and rigid frames (with and without sway), Symmetry and anti-symmetry - Simplification for hinged end - Support displacements.	8 Hours
Unit-4:	<b>Moment Distribution Method:</b> Distribution and carry-over of moments, Stiffness and carry over factors - Analysis of continuous beams with sinking of supports, single story Portal frames with and without sway.	8 Hours
Unit-5:	<ul> <li>Strain Energy of deformable systems, Maxwell's reciprocal &amp;Betti's theorem, Castigliano's first theorem.</li> <li>Columns and Struts: Types of column, Buckling of columns, different end conditions, effective length, Euler's and Rankine's formulae, Factor of safety.</li> </ul>	8 Hours
<u>Text Books:</u>	1. <u>Bhavikatti</u> ,S.S."Structural Analysis I & II", Vikas Publishing House.	
<u>Reference</u> <u>Books:</u> <u>Electroonic</u>	<ol> <li>Reddy,C.S., "Basic Structural Analysis", Tata McGraw Hill.</li> <li>Jain,O.P.and Jain, B.K., "Theory &amp; Analysis of Structures", Nem Chand.</li> <li>Hibbler, R.C. "Structural Analysis", Pearson Education.</li> <li>Vazirani &amp; Ratwani et al, "Analysis of Structures", Khanna Publishers.</li> <li>S.Ramamrutham, S. "Theory of Structures", Dhanpat Rai Publishing Company Pvt. Ltd.</li> <li>*Latest editions of all the suggested books are recommended. https://www.youtube.com/watch?v=eVEN8etXkYc</li> </ol>	
<b>Reference</b> <b>Material:</b>	https://www.youtube.com/watch?v=G32pY3IWe0Q	

<u>Course Code:</u> ECE563	B.Tech (Civil)- Semester-V Structural Analysis-I (Lab)		
Course Outcomes:	On completion of the course, the students will be :		
C01.	Determining flexural rigidity of a given beam		
CO2.	Calculating deflections of truss structures and curved members		
соз.	<b>Applying</b> equations of equilibrium to structures and compute the reactions		
CO4.	Analysing the behaviour of columns		
CO5.	<b>Evaluating</b> horizontal displacement of two hinged arch practically and analytically.		
Experiments:	Note: Minimum ten experiments should be performed-		
Experiment-1:	To determine the flexural rigidity (EI) of a given beam.		
Experiment-2:	To determine the deflection of curved members.		
Experiment-3:	To find carry over factor for the beam with far end fixed		
Experiment-4:	To verify the Clark-Maxwell reciprocal theorem with simply supported beam		
Experiment-5:	To study behavior of different types of columns and find Euler's buckling load for each case.		
Experiment-6:	To find forces in elastically coupled beams.		
Experiment-7:	To study experimentally and analytically of three hinged arch.		
Experiment-8:	To study two hinged arch for the horizontal displacement of the roller end for a given system of loading and to compare the same with those obtained analytically.		
Experiment-9:	To determine the deflection of a pin connected truss analytically & graphically and verify the same experimentally.		
Experiment-10:	To determine the moment required to produce a given rotation (rotational stiffness) at one end of the beam when the other end is pinned.		

### **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	RKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE514	B.Tech (Civil)- Semester-V RCC Structure-I			
Course Outcomes:	On completion of the course, the students will be :			
<u>CO1.</u>	<b>Remembering</b> the properties of concrete.			
$\frac{CO2}{CO3}$	<b>Applying</b> the general mechanical behavior of reinforced concrete.			
<u> </u>	Analyzing and design flexural compression members.			
CO5.	Analyzing and design for deflection and crack control of reinforced concrete member.			
Course Content:				
Unit-1:	Properties of concrete and reinforcements, testing of concrete, Introduction to Various Design Philosophies, Design of Rectangular Singly and Doubly Reinforced Sections by Working Stress Method.	8 Hours		
Unit-2:	Design of Rectangular Singly and Doubly Reinforced beams, T-beams, L-beams by Limit State Design Method.	8 Hours		
Unit-3:	Behavior of RC beam in Shear, Shear Strength of beams with and without shear reinforcement, Minimum and Maximum shear reinforcement, design of beam in shear, Introduction to development length, Anchorage bond, flexural bond. (Detailed Examples by Limit State Design Method), Failure of beam under shear, Concept of Equivalent Shear and Moments.			
Unit-4:	Design of one way and two-way slabs by Limit State Design Method, Serviceability Limit States, Control of deflection, cracking and vibrations.	8 Hours		
Unit-5:	Design of Columns by Limit State Design Method- Effective height of columns, Assumptions, Minimum eccentricity, Short column under axial compression, requirements for reinforcement, Column with helical reinforcement, Short column under axial load and uni-axial bending, Design of columns under bi-axial loading by Design Charts; Introduction to Long Columns.			
<u>Text Books:</u>	1. Jain, A.K., "Reinforced Concrete: Limit State Design", Nem Chand & Bros., Roorkee.			
<u>Reference</u> <u>Books:</u>	<ol> <li>IS: 456 – 2000, "Code of Practice for Plain and Reinforced Concrete", Bureau of Indian Standards, New Delhi.</li> <li>IS: 800 (Part I, II, III, IV, V), "Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures", Bureau of Indian Standards, New Delhi.</li> <li>Gambhir, M L, "Fundamentals of Reinforced Concrete", Prentice Hall of India.</li> <li>Unnikrishna Pillai, S. &amp; D. Menon, "Reinforced Concrete Design", Mc-Graw Hill Company Limited.</li> <li>Sinha, S.N., "Reinforced Concrete Design" Mc-Graw Hill Book Publishing Company Ltd., New Delhi.</li> <li>Subramanian, N. "Design of Reinforced Concrete Structures", Oxford University Press New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>			
<u>Electroonic</u> <u>Reference</u> <u>Material:</u>	http://www.digimat.in/nptel/courses/video/105105/L10.html https://www.youtube.com/watch?v=ba3mZhOpsTM			

<u>Course Code:</u> ECE515	B.Tech (Civil)- Semester-V Hydrology& Irrigation Engineering	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Remembering</b> the various components of hydrologic cycle that affects the movement of water in the earth	
CO2.	Understanding various Stream flow measurements technique	
CO3.	Applying concepts of movement of ground water beneath the earth	
CO4.	<b>Analyzing</b> the water requirements of the crops irrigation and various irrigation techniques, requirements of the crops	
CO5.	Creating the unlined and lined irrigation canals.	
Course Content:		
Unit-1:	Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record - Rainfall Double Mass Curve. Runoff- Factors affecting Runoff - Runoff over a Catchment - Empirical and Rational Formulae. Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney	8 Hours
	&Criddle Methods - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices. Distribution of Runoff - Hydrograph Analysis Flood Hydrography - Effective Rainfall - Base Flow - Base Flow Separation - Direct Runoff Hydrograph	
Unit-2:	applications of Unit Hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph. Ground water Occurrence, types of aquifers, aquifer parameters,	8 Hours
Unit-3:	porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of well's, Well Construction - Well Development.	8 Hours
Unit-4:	Necessity and Importance of Irrigation, advantages and ill effects of irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility - Crop Roation, preparation of land for Irrigation, standards of quality for Irrigation water. Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging	8 Hours
Unit-5:	Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standard for a canal design, canal lining. Design Discharge over a catchment, Computation of design discharge rational formula, SCS curve number method, flood frequency analysis- Introductory Part Only. Stream Gauging - measurement and estimation of stream flow.	8 Hours
Text Books:	<ol> <li>Punmia BC &amp; Lal "Irrigation and Water Power Engineering", Laxmi Publications Pvt. Ltd., New Delhi.</li> </ol>	
<u>Reference</u> <u>Books:</u>	1. SinghV. P. "Elementary Hydrology", PHI publications.	

	2. Modi, P. N. "Irrigation and Water Resources & Water Power",
	Standard Book House.
	3. Dr. G. Venkata Ramana "Water Resources Engineering – I",
	Acadamic Publishing Company.
	4. Manjundar, D. K. "Irrigation Water Management", Printice Hall of India
	5. Garg S. K. "Irrigation and Hydraulic structures", Khanna Publishers
	<ol> <li>Reddy, Jayram, "Engineering Hydrology", Laxmi publications pvt. Ltd., New Delhi.</li> </ol>
	*Latest editions of all the suggested books are recommended.
<u>Electroonic</u>	https://www.youtube.com/watch?v=2hHDRv80j50
<u>Reference</u> <u>Material:</u>	https://www.youtube.com/watch?v=d_jbaOYh-kU

<u>Course Code:</u> ECE564	e: B.Tech (Civil)- Semester-V Survey Camp		
Course Outcomes:	On completion of the course, the students will be :		
CO1.	Understanding the importance of working in a team.		
CO2.	<b>Applying</b> rules to collect data for road alignment of (L-section and cross-section) a given gradient connecting any two stations.		
CO3.	Calculating earth work in a highway project.		
CO4.	Drawing and Interpreting the contours.		
CO5.	<b>Creating</b> a topographical plan of a given area.		
Experiment:	The camp will be for three to five days in the fifth semester. Students would be divided equally amongst the faculty of the Civil Engineering department who would oversee thedaily activity and the camp progress. Each team will consist of 3-4 students and the following activities shall be carried out during the camp. Students will be expected to use the latest equipment and methodology to complete the camp activities.		
Experiment-1:	Reconnaissance survey and selection of control points		
Experiment-2:	Establishment of control points and reconnaissance map preparation		
Experiment-3:	Theodolite observations of traverse/triangulation station		
Experiment-4:	Measurement of base lines of traverse/triangulation station		
Experiment-5:	Levelling and Bearing observations of traverse/triangulation station		
<b>Experiment-6:</b>	Adjustment of errors in observations and Computation of Coordinates		
Experiment-7:	Preparing grid on plane table sheet and draw the diagonal scale and plot the control stations with the help of coordinates		
Experiment-8:	Use of Radiation and Intersection methods to plot the details on Plane Table as well as taking the elevations		
Experiment-9:	Plotting the contours simultaneously with Plane Table work		
	Each group will complete the above and submit the report of the camp in the format along with the level book, calculation sheets and final results. The camp performance will be evaluated as in case of practical evaluation.		

The camp performance will be evaluated as in case of practical evaluation.

# **Evaluation Scheme of Practical Examination:**

### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE			ON THE DAY	Y OF EXAM	TOTAL	
SEMESTER (35 MARKS)			(15 MA	ARKS)		
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT FILE WORI	C VIVA	TOTAL EXTERNAL
(20 MARKS) (10 MARKS	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE592	B. Tech (Civil)- Semester-V Skill based Practical Training & Presentation	L-0 T-0 P-0 C-2
Course Procedure:		
	Students will have to undergo Skill based Practical Training(Certificate course) of four weeks in any industry or reputed organization or training centre after the IV semester examination in summer. The evaluation of this certificate course shall be included in the V semester evaluation. The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be the nodal officer for coordination of the training. Students will receive certificate after completion his/her training which will be duly signed by the officer under whom training was undertaken in the industry/ organization/training centre. The student at the end of the V semester will present his/her presentation about the training before a committee constituted by the Director/Principal of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The presentation session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.	
	The marking shall be as follows:	
Internal: 50 marks	By the Faculty Guide – 25 marks. By Committee appointed by the Director/Principal – 25 marks.	
External:50 marks	By External examiner appointed by the University – 50 marks	

L-0 T-0 P-0 C-0

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

	Value Added Course	
Course Code	B.Tech Semester-V	L-2 T 1
TMUGA-501	Modern Algebra and Data Management	P-0 C-0
Course Outcomes:	On completion of the course, the students will be :	
C01.	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.	
CO2.	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.	
CO3.	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.	
CO4.	Correlating the various arithmetic concepts to check sufficiency of data	
Course		
Content:	Number theory	
Unit-1:	Classification of Numbers, Divisibility Rules, HCF and LCM, Factors, Cyclicity(Unit Digit and Last Two digit), Remainder Theorem, Highest Power of a Number in a Factorial, Number of trailing zeroes	8 Hours
Unit-2:	<b>Data interpretation</b> Data Interpretation Basics, Bar Chart, Line Chart, Tabular Chart, Pie Chart, DI tables with missing values	7 Hours
Unit-3:	<b>Data Sufficiency</b> Introduction of Data Sufficiency, different topics based DS	5 Hours
Unit-4:	<b>Permutations and combinations</b> Fundamental counting, and or, arrangements of digits, letters, people in row, identical objects, rank, geometrical arrangements, combination: - basic, handshakes, committee, selection of any number of objects, identical and distinct, grouping and distribution, de-arrangements	6 Hours
Unit-5:	<b>Probability</b> Introduction, Probability based on Dice and Coins, Conditional Probability, Bayes Theorem	4 Hours
<u>Reference</u> <u>Books:</u>	<ul> <li>R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude</li> <li>R2:-Quantitative Aptitude by R.S. Agrawal</li> <li>R3:-M Tyra: Quicker Maths</li> <li>R4:-Nishith K Sinha:- Quantitative Aptitude for CAT</li> <li>R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com</li> <li>R6:-Logical Reasoning by Nishith K Sinha</li> <li>R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal</li> </ul> * Latest editions of all the suggested books are recommended.	

<u>Course Code:</u> TMUGS-501	B.Tech- Semester-V Managing Self		
Course Outcomes:	On completion of the course, the students will be :		
C01.	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings		
СО2.	Understanding and analyzing self and devising a strategy for self growth and development.		
соз.	Adapting a positive mindset conducive for growth through optimism and constructive thinking.		
CO4.	Utilizing time in the most effective manner and avoiding procrastination.		
C05.	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.		
CO6.	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.		
Course Content:			
Unit-1:	Personal Development: Personal growth and improvement in personality Perception Positive attitude Values and Morals High self motivation and confidence Grooming	10 Hours	
Unit-2:	Professional Development: Goal setting and action planning Effective and assertive communication Decision making Time management Presentation Skills Happiness risk taking and facing unknown	8 Hours	
Unit-3:	Career Development: Resume Building Occupational Research Group discussion (GD) and Personal Interviews	12 Hours	
<u>Reference</u> <u>Books:</u>	<ol> <li>Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18<sup>th</sup> ed., Pearson Education</li> <li>Tracy, Brian, Time Management (2018), Manjul Publishing House</li> <li>Hill, Napolean, Think and grow rich (2014), Amazing Reads</li> <li>Scott, S.J., SMART goals made simple (2014), Createspace Independent Pub</li> <li>https://www.hloom.com/resumes/creative-templates/</li> <li>https://www.mbauniverse.com/group-discussion/topic.php</li> <li>Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan</li> <li>Burne, Eric, Games People Play (2010), Penguin UK</li> <li>https://www.indeed.com/career-advice/interviewing/job- interview-tips-how-to-make-a-great-impression</li> <li>* Latest editions of all the suggested books are recommended.</li> </ol>		

Course Code: ECE611	B.Tech (Civil)- Semester-VI Steel Structure-II				
Course Outcomes:	On completion of the course, the students will be :				
CO1.	<b>Remembering</b> the design concept for plate girders and various types of stiffeners.				
CO2.	<b>Understanding</b> and designing of moment resistant connections. <b>Applying</b> the relevant industry codes of practice for designing of the beam column connections.				
СО3.	<b>Analysing</b> and understanding an overall view of industrial buildings, Trusses etc.				
CO4.	Analysing and Designing of steel structures by plastic analysis.				
C05.	<b>Evaluating</b> the ultimate bending moment capacity of steel members considering both yielding and lateral buckling.				
Course Content:					
Unit-1:	<b>Components of plate girder;</b> Self weight and economical dept; Impact factor; Design of welded plate girder – Design considerations, IS-code recommendations, stiffeners, reduction of flange plates.	8 Hours			
Unit-2:	<b>Industrial Buildings:</b> Major components of an industrial building; Planning and structural framing; Bracings of industrial building, industrial bents in traverse & longitudinal directions.	8 Hours			
Unit-3:	<b>Beam column connections:</b> Design of beam to column connections - small moment resistant connection (Clip angle connections), large moment resistant connection (Split beam connections).	8 Hours			
Unit-4:	<b>Design of Roof Trusses:</b> Different types, components, economical spacing, load assessment forDL, LL & WL; Load combination; IS Code recommendations; Design of purlins.	8 Hours			
Unit-5:	<b>Plastic analysis and design of steel structures:</b> Introduction; Applicability of simple plastic theory of bending - Plastic bending of beams, Fully plastic moment of a section, Plastic hinge, Shape factor, Load factor, Margin of safety; Mechanism of hinge formation - static theorem or lower bound theorem, kinematic theorem or upper bound theorem, uniqueness theorem of combined theorem; Plastic collapse of a structure; Collapse load for standard cases of beams.	8 Hours			
<u>Text Books:</u>	<ol> <li>Duggal S K., "Design of steel Structures", Tata McGraw Hill publications.</li> </ol>				
<u>Reference</u> <u>Books:</u>	<ol> <li>Shiyeker M R, "Limit State Design in Structural Steel", PHI Learning Pvt. Ltd.</li> <li>Punmia B C, Ashok Kumar Jain &amp; Arun Kumar Jain, "Comprehensive Design of SteelStructures", Laxmi publication</li> <li>Ramachandra, "Design of Steel structures", Rajsons Publications Pvt. Ltd.</li> <li>IS:800-2007, "General Construction in Steel- Code of Practice", Bureau of Indian Standards</li> <li>IS:875, "Code of Practice for Design Loads (Other than Earthquake) for Building and Structures", Bureau of Indian Standards.</li> <li>*Latest editions of all the suggested books are recommended</li> </ol>				

Additional electronic reference material	https://youtu.be/4-v_tODgfVY	
	https://youtu.be/Rat9uIM3BFI	
	https://youtu.be/Pwm-qxmIO5I	
	https://youtu.be/06rfB6BBICs	

Course Code: ECE612	B.Tech (Civil) - Semester-VI Public Health & Environmental Engineering	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be :	
C01.	<b>Remembering</b> the basic needs for supplying water and factors affecting consumption of water.	
CO2.	Understanding the characteristics of supply water and waste water.	
CO3.	Applyingmodern principles and philosophies of waste water treatment.	
CO4.	Analyzingthe per capita water demand, future population andmethods of distribution of water supply.	
CO5.	<b>Evaluating</b> and designing unit processes for conventional and advanced wastewater treatment systems.	
Course Content:		
Unit-1:	Water Supply Water demands and domestic use, variation in demands, population forecasting by various methods - logistic curve method, per capita supply, basic needs and factors affecting consumption, design period. Sources of water, characteristics of water- physical, chemical and biological, quality of surface and ground waters, Factors governing the selection of a source of water supply	8 Hours
Unit-2:	<b>Intake Structures</b> Intake structures design consideration, determination of the capacity of impounding reservoir, Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements, lying and testing of water supply pipelines, pipe materials, joints, appurtenances and valves, leakages and control, water hammer and its control measures.	8 Hours
Unit-3:	<b>Storage and Water Distribution System:</b> Methods of distribution, pressure and gravity distribution systems, concept of service and balancing reservoirs, capacity of distribution reservoirs, general design guidelines for distribution system, Hardy - Cross method, Newton - Raphson method and equivalent pipe method of pipe network analysis, rural water supply distribution system, plumbing systems in buildings and houses: water connections, different cocks and pipe fittings, hot water installation, Institutional and industrial water supply.	8 Hours
Unit-4:	<b>Wastewater Characteristic and Treatments:</b> Estimation of wastewater flows, Characteristics of waste water, Treatment systems– Primary treatment,Secondarytreatment and Tertiary system, sedimentation, determination of settling velocity Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks.	8 Hours
Unit-5:	<ul> <li>Secondary Treatment: Objective of secondary treatment, Principles, Functions, Design and Drawing of Units - Activated Sludge Process and Trickling filter, other treatment methods.</li> <li>Disposal of sewage and sludge:Standards for Disposal - Methods – dilution – Self-purification of surface water bodies – Oxygen sag curve – Land disposal – Sewage farming – Deep well injection – Soil dispersion system - Sludge characterization – Thickening – Sludge digestion – Biogas recovery – Sludge Conditioning and Dewatering – disposal.</li> </ul>	8 Hours
<u>Text Books:</u>	<ol> <li>Garg SK, "Water Supply Engineering (Environmental Engineering Vol. – I)", Khanna Publishers.</li> <li>Garg SK: "Sewage Disposal and Air Pollution Engineering (Environmental Engineering", Khanna Publishers.</li> </ol>	

<u>Reference</u> <u>Books:</u>	<ol> <li>Peavy, Rowe George Techobangolous, "Environmental Engineering".</li> <li>Metcalf and Eddy Inc, "Wastewater Engineering".</li> <li>"Manual on Water Supply and Treatment", C. P. H. E. E. O., Ministry of UrbanDevelopment, Government of India, New Delhi.</li> <li>"Manual on Sewerage and Sewage Treatment", C. P. H. E. E. O., Ministry of UrbanDevelopment, Government of India, New Delhi</li> <li>Raju, "Water Supply and Wastewater Engineering"</li> <li>Sincero and Sincero, "Environmental Engineering: A Design Approach"</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>
Additional electronic reference material	https://youtu.be/b4stML-Mt9s https://youtu.be/cvUa82Qb1Hg https://youtu.be/f2faanH0_Ww

<u>Course Code:</u> ECE661	B.Tech (Civil)- Semester-VI Public Health & Environmental Engineering (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Remembering the properties of water.	
CO2.	<b>Understanding</b> the physical, chemical and biological characteristics of water and wastewater.	
СО3.	<b>Applying</b> the experimental results to compare with standards and deliberate based on the purpose of analysis.	
CO4.	Analyzing the type & degree of treatment, for water and wastewater.	
CO5.	<b>Creating</b> the significance of experimental results in environmental engineering practices.	
Experiments	Note: Minimum ten experiments should be performed:	
Experiment-1	Determination of turbidity, color and conductivity.	
Experiment-2	Determination of pH, alkalinity and acidity.	
Experiment-3	Determination of hardness and chlorides.	
Experiment-4	Determination of residual chlorine.	
Experiment-5	Determination of most probable number of coliforms.	
Experiment-6	Measurement of air pollutants with high volume sampler.	
Experiment-7	Measurement of sound level with sound level meter.	
Experiment-8	Determination of total suspended and dissolved solids.	
Experiment-9	Determination of BOD.	
Experiment-10	Determination of COD.	
Experiment-11	Determination of kjeldahl nitrogen.	
Experiment-12	Determination of fluoride.	

#### **Evaluation Scheme of Practical Examination: Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	RKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE613	B.Tech- Semester-VI Structural Analysis-II	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be :	
CO1.	<b>Remembering</b> analysis of indeterminate structure.	
CO2.	<b>Understanding</b> of equilibrium and compatibility equations to determine response of statically determinate and indeterminate structures.	
СО3.	<b>Applying</b> internal forces and reactions in determinate and indeterminate structures subjected to moving loads.	
CO4.	<b>Analyzing</b> displacements and internal forces of statically in determinate structures by classical, iterative and matrixmethods.	
CO5.	<b>Evaluating</b> moments and forces on two hinged three hinged circular and parabolic arches.	
Course Content:		
Unit-1:	Calculations of deflections: Moment area method, unit load method & Conjugate beam methods for statically determinate beams, truss and frames.	8 Hours
Unit-2:	Arches: Introduction to Arches; Types of arches; Analysis of Arches- three hinged, two hinged, fixed, parabolic and circular arches; Settlement and temperature effects on three hinged and two hinged arches	8 Hours
Unit-3:	ILD for statically indeterminate beams: MullerBreslau's principle, steps for obtaining ILD for reaction and internal forces in propped cantilever and continuous beams, ILD for three hinged and two hinged arches.	8 Hours
Unit-4:	Suspension Bridges, Analysis of cables with concentrated and continuous loadings, Basics of two and three hinged stiffening girders, Influence line diagrams for maximum bending moment and shear force for stiffening girders.	8 Hours
Unit-5:	Matrix Methods: Types of skeletal structures, Internal forces and deformations. Introduction and applications of stiffness method to analyze beams, Trusses and plane frames by system approachIntroduction and applications of Flexibility method to analyze beams, Trusses and plane frames by system approach.	8 Hours
<u>Text Books:</u>	<ol> <li>Ramamrutham, S., "Theory of Structures", Dhanpat Rai Publishing Company Pvt. Ltd.</li> <li>C. S. Reddy "Structural Analysis", Tata Mc Graw Hill Publishing Company Limited, New Delhi.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Timoshenko, S. P. and D. Young, "Theory of Structures", Tata Mc- Graw Hill Book Publishing Company Ltd., New Delhi.</li> <li>Dayaratnam, P. "Analysis of Statically Indeterminate Structures", Affiliated East-West Press.</li> <li>Hibbeler, R.C., "Structural Analysis", Pearson Prentice Hall.</li> <li>Gere &amp; Weaver; "Matrix Analysis of Framed Structures", CBS Publications.</li> <li>Jain, A. K., "Advanced Structural Analysis", Nem Chand &amp; Bros., Roorkee.</li> <li>Jain, O. P. and B. K. Jain, "Theory and Analysis of Structures", Nem Chand &amp; Bros., Roorkee.</li> <li>G S Pandit, S P Gupta, "Matrix Methods of Structural Analysis", Tata McGraw - Hill Education.</li> </ol>	
	https://youtu.be/Vfuh4YGM57w	
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Additional electronic	https://youtu.be/qQylLQ-YY2w	
reference material	https://youtu.be/7pq6DGfRrBQ	
	https://youtu.be/uMuFpT1gFVI 6.	

<u>Course Code:</u> ECE614	B.Tech (Civil)- Semester-VI Estimation & Costing			
Course Outcomes:	On completion of the course, the students will be :			
CO1.	Remembering different types of estimates in different situations.			
CO2.	Understanding valuation of assets.			
СО3.	Applying the analysis of rates and bill preparation at different locations			
CO4.	Analyzing tender and contract documents and project reports.			
CO5.	Evaluating the estimates of various structures.			
Course Content:				
Unit-1:	<b>ntroduction:</b> Types of estimates - Units of measurements; Methods of stimates – Advantages of estimates of Buildings; Calculations of juantities of brick work, RCC, PCC, Plastering, white washing, color vashing and paintings / varnishing for shops, rooms, residential building with flat roof.			
Unit-2:	<b>Estimates of other Structures:</b> Estimates of Septic tank, Soak pit, Sanitary and water supply installations (water supply pipe line, sewer line); Estimate of bituminous and cement concrete roads; Estimate of retaining walls, culverts; Estimating of irrigation works - aqueduct, siphon, fall.			
Unit-3:	<ul> <li>Specifications and Tenders: P.W.D. Schedule and cost indices for building material and labor. Schedule of rates; Analysis of rates; Specifications – Sources, Detailed and general specifications; Tenders; Contracts - Types of contracts, Contract Documents.</li> </ul>			
Unit-4:	Valuation: Necessity - Basics of value engineering; Capitalized value; Depreciation; Escalation value of Building; Calculations of Standard rent Mortgage, Lease.			
Unit-5:	<b>Report Preparation:</b> Principles for report preparation - report on estimate of residential building, Culvert, Roads; Water supply and sanitary installations - Tube wells, Open wells.	8 Hours		
<u>Text Books:</u>	<ol> <li>Dutta B N., "Estimating and Costing in Civil Engineering", UBS Publishers &amp; Distributors Pvt. Ltd.</li> </ol>			
<u>Reference</u> <u>Books:</u>	<ol> <li>Aggarwal &amp; A K Upadhyay, "Civil Estimating, Costing &amp; Evaluation", S K Kataria&amp; Sons.</li> <li>Kohli D D and Kohli R C., "A Text Book of Estimating and Costing (Civil)", S.Chand&amp; Company Ltd.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>			
Additional electronic reference material	https://youtu.be/qF2kZ1TUu1E         https://youtu.be/GHqnX7QBQbc         https://youtu.be/woYm4WA2OiA			

<u>Course Code:</u> ECE662	B.Tech- Semester-VI Estimation and Costing (Lab)					
Course Outcomes:	On completion of the course, the students will be :					
CO1.	<b>Remembering</b> the necessary commands of Audesk Quantity Take off software.					
CO2.	Understanding the steps for importing and exporting the files.					
СОЗ.	<b>Applying</b> the concepts for drawing and planning plumbing and electrical fitting drawing of residential and multistoried buildings.					
CO4.	<b>Analyzing</b> the total quantity of various material components for a residential and multistoried building.					
CO5.	Creating the complete project report.					
Experiments	Note: All experiments should be performed.					
Experiment-1	<b>Experiment-1</b> Comprehensive drawing of planning including plumbing& electrical fitting drawing of residential &Multistoried Buildings					
Experiment-2	Experiment-2Introduction to Autodesk Quantity Take off software ( It will be covered in six sessions*)					
Experiment-3	Preparation of estimates of residential &multistoried building, Plumbing & Electrical fittings.					
Experiment-4	Preparing the layout plan of water & sewer line services and their estimation using software					
Experiment-5	Project: To calculate the total quantity of various material components for a residential and multistoried building. i.e. – cement, sand, aggregates, brick etc complete including estimating cost of the building using AUTODESK QUANTITY TAKE OFFThe student will submit the complete report of the building on the completion of the project.Minimum floor area 1000 Sqm. & minimum 6 floors are required.					
<u>Reference</u> <u>Books:</u>	1. "Building Estimation &Costing" "By using Auto Desk Quantity Takeoff" "CADD CENTRE"					

- Introduction
  - Estimation
  - Quantity Takeoff
  - Autodesk Quantity Takeoff
  - o DWF, Non-intelligent image formats
  - $\circ$  DWF creation
    - AutoCAD
    - Revit Architecture
- Takeoff tools
  - o Manual Takeoff Tools
  - $\circ \quad \text{Automatic Takeoff Tools} \\$

<ul> <li>Workflow</li> <li>Graphical User Interface</li> <li>Adding Additional Currencies</li> <li>Catalog <ul> <li>Create a New Catalog</li> <li>Export and Import</li> </ul> </li> <li>Preferences</li> <li>Settings</li> <li>Organizing the Projects</li> <li>Work Breakdown Structure</li> <li>Sheet Scale</li> </ul>
<ul> <li>Manual Takeoff Tools <ul> <li>Area Takeoff Tools</li> <li>Backout</li> </ul> </li> <li>Assembly</li> </ul>
<ul> <li>Manual Takeoff Tools         <ul> <li>Linear Takeoff Tools</li> <li>Count Takeoff Tools</li> </ul> </li> </ul>
<ul> <li>Automatic Takeoff Tools         <ul> <li>Model Takeoff</li> <li>Search Takeoff</li> <li>Single Click Auto Takeoff</li> </ul> </li> </ul>
Report Generation

### **Evaluation Scheme of Practical Examination:**

#### **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

#### **Evaluation scheme:**

PRACTICAL PERFORMANCE & VIVA DURING THE				ON THE DAY	Y OF EXAM	TOTAL
SEMESTER (35 MARKS)				(15 MA	ARKS)	
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

### **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

<u>Course Code:</u> ECE615	B.Tech (Civil)- Semester-VI RCC Structure-II			
Course Outcomes:	On completion of the course, the students will be :			
C01.	<b>Remembering</b> the various IS codes relevant to the design of R.C.C. member as applicable to industry.			
CO2.	Understanding various losses in pre-stressed concrete.			
CO3	<b>Applying</b> the relevant industry codes of practice for designing the flat slab, retaining wall, water tank etc.			
CO4.	<b>Analyzing</b> and designing the structures having special design requirements like flat slab, curved beams, and different types of footings, water tank, slab culverts			
C05.	Evaluating the ultimate bending moment capacity of steel members considering both yielding and lateral buckling.			
Course Content:				
Unit-1:	Flat Slab: ntroduction; Behavior of Flat Slabs; Analysis of a Flat Slab – Direct Design Method and Equivalent Frame method; Two-way or Punching Shear in Flat Slab; Design of Flat Slab – Proportioning of Flat Slab Components, Design for Serviceability Requirements and Design for Strength Requirements; Reinforcement Detailing for Flat Slab			
Unit-2:	<b>Footings:</b> Structural behavior of footings; General Design Considerations; Design of Footing: - Strip Footing, Isolated Footing, Combined Footing for Two Axially Loaded Columns, Strap Footing.			
Unit-3:	Retaining Walls and Slab Culvert:         Retaining Walls: Structural Behavior of Retaining Wall, Stability of Retaining Wall, Design of Cantilever Retaining Wall, Behavior and Design Considerations of Counterfort Retaining Wall.         Slab Culvert: Loads, Forces and IRC Bridge Loadings, Design of R.C. Slab			
Unit-4:	CulvertCircular and Rectangular Water Tank:Fundamentals of Water Tanks: Special Considerations, Special Requirements, Control Joints, Fundamentals of RCC Design of Elements; Design of Circular Tanks: Circular Tanks Resting on the Ground, Design of Underground Storage Reservoir; Behavior and Design of Rectangular Tanks; Design Concept of Elevated Water Tanks			
Unit-5:	Curved Beams and Pre-Stressed Concrete:Curved Beams: Analysis and design of Circular beam loaded uniformly andsupported symmetrically over columns more than three in number.Pre-stressed Concrete: Basic Concepts of Pre-Stressed Concrete; Advantagesof Pre-stressing; Methods of Pre-stressing; Losses in Pre-stress; Stress Analysisof simple Pre-Stressed Rectangular, I and T-sections.			
<u>Text Books:</u>	<ol> <li>Shah, H.J. "Reinforced Concrete", Charotar Publishing House Pvt Ltd, Anand.</li> </ol>			
<u>Reference</u> <u>Books:</u>	<ol> <li>Subramanian, N. "Design of Reinforced Concrete Structures" Oxford University Press New Delhi.</li> <li>Punmia, BC, "RCC Design", Laxmi Publications (P) Ltd New Delhi</li> <li>Jain, A.K., "Reinforced Concrete: Limit State Design", Nem Chand &amp; Bros, Roorkee.</li> </ol>			

	<ol> <li>Sinha, S.N., "Reinforced Concrete Design" Mc-Graw Hill Book Publishing Company Ltd., New Delhi</li> </ol>
	5. Unnikrishna Pillai, S. & D. Menon, "Reinforced Concrete Design", Mc-
	Graw Hill Company Limited.
	<ol> <li>Gambhir, M L, "Fundamentals of Reinforced Concrete", Prentice Hall of India</li> </ol>
	IS Codes
	1. IS: 456, "Code of Practice for Plain and Reinforced Concrete", Bureau of Indian Standards, New Delhi.
	2. IS 3370-1: "Code of practice Concrete Structures for the Storage of
	Liquids, Part 1: General Requirements [CED 2: Cement and Concrete"
	<b>3.</b> IS 3370-2: "Code of Practice Concrete Structures for the Storage of
	Liquids, Part 2: Reinforced Concrete Structures [CED 2: Cement and Concrete]"
	4. IS 3370-4: "Code of Practice for Concrete Structures for the Storage of
	Liquids, Part 4: Design Tables [CED 2: Cement and Concrete]"
	5. IS: 800 (Part I, II, III, IV, V)-1987, "Code of Practice for Design
	Loads (Other than Earthquake) for Buildings and Structures", Bureau
	of Indian Standards, New Delhi.
Additional electronic reference material	https://youtu.be/6QL6mUHUE9c https://youtu.be/B9ypMT4Oja4 https://youtu.be/eylfDRCDjoc https://youtu.be/JqhNk_20nHU

Course Code TMUGE601	B.Tech(Civil)- Semester-VI			
	<b>English Communication – IV</b>	C-3		
Course Outcomes:	On completion of the course, the students will be :			
CO1.	<b>Remembering</b> adequate knowledge of grammar and vocabulary through prescribed text to address competitive exams.			
CO2.	Understanding the value of listening to understand the basic content.			
<u>CO3.</u>	Understanding the usage of English grammar in day to day context.			
<u>CO4.</u>	Understating about the skills required in corporate world.			
<u> </u>	<b>Applying</b> writing and comprehensive skills in English.			
Course	Creating a simple proposal and report.			
Content:				
Unit-1:	<ul> <li>Vocabulary &amp; Grammar</li> <li>Homophones and Homonyms</li> <li>Correction of Common Errors (with recap of English Grammar with its usage in practical context.)</li> <li>Transformation of sentences</li> </ul>			
Unit-2:	<ul> <li>Essence of Effective listening &amp; speaking</li> <li>Listening short conversation/ recording (TED talks / Speeches by eminent personalities) <i>Critical Review of these abovementioned</i></li> <li>Impromptu</li> </ul>	5 Hours		
Unit-3:	<ul> <li>Professional Writing</li> <li>Proposal: Significance, Types, Structure &amp; AIDA</li> <li>Report Writing: Significance, Types, Structure&amp; Steps towards Report writing</li> </ul>	8 Hours		
Unit-4:	<ul> <li>Job Oriented Skills</li> <li>Cover Letter</li> <li>Preparing Resume and Curriculum-Vitae</li> <li>Interview: Types of Interview, Tips for preparing for Interview and Mock Interview</li> <li>Corporate Expectation &amp; Professional ethics: Skills expected in corporate world</li> </ul>	10 Hours		
	Value based text reading: Short story			
Unit-5:	• A Bookish Topic - R.K. Narayan	5 Hours		
Text Books:	1. Singh R.P., An Anthology of English Essay, O.U.P. New Delhi			
<u>Reference</u> <u>Books:</u>	<ol> <li>Joseph, Dr C.J. &amp; Myall E.G. "A <i>Comprehensive Grammar of Current English</i>" Inter University Press, Delhi</li> <li>Chaudhary Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.</li> <li>Kumar Sanjay &amp;Pushplata "Communication Skills" Oxford University Press, New Delhi.</li> </ol>			
	*Latest editions of all the suggested books are recommended.			
Additional	1- <u>https://www.youtube.com/watch?v=dpYltVtsS_Q</u>			
<u>Electronics</u> Reference	2 - <u>https://www.youtube.com/watch?v=QindqiBUWS8</u> 3 -https://www.youtube.com/watch?v=MrgHfK8Pcfk			
Material	4 -https://www.youtube.com/watch?v=860LtRxP3rw			
<u></u>	5 - https://www.youtube.com/watch?v=000Lttx151w			
	1. The content will be conveyed through Real life situations. Pair			
<u>Methodology</u>	<ol> <li>Conversation, Group Talk and Class Discussion.</li> <li>Language Lab software.</li> <li>Sentence transformation on daily activities and conversations.</li> </ol>			

4.	Conversational Practice will be effectively carried out by Face to Face &	
	Via Media (Audio-Video Clips)	
5.	Modern Teaching tools (PPT Presentation & Motivational videos with	
	sub-titles) will be utilized.	

## **Evaluation Scheme**

Internal Evaluation			External Evaluation		Total Marks
40 Marks			60 Ma	rks	
20 Marks (Best 2 out of Three CTs) <i>(From Unit - I,</i>	10 Marks (Oral Assignments)	10 Marks (Attendance)	40 Marks (External Written Examination)	20 Marks (External Viva)*	100
` III, IV & V)´	(From Unit - II & IV)		(From Unit -I, III, IV & V)	(From Unit -II & IV)	

# **\*Parameters of External Viva**

Content	Body Language	Communication skills	Confidence	TOTAL
05Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising *a)* One Faculty teaching the class

*b)* One examiner nominated by University Examination cell. Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

<u>Course Code:</u> EHM613	B. Tech (Electrical)- Semester-VI Human Values & Professional Ethics	L-2 T-0 P-0 C-2
Course Outcomes:	On completion of the course, the students will be :	
C01.	<b>Understanding</b> the importance of value education in life and method of self-exploration.	
CO2.	<b>Understanding</b> 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.	
соз.	<b>Applying</b> right understanding about relationship and physical facilities.	
CO4.	<b>Analysing</b> harmony in myself, harmony in the family and society, harmony in the nature and existence.	
CO5.	Evaluating human conduct on ethical basis.	
<b>Course Content:</b>		
Unit-1:	Understanding of Morals, Values and Ethics; Introduction to Value Education- need for Value Education. Self- Exploration–content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration. Continuous Happiness and Prosperity- basic Human Aspirations. Gender Issues: Gender Discrimination and Gender Bias (home & office), Gender issues in human values, morality and ethics.	8 Hours
Unit-2:	Conflicts of Interest: Conflicts between Business Demands and Professional Ethics. Social and Ethical Responsibilities of Technologists. Ethical Issues at Workplace: Discrimination, Cybercrime, Plagiarism, Sexual Misconduct, Fraudulent Use of Institutional Resources. Intellectual Property Rights and its uses. Whistle blowing and beyond, Case study.	8 Hours
Unit-3:	Harmony in the Family and Society- Harmony in Human-Human Relationship, Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman and other salient values in relationship.	8 Hours
Unit-4:	Understanding Harmony in the Nature and Existence – Whole existence as Co-existence. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.	8 Hours
Unit-5:	<ul> <li>Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Competence in professional ethics:</li> <li>a) Ability to utilize the professional competence for augmenting universal human order</li> <li>b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems</li> <li>c) Ability to identify and develop appropriate technologies and management patterns for above production systems.</li> </ul>	8 Hours
<u>Text Book:</u>	1. K K Gaur, K Sangal, G P Bagaria, A Foundation Course in Value Education.	

	1. Ivan Illich, Energy & Equity, The Trinity Press, Worcester,
	and HarperCollins, USA 2. E.F. Schumacher, Small is
	Beautiful: a study of economics as if people mattered, Blond
	& Briggs, Britain.
	2. A Nagraj, Jeevan Vidya ekParichay, Divya Path Sansthan,
	Amarkantak.
	3. Sussan George, How the Other Half Dies, Penguin Press.
<b>Reference Books:</b>	Reprinted.
	4. PL Dhar, RR Gaur, Science and Humanism, Commonwealth
	Purblishers.
	5. A.N. Tripathy, Human Values, New Age International
	Publishers.
	6. E G Seebauer & Robert L. Berry, Fundamentals of Ethics for
	Scientists & Engineers, Oxford University Press.
	*Latest editions of all the suggested books are recommended.
Additional	https://www.youtube.com/watch?v=Cnw1nK3K5qk
<u>electronics</u>	https://www.youtube.com/watch?v=hTTCMrQyF8E
<u>reference</u>	
<u>material</u>	

L-0 T-0 P-0 C-0

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

	Value Added Course	
Course Code	B.Tech Semester-VI	
TMUGA-601	Advance Algebra and Coometry	P-0
	Auvance Aigebra and Geometry	C-0
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.	
CO2.	Illustrating the different concepts of Height and Distance and Functions.	
CO3.	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.	
CO4.	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.	
Course Content:		
Unit-1:	<b>Clocks and calendars</b> Introduction , Angle based , faulty Clock, Interchange of hands, Introduction of Calendars, Leap Year , Ordinary Year	5 Hours
Unit-2:	Set theory Introduction, Venn Diagrams basics, Venn Diagram – 3 sets, 4-Group Venn Diagrams	4 Hours
Unit-3:	Heights and Distance Basic concept, Word problems	3 Hours
Unit-4:	<b>Functions</b> Introduction to Functions, Even and Odd Functions, Recursive	3 Hours
Unit-5:	<b>Problem Solving</b> Introduction, Puzzle based on 3 variable, Puzzle based on 4 variable	6 Hours
Unit-6:	<b>Data Sufficiency</b> Introduction, Blood relation based, direction based, ranking based	5 Hours
Unit-7:	<b>Crypt Arithmetic</b> Introduction of Crypt Arithmetic, Mathematical operations using Crypt Arithmetic, Company Specific Pattern	4 Hours
<u>Reference</u> <u>Books:</u>	<ul> <li>R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude</li> <li>R2:-Quantitative Aptitude by R.S. Agrawal</li> <li>R3:-M Tyra: Quicker Maths</li> <li>R4:-Nishith K Sinha:- Quantitative Aptitude for CAT</li> <li>R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com</li> <li>R6:-Logical Reasoning by Nishith K Sinha</li> <li>R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal</li> <li>* Latest editions of all the suggested books are recommended.</li> </ul>	

<u>Course Code:</u> TMUGS-601	B.Tech - Semester-VI Managing Work and Others		
	Managing Work and Others	C-0	
Course Outcomes:	On completion of the course, the students will be :		
CO1.	Communicating effectively in a variety of public and interpersonal settings.		
CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.		
СО3.	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.		
CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.		
CO5.	Handling difficult situations with grace, style, and professionalism.		
Course			
Content:			
	Intrapersonal Skills: Creativity and Innovation Understanding self and others (Johari window)		
Unit-1:	Stress Management	8 Hours	
	Managing Change for competitive success		
	Handling feedback and criticism		
	Interpersonal Skills:		
	Conflict management		
II	Development of cordial interpersonal relations at all levels	12 11	
Unit-2:	Negotiation	12 Hours	
	Importance of working in teams in modern organisations		
	Manners, etiquette and net etiquette		
	Interview Techniques:		
∐nit_3•	Job Seeking	10 Hours	
0111-5.	Group discussion (GD)	10 11001 5	
	Personal Interview		
	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika,		
	Organizational Behaviour (2018) 18 <sup>th</sup> ed. Pearson Education		
	2 Burne Fric Games People Play (2010), Penguin LIK		
	3 Carnegie Dale How to win friends and influence people (2004)		
	S. Cantege, Date, now to win mends and influence people (2004), RHIK		
	A Rathgeher Holger Kotter John Our Joeherg is melting (2017)		
D.f	Macmillan		
<u>Reference</u>	5 Steinburg Scott Nettiquette Essentials (2013) Lulu com		
<u>Books:</u>	6. https://www.hloom.com/regumes/areative.templetes/		
	7 https://www.moom.com/resumes/creative-templates/		
	7. https://www.moaunverse.com/group-discussion/topic.pip 8. https://www.indeed.com/concerted/interviewiewiewiewiewiewiewiewiewiewiewiewiewi		
	<ol> <li>nups://www.indeed.com/career-advice/interviewing/job- interviewing how to make a special imageneity.</li> </ol>		
	interview-tips-now-to-make-a-great-impression		
	* Latest editions of all the suggested books are recommended.		

<u>Course</u> <u>Code:</u> ECE711	B.Tech (Civil) - Semester-VII Advanced Computer Aided Design (CAD)	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Remembering</b> the General guideline for concrete design as per Indian codes, concrete design using STAAD PRO.	
CO2.	<b>Understanding</b> the theory governing the structural behavior of various elements like bar, beam and truss applying Finite Element Analysis (FEA).	
СОЗ.	Understanding the history of AUTODESK 3DS-MAX.	
CO4.	<b>Understanding</b> the Element of STAAD PRO and its advantages over conventional method	
CO5.	Analyzing, Designing and optimizing for basic structural members using STADDPRO.	
Course Content:		
Unit-1:	Introduction STAAD PRO and STAAD EDITOR concept of integrated CAD, CAD Engineering application, its importance and its necessity, Introduction of Engineering Drawing, projection (1 <sup>st</sup> angle& 3 <sup>rd</sup> angle), Isometric view, Orthographic views with top, front, side views. One point, two points, there points perspective views.	8 Hours
Unit-2:	Computer application in analysis and design of civil engineering system, Introduction to Finite element method (FEM), Application, displacement/ stiffness matrix, Analysis of one dimensional and two-dimensional bar element, Beam and Truss element.	8 Hours
Unit-3:	Introduction to CAD, element of CAD, Element of STAAD PRO and its advantages over conventional method, unit, creating nodes, creating members, assign fix support, creating load case, applying self-weight, adding U.D.L & point load and analyses of loads.	8 Hours
Unit-4:	Design and optimization of structure engineering package –principal of design of steel and RC structure, General guideline for concrete design as per Indian codes, concrete design using STAAD PRO.	8 Hours
Unit-5:	Introduction and history of AUTODESK 3DS-MAX, explain the process to create the furniture and product i.e table, sofa, bed, light lamp etc Explain the process for applying the material on object, explain the process of rendering.	8 Hours
<u>Text Books:</u>	<ol> <li>S.S Bhavikatti, "Finite Element Analysis", New Age International Publication.</li> <li>R.K.Srivastava, "Computer Aided Design", Prentice Hall Of India Pvt Ltd.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>"Max for Engineers / Architects", AutoDesk Reference Guide, CADD CENTRE.</li> <li>"STAAD.Pro V8i,Bentley Sustaining Infrastructure", Reference Guide, CADD CENTRE</li> <li>Rao &amp;Dukkipati, "Computer Aided Analysis &amp; Design of Machine Elements",</li> <li>Rajaraman, "Computer Oriented Numerical Methods", Prentice Hall of India Pvt Ltd</li> <li>Rajeev S, "Computer Aided Design", Narosa Publications</li> </ol>	

	6. Ibrahim Zeid, "Cad/Cam Theory and Practice", Mc Graw Hill International Publ.	
	*Latest editions of all the suggested books are recommended.	
<u>Additional</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=1gDmNDJ9SHc&list=PL1F857AA89 C464B15&ab_channel=nptelhrd	

<u>Course Code:</u> ECE761	B.Tech (Civil)- Semester-VII Analysis & Design (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	On completion of the course, the students will be :	
C01.	Drawing shear force and bending moment diagram of simply supported beams with different load conditions.	
CO2.	Determining the stress and deflection of a cantilever with different load conditions.	
соз.	Creating a furniture object using AUTODESK 3DS-MAX with wooden finish.	
CO4.	Creating a 3seater sofa with centre table by using AUTODESK 3DS – MAX with Rendering.	
CO5.	Applying StaadPro software for analysis of a simple building.	
Experiments:	Note: All experiments should be performed:	
Experiment-1:	To prepare shear force diagram and bending moment diagram of a simply supported beam in which point load is applied at mid point.	
Experiment-2:	To prepare shear force diagram and bending moment diagram of a simply supported beam in which point load is applied at point "A" located at a distance of "x" from left joint.	
Experiment-3:	To prepare shear force diagram and bending moment diagram of a simply supported beam in which U.D.L is applied over the entire length of beam.	
Experiment-4:	To prepare shear force diagram and bending moment diagram of a simply supported beam in which U.D.L is applied over the defined portion of beam.	
Experiment-5:	To determine the stress and deflection of a cantilever beam in which point load applied at midpoint of cantilever beam.	
Experiment-6:	To determine the stress and deflection of a cantilever beam in which point load applied at outer end point of cantilever beam.	
Experiment-7:	To determine the stress and deflection of a cantilever beam in which U.D.L applied over the entire length of beam.	
Experiment-8:	To determine the stress and deflection of a cantilever beam in which U.D.L applied over the only length of cantilever portion of beam.	
Experiment-9:	To create a furniture object using AUTODESK 3DS-MAX with wooden finish	
Experiment-10:	To create a 3seater sofa with centre table by using AUTODESK 3DS – MAX with Rendering.	
<u>Reference</u> <u>Books:</u>	<ol> <li>"STAAD.Pro V8i,Bentley Sustaining Infrastructure", Reference Guide, CADD CENTRE.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	

## **Evaluation Scheme of Practical Examination:**

# **Internal Evaluation (50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

## **Evaluation scheme:**

PRACTICA	AL PERFORMA SEMESTER	NCE & VIVA DU (35 MARKS)	URING THE	ON THE DAY (15 MA	Y OF EXAM ARKS)	TOTAL
EXPERIMENT	FILE WORK	VIVA	ATTENDANCE	EXPERIMENT	VIVA	INTERNAL
(5 MARKS)	(10 MARKS)	(10 MARKS)	(10 MARKS)	(5 MARKS)	(10 MARKS)	(50 MARKS)

## **External Evaluation (50 marks)**

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT	FILE WORK	VIVA	TOTAL EXTERNAL
(20 MARKS)	(10 MARKS)	(20 MARKS)	(50 MARKS)

Course Code:	B. Tech (Civil)- Semester-VII	L-0 T-0
ECE792	Industrial Training & Presentation	P-0
Course		C-2
Procedure:		
Procedure:	Students will have to undergo industrial training of six weeks in any industry or reputed organization after the VI semester examination in summer. The evaluation of this training shall be included in the VII semester evaluation. The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester and shall be the nodal officer for coordination of the training. Students will prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was undertaken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director/Principal of the college. The student at the end of the VII semester will present his report about the training before a committee constituted by the Director/Principal of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee senarately in a sealed envelope to the	
	Director/Principal. The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned. Not more than three students would form a group for such industrial training/ project submission.	
	The marking shall be as follows.	
Internal: 50	By the Faculty Guide – 25 marks.	
marks	By Committee appointed by the Director/Principal – 25 marks.	
External:50	By Officer-in-charge trainee in industry – 25 marks.	
тагкя	By External examiner appointed by the University – 25 marks	
	I echnical report will consist five chapter as per given format:	
Chapter 1:	Brief about organization	
Chapter 2:	Detail of business carried out by organization	
Chapter 3:	Specific contribution during the industrial training (not more than 500 words)	
Chapter 4:	Learning during the industrial training (not more than 200 words)	
Chapter 5:	Conclusion	

<u>Course Code:</u> ECE798	B. Tech (Civil)- Semester-VII Project Work Phase-I	L-0 T-0 P-10 C-5
Course Procedure:		
	A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the group. The faculty would be identified in the starting of the VII semester.	
	The group will carry out the literature search and collect required material for carrying out the project.	
	The group will prepare a report not exceeding 15 pages at the end of semester.	
	The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester, the student shall present the progress of project live as also using overheads project (30% Project completion) or power point presentation on LCD to the internal committee.	
	The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.	
	The marking shall be as follows.	
Internal: 100 marks	By the Faculty Guide - 50 marks By Committee appointed by the Director/Principal – 50 marks	

L-0 T-0 P-0 C-0

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

<u>Course</u> <u>Code:</u> ECE712	Program Elective-I B.Tech (Civil)- Semester-VII Introduction to Remote Sensing	L-3 T-0 P-0 C-3
Course Outcome s:	On completion of the course, the students will be:	
CO1.	Understanding the basic principles of remotesensing.	
CO2.	Understanding the advantages and limitations of photogrammetry.	
<u>CO3.</u>	Applying the GPS for various applications.	
<u>CO4.</u>	Applying Remote Sensing in Different Fields.	
<u> </u>	Applying Remote Sensing in Civil Engineering.	
Course Content:		
Unit-1:	<ul> <li>Photogrammetry: Introduction, Aerial photographs, Type of aerial photographs; Comparison of Aerial photograph and Map; Advantages of Aerial photography, Ground Control for aerial photography.</li> <li>Stereoscopic vision: Different types of stereoscopes; Stereo model.</li> <li>Visual Interpretation: Elements of visual interpretation; uses of photogrammetry</li> </ul>	8 Hours
Unit-2:	<b>Remote Sensing:</b> Definition, Energy in electromagnetic waves; Electromagnetic spectrum; Interaction of EMR with atmosphere; Interaction of EMR with earth's surface, Ideal remote sensing system, Active & Passive Sensors, Different Platforms; Resolution concept in remote sensing, Major Satellites and satellite sensors, multi-concept of Remote Sensing, Elements of spatial interpretation.	8 Hours
Unit-3:	<b>Global Positioning Systems:</b> Introduction, Components of GPS-Satellite Constellation, Operational Control Segment, User Segment; GPS Instrumentation, Satellite Ranging, Satellite Communication, GPS Codes, Pseudo Range, Advantages of GPS over Conventional Surveying methods, GPS Coordinates system, Sources of GPS Error, Uses and Applications of GPS	8 Hours
Unit-4:	Application of Remote Sensing in Different Fields: Introduction, Forestry,Agriculture, Geosciences, Hydrology, Landuse/Landcover Mapping, Environmental monitoring, Marine and coastal zoneManagement, Soil mapping	8 Hours
Unit-5:	Application of Remote Sensing in Civil Engineering:In structural engineering,Regional Planning and Site Investigations, Town Planning and UrbanDevelopment,EnvironmentandGeology,WaterResourcesEngineering,Landslides,Least cost highway alignment,Terrain Mapping and Analysis.	8 Hours
<u>Text</u> <u>Books:</u>	<ol> <li>ShivangiSomvanshi, Maya Kumari, "An Introduction to Remote Sensing and its Application" S K Kataria&amp; Sons, New Delhi.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Wolf, "Elements of Photogrammetry"</li> <li>Sabins Floyd F. Jr., "Principles and Image Interpretation"</li> <li>Lillesand and Keifer, "Remote Sensing and Image Interpretation"</li> <li>Kennie T. J. M., "Remote Sensing in Civil Engineering"</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
Additiona <u>l</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=-4D1- eSEWXw&list=PLwdnzlV3ogoUdLSIGNmXpnDLrnEqcNbaI&ab_channel=NPTEL IITGuwahati	

	Program Elective-I	т э
<u>Course</u> <u>Code:</u> ECE713	B.Tech (Civil)- Semester-VII Pavement Design	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the detailed survey	
CO2.	Applying the applicable industry design codes relevant to the design, construction and maintenance of pavements.	
CO3.	Evaluating the strength of different pavement materials.	
CO4.	Evaluating and strengthening the existing pavements.	
CO5.	Analysis and Design of flexible and Concrete Pavements using different methods	
Course		
Content:		
Unit-1:	Introduction Historical Review of Highway Pavements, Requirements and Objectives of Pavements; Types of Pavements, Functions and Evaluation of Components of Pavement, Factors affecting Design of Pavement; Traffic Considerations in Pavement Design - Vehicle Types, Axle Configurations, Contact Shapes and Contact Stress Distributions, Concept of Standard Axle Load, Various Factors in Traffic Wheel Loads; ESWL of Multiple Wheels. Repeated Loads and EWL Factors.	8 Hours
Unit-2:	<b>Pavement Materials</b> Subgrade Soil – Desirable Properties of Soil, Tests for Evaluation of Soil Strength; Stone Aggregates – Desirable Properties of Road Aggregates, Tests for Road Aggregate; Bituminous Materials – Types of Bituminous Materials: Bitumen, Cutback Bitumen, Bituminous Emulsions, Tar; Design of Bituminous Paving Mixes- Marshall Method of Bituminous Mix Design.	8 Hours
Unit-3:	Analysis and Design of Flexible Pavements: Stresses in Flexible Pavements, Stress Distribution through various layers, Design Methods: Empirical Methods – Group Index Method, CBR Method; Semi-empirical Method – Triaxial Method; Theoretical Method – Burmister Method;	8 Hours
Unit-4:	Analysis and Design of Concrete Pavements: Evaluation of Subgrade, Modulus of Subgrade Reaction by Plate Bearing Test, Westergaard's Stress Theory, Stresses in Rigid Pavements, Temperature Stresses, Warping Stresses, Frictional Stresses, Critical Combination of Stresses, Critical Loading Positions; Design Methods - IRC Method, PCA & AASHTO Methods; Joints – Types of Joints, Design of Joints.	8 Hours
Unit-5:	<b>Evaluation and Strengthening of Existing Pavements:</b> Pavement Failures- Failures in Flexible Pavements, Failures in Rigid Pavements; Methods of Pavement Evaluation – Structural Evaluation of Pavements, Evaluation of Pavement Surface Conditions; Strengthening of Existing Pavements - Choice and Design of Overlay Type and Pavement Materials over existing Flexible and Rigid Pavements.	8 Hours
<u>Text</u> <u>Books:</u>	<ol> <li>Khanna S.K. &amp; Justo, C.E.G. "Highway Engineering", Nem Chand &amp; Bros., Roorkee.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>IRC: 85 – "Code of Practice for Accelerated Strength Testing and Evaluation of Concrete Road and Air field Constructions", IRC, New Delhi.</li> <li>IRC: 58– "Guidelines for the Design of Rigid Pavements for Highways", IRC, New Delhi.</li> <li>IRC: 37– "Guidelines for the Design of Flexible Pavements for Highways", IRC, New Delhi.</li> </ol>	

	4. Kadiyali L.R. & Lal, N.B. "Principles and Practice of Highway Engineering	
	Including Expressways and Airport Engineering", Khanna Publishers, New	
	Delhi.	
	5. Yang H. Huang, "Pavement Analysis and Design", Prentice Hall.	
	6. Yoder E.J. and M.W. Witczak, "Principles of Pavement Design", John	
	Wiley & Sons, Inc., New York.	
	*Latest editions of all the suggested books are recommended.	
Additional		
<b>Electronic</b>	https://www.youtube.com/watch?y=exctAga2KXY&t=806s&ab_channel=nptelhrd	
<u>Reference</u>		
Material		

	Program Elective-I	
Course		L-3
Code:	B.Tech (Civil)- Semester-VII	1-U D ()
<b>ECE715</b>	<b>Transportation Systems and Planning</b>	C-3
	l v O	
Course Outcomes :	On completion of the course, the students will be:	
CO1.	Remembering various types of transportation system.	
CO2.	Understanding the significance of transportation planning.	
CO3.	Understanding the various Transportation Facilities and use if IT in it.	
CO4.	Analyzing the travel demand.	
CO5.	Evaluating the transport planning proposals.	
Course Content:		
Unit-1:	<b>Introduction:</b> Overview of transportation system, nature of traffic problems incities, Present Scenario of road transport and transport assets. Role of transportation: Social, Political, Environmental, Goals and objectives of transportation planning,	8 Hours
Unit-2:	<b>Type of transportation system:</b> Intermediate Public Transport (IPT), PublicTransport, Rapid and mass transport system. Traffic Flow and traffic streamvariables.	8 Hours
Unit-3:	<b>Travel demand:</b> Estimation and fore casting, trip classification, trip generation: factors and methods, multiple regression analysis. Trip distribution methods, modal split, trip assignment.	8 Hours
Unit-4:	<b>Evaluation of transport planning proposals:</b> Land Use Transport Planning, Economic Evaluation methods, net-present-Value methods, Benefit Cost method, Internal rate of return method.	8 Hours
Unit-5:	<b>Transportation Facilities:</b> Pedestrian facilities, Bicycle facilities, parking andterminal facilities. Transport system management. Long term and short termplanning, use of IT in transportation.	8 Hours
<u>Text</u> <u>Books:</u>	<ol> <li>Khanna, SK, Justo C.E.G, "Highway Engineering", Nem Chand &amp; Bros, Roorkee.</li> </ol>	
Reference Books:	<ol> <li>Kadiyali, L.R. "Traffic Engineering and Transport Planning", Khanna Publishers Delhi.</li> <li>W. Hay "Introduction to Transportation Engineering"</li> <li>MortakE.K"Introduction to Transportation Engineering planning"</li> <li>J.W. Dickey "Metropolitan transportation planning"</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
Additiona <u>l</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=VP6Q9FZ188c&list=PLA5B61833B97603 8C&index=5&ab_channel=nptelhrd	

	Program Elective-I	Т 2
<u>Course</u>		L-3 T_0
Code:	B.Tech (Civil)- Semester-VII	P-0
ECE717	Introduction to GIS	C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the basic concepts of GIS technology.	
CO2.	Understanding different types of Map projections.	
CO3.	Applying GIS in various sectors.	
CO4.	Analyzing the capabilities of GIS.	
CO5.	Analysing GIS software for making Maps.	
Course Content:		
Unit-1:	<b>Fundamentals of GIS:</b> Introduction, Components of GIS, Spatial Data Representation, Vector model, Raster model; Conversion of raster into vector data (vectorization), Capabilities/Functionalities of GIS, Data Quality, Map overlay Analysis, Sources of errors in GIS.	8 Hours
Unit-2:	<ul> <li>GIS Functions- Data input, Data Management, Data Manipulation and Analysis, Map Overlay Analysis, Buffering, Data Output,</li> <li>Database Management systems: spatial &amp;non spatial data (Attribute data) Data capture, DataRepresentation, Data integration, data analysis &amp;modeling.</li> </ul>	8 Hours
Unit-3:	<b>Coordinate systems and Referencing Earth Objects</b> : Introduction, Definition, Requirement of Coordinate System, Spatial Coordinate Systems- Geographic coordinates, Geocentric coordinates, Coordinate Transformation, Shape of the earth, Datum Maps & Themes- Map symbols, colour, text, layout & thematic representation	8 Hours
Unit-4:	Map Projection: Introduction, Basis of Map projections, Ideal map projection, Scale, Scale factor, Coordinates, Geographic reference, datum, Projection, Types Of map projection, cylindrical, Conical & Azimuthal projection. Well Known Map Projections-Mercator projection, Transverse Mercator Projection, & Universal Transverse Mercator (UTM).	8 Hours
Unit-5:	<b>Application of GIS</b> : Land use/Land cover Analysis, Change Detection, Natural Resources Management, Disaster Mitigation Programs, Water Resources management, Cadastral surveying, Utility and Infrastructure planning, Real Estate Analysis etc.	8 Hours
<u>Text</u> <u>Books:</u>	1. Burrough PA & RA Mc Donnell, "Principles of GIS", Oxford University Press.	
<u>Reference</u> <u>Books:</u>	<ol> <li>G S Srivastava, "An Introduction to Geoinformatics" McGraw Hill Education (India) Pvt Ltd.,New Delhi.</li> <li>Clarke, Keith C., Bradley O. Parks, and Michael P. Crane. "Geographic Information Systems and Environmental Modeling", Upper Saddle River, NJ: Prentice Hall,</li> <li>Albert, Donald P., William M. Gesler, and Barbara Levergood, "Spatial Analysis, GIS, &amp; Remote Sensing Applications in the Health Sciences", Chelsea, MI: Ann Arbor Press</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=vJAQHA5XQWI&list=PL3MO67NH2XxL AFn3jc7gOhXLD9YFxoew&ab_channel=IntroductiontoGeographicInformationSystems	

	Program Elective-I	13	
<u>Course</u>		Ц-3 Т-0	
Code:	B. I ech (Civil)- Semester-VII	P-0	
ECE718	<b>Railway and Airport Engineering</b>	C-3	
Course Outcomes :	On completion of the course, the students will be:		
C01.	Understanding railway track components, their materials, size, function and importance		
CO2.	Understanding the geometric design of railway track.		
СО3.	<b>Understanding</b> various components in diverging, merging and crossings of railway tracks, stations, yards, signaling, interlocking and control systems.		
CO4.	Analyzing the runway elements.		
CO5.	Evaluating the various layouts of airport.		
Course Content:			
Unit-1:	<b>Indian Railways:</b> Development and organization of Indian Railways. Permanent way: Sub-grade, formation, embankment and cutting, track drainage. Rails: Rail gauges, types of rails, rail failure, creep of rail. Fish plates, bearing plates. Types of Sleepers. Ballast materials, size of ballast.	8 Hours	
Unit-2:	<b>Railway Track Geometry:</b> Gradients, horizontal curves, super-elevation, safe speed on curves, cant deficiency, negative super elevation, compensation for curvature on gradients, track resistance and tractive power. Points & Crossings: Elements of a simple turn-out, design of turn-out.	8 Hours	
Unit-3:	<b>Stations &amp; Yards:</b> Site selection for a railway station, layout of different types of stations, classification of stations, types of railway yard, functions of Marshalling yards. Signaling& Interlocking: Classification of signals, Modernization of Railways.	8 Hours	
Unit-4:	<b>Airport:</b> Introduction; National and International Organizations; Aircraft Characteristics, Factors for Site Selection, General Layout of an Airport. Obstructions, Imaginary Surfaces.	8 Hours	
Unit-5:	<b>Runway Design:</b> Wind Rose Diagram, Basic Runway Length, Corrections, Geometric Design Elements, Parking of aircrafts; Navigational aids.	8 Hours	
<u>Text</u> <u>Books:</u>	<ol> <li>Arora S and Saxena S C, "A text book of Railway Engineering", Dhanpat Rai &amp; Sons, Delhi.</li> </ol>		
<u>Reference</u> <u>Books:</u>	<ol> <li>Rangwala S C and Rangwala P S, "Airport Engineering", Charotar Publishing House, Anand</li> <li>KadiyaliL.R, "Traffic Engineering and Transport Planning", Khanna publishers, Delhi.</li> <li>Horenjeff, R. and McKelvey, F., "Planning and Design of Airports", McGraw Hill Company, New York.</li> <li>Norman J. Ashford, Saleh Mumayiz, Paul H. Wright, "Airport Engineering: Planning, Design and Development of 21st Century", Wiley Publishers.</li> <li>J. S. Mundrey, "Railway Track Engineering", McGraw Hill Publishing Co.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>		
<u>Additiona</u> <u>l</u> <u>Electronic</u> <u>Material</u>	1.https://www.youtube.com/watch?v=Jht88rcspuM&ab_channel=MindzillaWeRiseB         yLiftingOthers         2.https://www.youtube.com/watch?v=37WMS483T7Y&list=PL05C6EFB31D92056         8&ab_channel=nptelhrd		

	Program Elective-II	
Course		L-3
Code:	B.Tech (Civil)- Semester-VII	1-0 D ()
ECE719	Earthquake Resistant Structures	C-3
Cannag		
Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Remembering</b> Earthquake and related terminology	
	<b>Understanding</b> the types of seismic forces and the techniques to prevent	
CO2.	failure of structures.	
CO3.	Understanding degrees of freedom.	
<b>CO4</b> .	Analyzing and Designing of earthquake resistant structures.	
CO5.	Analyzing the Modeling of R.C. Buildings for earthquake.	
Course		
Content:		
Unit-1:	Introduction - Origin of Earthquakes, magnitude, intensity, ground motions, sensors, Strong motion characteristics.	8 Hours
	Response of Structure to Earthquake motion, base shear calculation,	
Unit-2:	distribution of base shearModeling of structures S.D.O.F. Systems- Equation	8 Hours
	of motion, free and forced vibrations, damping, Response Spectrum.	
Unit-3:	M.D.O.F Systems Two degree and multi-degree freedom systems.	8 Hours
	Seismic Analysis and Modeling of R.C. Buildings- Codal procedure for	
Unit-4:	determination of design lateral loads, in-fill walls, seismic analysis of R.C.	8 Hours
	building as per IS: 1893 (Part1)	
Unit-5.	R C building Design of load bearing buildings Design of shear wall	
0111 3.	i.e. building, Design of four bourning buildings, Design of shear wan.	8 Hours
	1. Duggal S.K. "Earthquake Resistant Design of Structures", Oxford	
Text Books:	University Press Delhi	
	1 P. Agarwal & M. Shrikhanda "Earthquake Resistant Design of	
	Structures" PHI Private Learning Delhi	
	<ol> <li>Mario Paz. "Structural Dynamics – Theory &amp; Computation Dynamics</li> </ol>	
	of Structures"	
Reference	<b>3.</b> Chopra Anil K."Theory and Applications to Earthquake	
Books:	Engineering", Prentice Hall India Delhi	
	4. Kramer Steven L. "Geotechnical Earthquake Engineering", Pearson	
	Education.	
	*Latest editions of all the suggested books are recommended.	
Additional	https://www.youtube.com/wetch?y=YpKA;BAOOSa&list=DLhMVaaVi5pISO	
<b>Electronic</b>	YILINgS_P3KNI9vGNVsoh&ab_channel=nntelhrd	
<u>Material</u>		

	Program Elective-II	Т 2	
Course	P. Tash (Civil) Somester VII		
<u>Code:</u>	B. Lech (CIVII)- Semester-VII	P-0	
ECE/20	Advanced Concrete Design	C-3	
Course Outcomes:	On completion of the course, the students will be:		
CO1.	Understanding the various codes related with R.C.C. design.		
CO2.	Analyzing and Designing of the grid floor and deep beams.		
CO3.	Analyzing and Designing of elevated water tanks.		
CO4.	Analyzing and Designing of chimneys.		
CO5.	Analyzing and Designing of portal frames.		
Course			
Content:	Crid or Cofford Floors		
Unit-1:	Introduction, General Features, Analysis and Design of Grid Floors	8 Hours	
Unit-2:	Continuous and Deep Beams Continuous Beams – Analysis and Design; Deep Beams - General Features, Parameters influencing Design, Flexural Bending Stresses, Shear Stresses in Deep Beams, IS Code Provisions, Design Examples.		
Unit-3:	<b>Elevated Water Tanks:</b> Introduction, Analysis & Design of INTZ Water Tank including Design of Staging.	8 Hours	
Unit-4:	<b>Chimneys</b> Wind Pressure, Stresses in Chimney Shaft due to Self-Weight and Wind, Stresses in Horizontal Reinforcement due to Wind Shear, Stresses due to Temperature Difference, Combined Effect of Self Load, Wind and Temperature, Temperature Stresses in Horizontal Reinforcement, Design of RC Chimney.	8 Hours	
Unit-5:	<b>Portal Frames</b> Introduction, Analysis and Design of Portal Frames, Design Examples.	8 Hours	
Text Books:	<ol> <li>Raju, N.Krishna, "Advanced Reinforced Concrete Design", CBS Publishers &amp; Distributors Delhi.</li> <li>Shah, H.J. "Reinforced Concrete Vol II", Charotar Publishing House Pvt Ltd.</li> </ol>		
<u>Reference</u> <u>Books:</u>	<ol> <li>IS: 456, "Code of Practice for Plain and Reinforced Concrete", Bureau of Indian Standards, New Delhi.</li> <li>IS 3370-1: Code of practice Concrete Structures for the Storage of Liquids, Part 1: General Requirements [CED 2: Cement and Concrete]</li> <li>Jain, A.K., "Reinforced Concrete: Limit State Design", Nem Chand &amp; Bros., Roorkee.</li> <li>Punmia, BC, "RCC Design", Laxmi Publications (P) Ltd New Delhi.</li> <li>Gambhir, M L, "Design of Reinforced Concrete Structures", Prentice Hall of India.</li> <li>Varghese, PC, "Advanced Reinforced Concrete Design" PHI</li> <li>Bhavikatti, S.S."Advanced Reinforced Concrete Design (Vol-II)", New Age International</li> </ol> *Latest editions of all the suggested books are recommended.		
<u>Additional</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=undsd92MM8w&list=PLbQO4xhI7wEDIY v90NoF7veaJlohpuf0Q&ab_channel=AdvancedReinforcedConcreteDesign- Prof.DevdasMenon		

	Program Elective-II	ТО
Course		L-3 T 0
Code:	B.Tech (Civil)- Semester-VII	1-V D A
ECE721	Pre-Stressed Concrete	C-3
		C-5
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the various techniques used in pre-stressing.	
CO2.	Understanding the various codal provisions in pre-stressed concrete.	
СО3.	Analyzing pre-stress concrete members subjected to various loading conditions.	
CO4.	<b>Analyzing</b> and designing simple pre- stressed concrete members like beam, slabs, and Electric poles.	
CO5.	Evaluating and Estimating the variouslosses in pre stress concrete.	
Course		
Content:		
Unit-1:	<b>Introduction to Pre-stressing Systems:</b> Review&basic concepts of Pre-Stressing, need for high strength steel and concrete, properties of materials, advantages of pre-stressed concrete, basic assumptions, tensioning devices, pre-tensioning and post-tensioning systems; Fressynet, MagnelBlaton, CCL and other systems.	8 Hours
Unit-2:	Assumptions, analysis of pre-stress, resultant stresses at a section, Load balancing concept, concentric tendons; eccentric tendons, Analysis of Rectangular & flanged beams (T-section, I-section)	8 Hours
Unit-3:	<ul> <li>Losses in Pre-StressedConcrete:Nature of losses of pre-stress, estimation of loss due to Friction, loss due to anchorage slip;loss due to elastic deformation; loss due to Shrinkage of concrete; loss due to Creep of concrete; loss due to relaxation in steel.Total losses allowed in design.</li> <li>Deflection of Pre-Stressed Concrete Members:Importance of control deflections, Factors influencing deflection; Short and long-term deflection of un-cracked members; Deflection of cracked beams; Code requirements.</li> </ul>	8 Hours
Unit-4:	<b>Design of Pre-stressed members</b> - rectangular beams, simply supported slabs, concrete poles	8 Hours
Unit-5:	Shear and Torsion in Pre-Stressed Concrete Beams: Principal and shear stresses; Ultimate shear resistance of pre-stressed concrete members; Design of reinforcements for shear, Pre-stressed concrete members in torsion Anchor Zone Stresses in Post-Tensioned Members:IntroductionStress distribution in the end blocks; Anchor zone reinforcement	8 Hours
<u>Text</u> <u>Books:</u>	1. Raju N. K."Prestressed Concrete", Mc Graw Hill Education (India) Pvt. Ltd.	
Reference Books:	<ol> <li>RamamurthamS, "RCC Design", Dhanpat Rai &amp; publishing companies.</li> <li>Punmia B C, Ashok Kumar Jain, Arun Kumar Jain, "RCC Design", Laxmi Publications</li> <li>Mallick and Gupta, "Prestressed Concrete", Oxford and IBH Publishing Company, New Delhi.</li> <li>IS: 1343 – 1987 Reaffirmed 1999, "Code of practice for prestressed concrete, Bureau of Indian Standards, New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=4KYPltsNAWs&list=PLB50EF6A79D1F8C14&ab_ channel=nptelhrd	

	Program Elective-II	т 3
Course		L-3 T-0
<u>Code:</u>	B. I ech (Civil)- Semester-VII	P-0
ECE/22	Finite Element Method	C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the concept of FEM.	
CO2.	<b>Understanding</b> the Finite Element Formulation Techniquesusing different methods.	
СО3.	Applying FEM for Two and Three-Dimensional Solids.	
CO4.	Analyzing the bar beams and truss element by FEM.	
<u>CO5.</u>	Analyzing the structures by discretizing the member with number of nodes.	
Course		
Content.	Introduction to Finite Element Analysis	
Unit-1:	<ul> <li>Introduction: - Background of Finite Element Analysis, Numerical Methods, Concepts of Elements, Nodes Degrees of Freedom</li> <li>Basic Concepts of Finite Element Analysis: - Discretization of Technique Basic, Concepts of Finite Element Analysis, Advantages of FEA, Disadvantages of FEA, Limitations of the FEM, Errors and Accuracy in FEA.</li> </ul>	8 Hours
	<ul> <li>Introduction to Elasticity: -Strain-Displacement Relations, Linear Constitutive Relations, Two-Dimensional Stress Distribution.</li> <li>Steps in Finite Element Analysis: -Loading Conditions, Support Conditions, Type of Engineering Analysis, Basic Steps in Finite Element Analysis, and Element Library in FEA Software.</li> </ul>	Hours
Unit-2:	<ul> <li>Finite Element Formulation Techniques</li> <li>Virtual Work and Variationally Principle: - Introduction, Principle of Virtual Work, Variationally Principle, Weighted Residual Method.</li> <li>Galerkin Method: - Introduction, Galerkin Method for 2D Elasticity Problem, Galerkin Method for 2D Fluid Flow Problem.</li> <li>Finite Element Method: Displacement Approach: -Choice of Displacement Function, Shape Function, Degree of Continuity, Elements, Various Elements.</li> <li>Stiffness Matrix and Boundary Conditions: -Element Stiffness Matrix, Global Stiffness Matrix, Boundary Conditions.</li> </ul>	8 Hours
Unit-3:	<b>Element properties</b> Natural Coordinates, Triangular Elements, Rectangular Elements, Lagrange and Serendipity Elements, Solid Elements, Isoperimetric Formulation, Stiffness Matrix of isoperimetric Elements, Numerical Integration: One Dimensional, Numerical Integration: Two and Three Dimensional.	8 Hours
Unit-4:	Analysis of frame Structures Stiffness of Truss Members, Analysis of Truss, Stiffness of Beam Members, Finite Element Analysis of Continuous Beam, Plane Frame Analysis, Analysis of Grid and Space Frame.	8 Hours
Unit-5:	<b>FEM for Two and Three-Dimensional Solids</b> Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness, Computation of Stresses, Geometric Nonlinearity and Static Condensation, Axisymmetric Element, Finite Element Formulation of Axisymmetric Element, Finite Element Formulation for 3 Dimensional Elements.	8 Hours
<u>Text</u> <u>Books:</u>	<ol> <li>Krishnanmoorthy,C.S., "Finite Element Analysis", Tata McGraw Hill Publishing Co. Ltd, New Delhi,</li> </ol>	
Reference Books:	<ol> <li>ShrikhandeManish, "Finite Element Method And Computational Structural Dynamics", PHI Private Learning, Delhi.</li> </ol>	

	2. COOK. D. Robert, Malus.S.David, PleshaE.Michel, John,"Concepts			
	and Applications of Finite Element Analysis", Wilely& Sons.			
	3. Desai / ABEL,"Introduction to the Finite Element Method", C.B.S.			
	Publishers & Distributors, New Delhi.			
	*Latest editions of all the suggested books are recommended.			
<u>Additional</u>				
<u>Electronic</u>	https://www.youtube.com/watch?v=RRB83Z1zyCU&list=PLbMVogVj5nJT5			
<b><u>Reference</u></b>	ExFh0t6hYnyAlHSpbRWV&ab_channel=nptelhrd			
<u>Material</u>				

	Program Elective-II	т э
<u>Course</u>		L-3 T_0
Code:	B.Tech (Civil)- Semester-VII	P-0
ECE723	<b>Building Maintenance &amp; Repair</b>	C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the maintenance techniques of buildings.	
CO2.	<b>Understanding</b> methods for strengthening of the foundations of buildings, RC beams, columns and slabs.	
CO3.	Understanding various methods of crack repair.	
<b>CO4</b> .	UnderstandingJacketing and strengthen techniques.	
CO5.	<b>Evaluating</b> various construction chemicals and their effect on cement mortar and concrete.	
Course Content:		
Unit-1:	Introduction: -Maintenance, rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures. Cracks in R.C. buildings: -Various cracks in R.C. buildings, causes and effects. Maintenance: - Maintenance importance of maintenance, routine and preventive maintenance. Damages to masonry structures: -Various damages to masonry structures and causes.	8 Hours
Unit-2:	Repair materials: -Various repair materials, Criteria for material selection, Methodology of selection, Healthand safety precautions for handling and applications of repair materials. Special mortars and concretes: -Polymer Concrete and Mortar, Quick setting compounds. Grouting materials: -Gas forming grouts, Salfoalumate grouts, Polymer grouts, Acrylate and Urethane grouts. Bonding agents: -Latex emulsions, Epoxy bonding agents.Protectivecoatings: -Protective coatings for Concrete and Steel, FRP sheets	8 Hours
Unit-3:	Damage diagnosis and assessment: -Visual inspection, Non-Destructive Testing using Rebound hammer, ultra-sonic pulse velocity,semi destructive testing, Probe test, Pull out testChloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement. Substrate preparation: -Importance of substrate/surface preparation, General surface preparation methods and procedure, Reinforcing steel cleaning.	8 Hours
Unit-4:	Crack repair: -Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks.Corrosion of embedded steel in concrete: -Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair ofvarious corrosion damaged of structural elements (slab, beam and columns).	8 Hours
Unit-5:	Jacketing: -Jacketing, Column jacketing, Beam jacketing, Beam Column joint jacketing, reinforced concretejacketing, Steel jacketing, FRP jacketing.Strengthening: -Strengthening, Beam shear strengthening, Flexural strengthening.	8 Hours
<u>Text Books:</u>	<ol> <li>Verghese, P.C. "Maintenance, repair an &amp; Rehabilitation &amp; Minor Works of Buildings", PHI Learning Private Limited, Delhi</li> </ol>	

	1. Modi, Poonam I., Patel, ChiragN."Repair and Rehabilitation of	
	Concrete Structures", PHI Learning Private Limited, Delhi	
	2. Sidney M. Johnson, "Deterioration, Maintenance, and Repair of	
	Structures", McGraw Hill Publication, Delhi.	
<u>Reference</u> <u>Books:</u>	3. "Case Studies of Rehabilitation, Repair, Retrofitting and	
	Strengthening of Structures", International Association of Bridge	
	and Structural Engineering, Zurich, Switzerland.	
	4. "Handbook on Repairs and Rehabilitation of RCC	
	Buildings", CPWD, Central Public Works Department	
	(CPWD), New Delhi.	
	*Latest editions of all the suggested books are recommended.	
Additional		
Electronic	https://www.youtube.com/watch?v=i11zIIOeqfU&ab_channel=nptelhrd	
<u>Material</u>		

	Program Elective-II	I_3
Course	P. Task (Civil) Somestar VII	Ц-3 Т-0
<u>Code:</u>	B. I ech (Civil)- Semester-v II	P-0
ECE724	Groundwater Management	C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Understanding</b> the ground water occurrences and its prospects.	
CO2.	Understanding Well logging and its construction techniques.	
CO3.	Understanding and monitoring Quality of Groundwater.	
CO4.	Applying the methods of exploration for searching ground water.	
CO5.	Analyzing and Designing artificial and natural ground water recharge structures.	
Course		
<b>Content:</b>		
Unit-1:	Fundamentals of groundwater: Introduction, sources of groundwater, Ground Water occurrences,Ground water hydrologic cycle, vertical distribution of ground water, zone of aeration and zone of saturation, water table, Groundwater	8 Hours
Unit-2:	assessment, engineering considerations for groundwater Groundwater-Aquifers and Indian Scenario: Introduction, Aquifers and its types, GeologicFormations as aquifers, Confined aquifers, unconfined aquifers Indian aquifers,Groundwater resources status of India	8 Hours
Unit-3:	Groundwater Prospecting: Introduction, Geologic method and hydrologic methods, SurfaceGeophysical methods of exploration - Electrical Resistivity method, Seismic refraction method, Well logging and construction: Introduction, types of wells, Selection of well site, desk study, fieldreconnaissance, well survey, pumping tests, Well logging and its techniques	8 Hours
Unit-4:	Artificial Recharge of Ground Water: Concept of artificial recharge, relative merits. Applicationsof GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies. Recharging of groundwater by rainwater harvesting	8 Hours
Unit-5:	Quality of Groundwater: Sources of salinity, measures of water quality, Bacteriological quality,chemical quality, physical quality, Quality criteria for groundwater use, Groundwater pollution,Application of water quality data to quantitative assessments, Monitoring of groundwater quality	8 Hours
<u>Text Books:</u>	<ol> <li>Karanth, K R "Groundwater Assessment Development and Management", Tata McGraw Hill Education Private Limited, New Delhi</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Raghunath, H.M. "Groundwater" Wiley Eastern Ltd.</li> <li>David Keith Todd, "Ground water Hydrology" John Wiley &amp; Son, New York.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Material</u>	https://www.youtube.com/watch?v=CxgwgMtzrsQ&list=PLbRMhDVUMngdZ vhdNC31fHsV_HLIW5Jby&ab_channel=IITKharagpurJuly2018	

Course	Program Elective- III	L-3
<u>Code:</u>	B.Tech - Semester-VII	T-1
EHM731	Principle of Management	г-о С-4
Course Outcomes:	On completion of the course, students will be:	
CO1.	Understanding the concept, evolution and current trends of management.	
CO2.	<b>Applying</b> managerial functions like planning, organizing, staffing, leading & controlling in decision making.	
<u> </u>	<b>Applying</b> theories of motivation and leadership in organizational settings.	
CO4.	training and development, performance management.	
CO5.	<b>Evaluating</b> controlling techniques- budgetary and non-budgetary, and productivity problems in management.	
Course Content:		
Unit-1:	IntroductionToManagementAndOrganizationsDefinition of Management – Science or Art – Manager VsEntrepreneur -types of managers - managerial roles and skills – Evolution of Management –Scientific, human relations , system and contingency approaches – Types ofBusiness organization - Sole proprietorship, partnership, company-public andprivate sector enterprises - Organization culture and Environment – Currenttrends and issues in Management.	8 Hours
Unit-2:	PlanningNature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques –Decision making steps andprocess.	8 Hours
Unit-3:	Organising Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design – Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.	8 Hours
Unit-4	<b>Directing</b> Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.	8 Hours
Unit-5	<b>Controlling</b> System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.	8 Hours
<u>Text</u> Books:	<ol> <li>JAF Stoner, Freeman R.E and Daniel R Gilbert "Management: Pearson Education.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Stephen A. Robbins &amp; David A. Decenzo&amp; Mary Coulter, "Fundamentals of Management" 7<sup>th</sup> Edition, Pearson Education.</li> <li>Robert Kreitner&amp;MamataMohapatra, "Management", Biztantra.</li> <li>Harold Koontz &amp; Heinz Weihrich "Essentials of Management" Tata McGraw Hill.</li> <li>Tripathy PC &amp; ReddyuPn," Principles of Management", Tata McGraw Hill.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	

Additional	1.https://www.youtube.com/watch?v=RIozYN rhkA&ab channel=EasyMBA							
<b>Electronic</b>	2. https://www.youtube.com/watch?v=RYnUDLey-							
<b>Reference</b>	g4&list=PLF1DBCAC25C2BC963&index=6&ab channel=nptelhrd							
<u>Material</u>								
Program Elective- III								
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Course Code:	D Task Somester VII							
EHM735	D. 1 eth - Semester-VII Industrial Sociology	P-0						
	industrial Sociology	C-4						
Course Outcomes:	On completion of the course, students will be:							
CO1.	<b>Understanding</b> the concepts of sociology, trace its historical development, and social impact of industrialization.							
CO2.	<b>Understanding</b> the nature of modern societies, significance of the							
	current service sector, and importance of work experience in Industry							
CO3.	Understanding the concepts related the industrial work.							
CO4.	Analyzing the problems of business Ethics.							
CO5.	<b>Creating</b> corporate culture, reputation and ethical leadership in organizational settings.							
Course								
Content:								
Unit-1:	Sociology in the industrial Perspective: Concept of Sociology, Sociology as a Science, Sociology of work & industry, Perspectives for sociological analysis of work, Class- Conflict in Industry, Social impact of industrialization, Corporate skills in the fast growing multinational set up.							
Unit-2:	Work and Social change: Nature of modern societies, emergence of industrial capitalism, Technology & Social change, the information society after the industrial society, post-modernity, globalization & Convergence, Significance of the service sector today, work restructuring and corporate management.	8 Hours						
Unit-3:	<b>Work experience in Industry:</b> The concept of alienation, Work satisfaction, Technology & work experience, and Social background of workers, Work orientations, Stress & anxiety of the worker, Work & Leisure Unemployment Conflicts in the work place							
Unit-4	<b>General and Applied Ethics</b> - Ethics and the professions – Standard of right and wrong, problems of Ethical Certainty, Significance of professional Ethics for Engineers, New Technology and Ethics, Applied Ethics - Cases in professional Engineering Practice, Principles of business ethics. Individual in the organization							
Unit-5	Ethical Leadership: Decision making, corporate culture and reputation management, corporate social responsibility and social reporting.	8 Hours						
<u>Text Books:</u>	1. Sheth N.R., Social Frame Work of Indian Factory, O.U.P. Bombay							
<u>Reference</u> <u>Books:</u>	<ol> <li>Fleddermann Charles, Engineering Ethics, Upper Saddle River- N.J. Prentice Hall.</li> <li>Miller &amp; Form, Industrial Sociology, London Harper &amp; Row.</li> <li>Parsons Richard D., The Ethics of Professional Practice- Allyn&amp; Bacon, London.</li> <li>Govindarajan- Engineering Ethics- Prentice Hall (India) New Delhi.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>							
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=LKJzwPj34BI&list=PLLcrDBoL- 7rL0ADv1qIE9Z2qalhWscFRO&ab_channel=Flavido							

	Program Elective- III					
Commo						
Coder	R Tach Somostar VII	<b>T-1</b>				
EUM724						
EHN1/34	Engineering and Managerial Economics	C-4				
Course Outcomes:	On completion of the course, students will be:					
CO1.	Understanding the role of managerial economics in engineering perspective.					
CO2.	<b>Understanding</b> different market structures and price determination in different market conditions.					
CO3.	Understanding the concepts of national income, inflation, and business cycles.					
CO4.	Applying the concepts of demand analysis.					
CO5.	<b>Evaluating</b> fixed cost, variable cost, average cost, marginal cost, Opportunity cost.					
Course	<b>e</b> , , , , , , , , , , , , , , , , , , ,					
<b>Content:</b>						
Unit-1:	<b>roduction:</b> Meaning, Nature and Scope of Economics, Meaning of Science, gineering and Technology; Managerial Economics and its scope in engineering spective.					
Unit-2:	<b>Demand:</b> Basic Concepts Demand Analysis; Law of Demand; Determinates of Demand; Elasticity of Demand-Price, Income and cross Elasticity; Uses of concept of elasticity of demand in managerial decisions.	8 Hours				
Unit-3:	<ul> <li>Forecasting: Demand forecasting; Meaning, significance and methods of demand forecasting; production function; Laws of returns to scale &amp; Law of Diminishing returns scale.</li> <li>Short and Long run Cost curves: fixed cost, variable cost, average cost, marginal cost. Opportunity cost</li> </ul>					
Unit-4	Market Study:       Market Structure Perfect Competition; Imperfect competition:         Monopolistic competition, Monopoly, Oligopoly, Duopoly Sorbent features of price         determination and various market conditions					
Unit-5	<b>Inflation:</b> National Income; Concept of N.I. and Measurement; Inflation: Meaning of Inflation; Type, causes& prevention methods; Business Cycles, Phases of business cycle.	8 Hours				
<u>Text</u> <u>Books:</u>	1. Kakkar, D.N., Managerial Economics for Engineering, New Age International Publication.					
<u>Reference</u> <u>Books:</u>	<ol> <li>Dwivedi, D.N., Managerial Economics, Vikas Publishing.</li> <li>Maheshwari, Y., Managerial Economics, Prentice Hall of India.</li> <li>Koutsoyiannis, A : Modern Microeconomics, ELBS.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>					
Additional	https://www.youtube.com/watch?v=7SVZxilZOfk&list=PLbMVogVi5nJRTAVF4-					
Electronic	tueujAFiLKIV3Mo&index=6&ab channel=nptelhrd					
Reference Material						

	Program Elective- III						
<u>Course</u>							
<u>Code:</u>	B.Tech (Civil) - Semester-VII						
ECE734	Solid and Hazardous Waste Management	C-4					
Course Outcomes:	On completion of the course, the students will be:						
CO1.	<b>Remembering</b> the important concepts in the field of solid and hazardous waste management						
CO2.	<b>Understanding</b> of problems of municipal waste, biomedical waste, hazardous waste, e- waste, industrial waste etc						
СО3.	<b>Applying</b> the most common techniques for preventing, minimizing, recycling, disposing and treatment of waste						
CO4.	Applying suitable technical solutions for treatment of municipal and industrial waste.						
CO5.	Analyzing the collection system and transfer of solid waste.						
Course							
Content:							
Unit-1:	<b>Source and Characteristics of Solid Waste:</b> Definition of solid waste, Composition of solid waste, Classification of solid waste, Physical, Mechanical & Chemical properties of waste, Method of sampling and measurement, Variations in quantity and composition of solid wasteForecasting future waste quantities						
Unit-2:	Source Reduction, On-Site Processing and Storage of Solid: Introduction, Source reduction, Onsite processing and collection of waste materials, Implementation of source reduction and on-site processing, Calculation of source reduction, On-site storage						
Unit-3:	<ul> <li>Collection and Transfer of Solid Wastes: Introduction, Classification of collection systems, Composting: Introduction, Composting process, Factors affecting composting process, Composting methods-Vermicomposting, Barrel composting and Self-turning composting.</li> <li>Collection and Transfer of Solid Wastes: Introduction, Classification of collection systems, Point of collection, Frequency of waste collection, Street cleansing, Transfer</li> </ul>						
Unit-4:	<b>Recycling and Reuse:</b> Introduction, Recycling processes, Material recovery facilities, planning for recycling, recycling performance indicators <b>Anaerobic Digestion</b> / <b>Bio gasification:</b> Introduction, mechanism of anaerobic digestion, Environmental factors affecting anaerobic digestion, Anaerobic treatment processes,	8 Hours					
Unit-5:	Unit-5:Environmental factors affecting anaerobic digestion, Anaerobic treatment processes, Thermal Treatment: Introduction, Incineration, Processes of thermal treatment, Pyrolysis, Plasma thermal treatment Land Disposal: Introduction, Landfill classification, Planning, design and operation of sanitary landfills, Landfill closure and post-closure care, Environmental monitoring, Landfill completion After-use of landfill sites Hazardous Waste Treatment:Definition,Treatment of hazardous waste Hazardous waste management, Healthcare waste management						
<u>Text</u> <u>Books:</u>	Text Books:1. Kanti L. Shah, "Basics of Solid and Hazardous Waste Management Technology", University of Michigon, Prentice Hall.						
<u>Reference</u> <u>Books:</u>	<ol> <li>Rao, M.N. Razia Sultana Sri Harsha Kota "Solid and Hazardous Waste Management" Elsevier Publication.</li> <li>Techobanglous, Thiesen and Vigil, "Integrated Solid Waste Management," McGraw Hill, N.Y.</li> <li>Lagrega, Buckingham and Evans, "Hazardous Waste Management", McGraw Hill, N.Y.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>						

<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=RsAzbF96zyY&ab_channel=CIVILWITHSUDHEER	
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	Program Elective- III								
<u>Course</u>									
<u>Code:</u>	B.Tech (Civil) - Semester-VII								
ECE735	Disaster Management								
Course	On completion of the course, the students will be:	-							
Outcomes:	Understanding foundations of hazards, disasters and associated natural/social								
C01.	phenomena.								
CO2.	Understanding disaster management theory (cycle, phases).								
CO3.	government.								
CO4.	Applying the emerging techniques of disaster mitigation.								
CO5.	Analyzing vulnerability of disaster and its risk assessment.								
Course Content:									
Unit-1:	Understanding Disasters: Introduction, characteristics and types of Disasters, Causes and effects, Disaster: A Global View, Disaster Profile of India Natural Disasters: Geological Hazards: Landslides, Earthquakes, Volcanic Eruption, Mine fire, Dam failure Hydro-meteorological Hazards: Floods Droughts, Cyclones, Tsunamis								
Unit-2:	Man Made Disasters: Fires and Forest Fires, Nuclear, Industrial and Chemical disaster         Bisaster         Disaster         Preparedness:         Introduction, Concept & Nature, Post disaster         H         preparedness:         Disaster         Preparedness:         Preparedness:								
Unit-3:	Disaster Mitigation: meaning and concept, Mitigation Strategies, Emerging Trends in Disaster Mitigation, Mitigation management Reconstruction and Rehabilitation: Damage Assessment Monitoring and Evaluation of Rehabilitation Work								
Unit-4:	Risk Assessment: Understanding Risk: Concepts and Elements, Disaster Risk         Reduction, Risk Analysis Techniques         Vulnerability Analysis: Vulnerability: Concept and Parameters, Vulnerability         Analysis Socio-Economic Factors of Vulnerability								
Unit-5:	<ul> <li>Disaster Management: Introduction, Disaster Management Cycle, Disaster</li> <li>Risk Management,</li> <li>Disaster Management in India</li> <li>Roles &amp; Responsibilities of Different Agencies and Government</li> <li>Role of Remote Sensing, GIS and GPS in Disaster management</li> </ul>								
<u>Text</u> <u>Books:</u>	1. Sahni, Pardeep et.al. "Disaster Mitigation Experiences and Reflections", Prentice Hall of India, New Delhi.								
<u>Reference</u> <u>Books:</u>	<ol> <li>Bryant Edwards, "Natural Hazards", Cambridge University Press, U.K.</li> <li>Roy, P.S. "Space Technology for Disaster management: a Remote Sensing &amp; GIS Perspective", Indian Institute of Remote Sensing (NRSA), Dehradun.</li> <li>Sharma, R.K. &amp; Sharma, G. "Natural Disaster", APH Publishing, New Delhi.</li> <li>Singh Satendra, "Disaster Management in the Hills", Concept Publishing Company, New Delhi.</li> <li>*Latest editions of all the suggested books are recommended</li> </ol>								

Additional	
Electronic	https://www.youtube.com/watch?v=DExlZTfKZAM&list=PLC4PaTsQiLcbej
Reference	XqJR7S59Ohk2OK1rgEG&ab_channel=MOOCsEMRCOsmaniaUniversity
Material	

<u>Course Code:</u> ECE811	Code:B.Tech (Civil)- Semester-VIII811Project Planning & Control							
Course Outcomes:	On completion of the course, the students will be:							
CO1.	<b>Understanding</b> the concept of Project management for construction industry.							
CO2.	<b>Understanding</b> and applying the different tools for time management.							
СО3.	<b>Applying</b> the tools related to time management for solving the construction management problems.							
CO4.	Evaluating the Time Cost Trade-off and Resource Scheduling problems.							
CO5.	<b>Evaluating</b> the ways of monitoring and controlling the project tools for resource scheduling like PERT and CPM.							
Course Content:								
Unit-1:	Construction Project Management         Introduction, Management & Project Management, Process & Project         Management, Art vs. Science, Project Objectives & Scientific         Management of Projects, Construction Industry & National Growth,         Project Stakeholders, Project Phases, Project Organization, Project							
Unit-2:	Time Management Basics of Work Breakdown Structure, Management Approach, Tools for Time Management, Gantt / Bar Chart - History, Representation, Progress Monitoring, Uses, Steps to draw a Bar Chart, Exercise to Develop a Bar Chart, Bar Charts for Resource Usage, Pros and Cons, Activity Duration Estimation (Tools & Techniques) - Types, Inputs, Methods, Parametric Estimation,	8 Hours						
Unit-3:	Networks for Time Management Networks Analysis: - Types of Networks & Comparison, Network Representation, Network Analysis, Forward Pass (ES,LS, Project Duration), Backward Pass (EF,LF, Critical Activity), Results in Gantt chart, Usage for Project Planning, Definitions and Types of Float or Slack, Calculation of Floats Usage of Floats for Project Decisions, Examples on Activity Identification and Duration Estimation.	8 Hours						
Unit-4:	Examples on Activity Identification and Duration Estimation.Time Cost Trade-off (Crashing) & Resource SchedulingTime Cost Trade-off (Crashing): - Fast-Tracking vs. Crashing, Relationship between Activity Direct Cost & Activity Duration – Assumptions, Steps for Crashing, Indirect Cost and Effect of Crashing, Time-Cost Trade-off Problems, Tabulation Approach, Incorporating Factors such as Bonus and Penalty. Resource Scheduling: - Projects & Resources, Example of Two Resources, Resolving Over-Allocation, Resource Profile Requirements, Resource Leveling, Minimum Moment Concept, Applying Improvement Easter							
Unit-5:	<b>Project Monitoring &amp; Control</b> Typical Project Time Monitoring Process, Levels and Frequency of Updates, Earned Value Analysis (EVA) – % Complete of the Project, Cost & Schedule Performance –CPI,SPI, Forecasts, EVA Examples; Uncertainty in Project Schedules – PERT Background & Assumptions– PERT –Stepwise Procedure –PERT Examples.							
Text Book:	<ol> <li>Punmia, B.C &amp; Khandelwal K.K. "Project Planning and Control with PERT and CPM", Laxmi Publications Pvt Ltd Delhi.</li> </ol>							
<u>Reference</u> <u>Books:</u>	<ol> <li>Salah Mubrak, "Construction Project, Scheduling and Control," Wiley Publications.</li> <li>Chitkara, K.K. "Construction Project Management, Planning, Scheduling and Controlling", McGraw Hill Education*Latest editions of all the suggested books are recommended</li> </ol>							

B.Tech (CE) Syllabus Applicable w.e.f. Academic Session 2020-21

Electronic Reference Material	https://www.youtube.com/watch?v=H58TPQNr2kM https://www.youtube.com/watch?v=2AOhCWhwOKo https://www.youtube.com/watch?v=lfIX8VwZpPE	

<u>Course Code:</u> ECE812	<b>B.Tech (Civil)- Semester-VIII</b> <b>Design of Hydraulic Structures</b>							
Course Outcomes:	On completion of the course, the students will be:							
C01.	CO1.Understanding different water storage structures like gravity dams, earth dams.							
CO2.	Understanding different hydraulic phenomena in the design of hydraulic structures.							
CO3.	Understanding hydropower engineering project.							
CO4.	Understanding river training works.							
CO5.	Analyzing diversion head works required in irrigation system and Cross-drainage structures.							
Course								
Content:								
Unit-1:	<b>Storage Works:</b> Classification of dams, factors governing selection of type of dam, selection of site, preliminary investigations. Gravity Dams: Forces acting on a gravity dam, stability criteria, modes of failure elementary and practical profiles, stability analysis, stress analysis, construction joints, openings in dams' galleries, foundation treatment of gravity dam.	8 Hours						
Unit-2:	<b>Earth Dams:</b> Types, foundation for earth dams, design of earth dams, causes for failure of earth dams, criteria for safe design, phreatic line, seepage analysis – seepage control through body and foundation. Spillways: Essential requirements, spillway capacity, components, types of spillways and their working, design of ogee spillway, spillway crest gates, energy dissipation below spill way, scour protection, use of hydraulic jump as energy dissipater – design of stilling basins – IS standard basins.	8 Hours						
Unit-3:	<b>Diversion Head Works:</b> Location and components, effects of construction of weirs on permeable foundation, Bligh's, Lane's and Khosla's theories, weirs and barrages, weirs on permeable foundations, design of barrage, canal head regulator, silt control devices. Regulation Works: Canal falls, definition, necessity and location, classification of falls, design principles of notch fall, and distributary cross regulator and off-take head regulator.	8 Hours						
Unit-4:	OII-take nead regulator.Cross Drainage Works: Types, factors affecting the suitability of each type, classification, design principles of Aqueduct (Type-III). River Engineering: Classification of Rivers, River Training and its objectives, Classification of River Training Works, Methods for River Training, Marginal Embankments or Levees, Guide Banks or Guide Bunds, Groynes or Spurs, Cutoffs, Bank Pitching and Launching Aprons, Pitched Islands Miscellaneous Methods							
Unit-5:	Water Power Engineering: Development of hydro power in India, assessment of available power, utilization factor, load factor, diversity factor, storage and pondage, types of hydro power schemes, components of hydel schemes – forebay, intake structure, trash racks, water hammer, surge tanks, sub structure and super structure of power house.	8 Hours						
<u>Text Books:</u>	Text Books:       1. Punima B.C. &Pande B. B. Lal, "Irrigation and Water Power Engineering", Laxmi Publishing, New Delhi.							
<u>Reference Books:</u>	<ol> <li>Majumdar Dilip Kumar, "Irrigation Water Management (Principles &amp; Practices)", Prentice Hall of India (P), Ltd.</li> <li>Basak, N.N, "Irrigation Engineering", Tata McGraw-Hill Publishing Co. New Delhi.</li> </ol>							

	<ol> <li>P. N. Modi, "Irrigation, Water Resources and Water Power Engineering", Standard Book House, Delhi-6, sixth edition.</li> </ol>
	<ol> <li>S. K. Garg, "Irrigation Engineering, and Hydraulic Structures", Khanna Publishers, Delhi.</li> </ol>
	<ol> <li>Asawa, G.L., "Irrigation Engineering", New Age International Publishers.</li> </ol>
	<ul> <li>6. R. S. Varshney, S.C. Gupta, and R.L. Gupta, "Theory &amp; Design of Irrigation Structures", Nem Chand &amp; Bros., Roorkee, Sixth edition.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ul>
Electronic Reference Material	https://www.youtube.com/watch?v=VlQmjeFS4ls         https://www.youtube.com/watch?v=zTH194KMlnU         https://www.youtube.com/watch?v=fqceTkveWTo         https://www.youtube.com/watch?v=JBrdUoU2uTE

<u>Course Code:</u> ECE898	B. Tech (Civil)- Semester-VIII Project Work Phase-II	L-0 T-0 P-6 C-3
Course Procedure:		
	Students should devote themselves to prepare something tangible, which could be a working model of their thoughts based on their subject of choice. The project shall be finalized by the students based on the VII semester project work report and shall be completed (100% working condition) and submitted at least one month before the last teaching day of the VIII semester, date of which shall be notified in the academic calendar. The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner. The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.	
	The marking shall be as follows.	
Internal: 50 marks	By the Faculty Guide - 25 marks By Committee appointed by the Director/Principal – 25 marks	
External: 50 marks	By External examiner appointed by the University – 50 marks.	

There shall be continuous evaluation of the student on the following broad parameters:

**1.** Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

**3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

**5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

**6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd&IIIrd CT in semester:

S N o		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co- curricular activities	General Behavior	Any Extra Achievement
				(5)	(15)	(20)	(10)	(20)	(20)	(5)	(5)
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

	Program Elective- IV	ТЭ
Course Code: ECE813	B.Tech (Civil) - Semester-VIII Rock Mechanics	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be:	
C01.	<b>Understanding</b> the importance of the knowledge of rock mechanics and engineering geology in the design of constructions in rock mass, such as tunnels, rock slopes, caverns, high-ways and other rock construction;	
CO2.	<b>Understanding</b> basic principles in making the designs or layouts of the above engineering practices.	
CO3.	Understanding physical and mechanical properties of rocks.	
CO4.	Applying field and in-situ strength of rocks.	
C05.	<b>Applying</b> the ground improvement techniques for mega projects such as construction of dam tunnels, bridges and flyovers.	
Course Content:		
Unit-1:	<ul> <li>Rocks Mechanics: Its scope &amp; importance; Application in Civil engineering problems</li> <li>Classification of rocks: Geological &amp; lithological classifications; Terzaghis's classification; RQD classification of rock masses; Engineering classification of rocks; Geo-mechanics classification (RMR); Applications of rock mass classification.</li> <li>Rock exploration: Objective, Geophysical exploration methods-Seismic methods, electrical resistivity method, Gravity methods and magnetic methods.</li> </ul>	8 Hours
Unit-2:	<b>Engineering Properties of Rocks:</b> Elasticity & Strength of rocks; Engineering behavior of rock mass; Stress - strain curves; Effect of confining pressure and temperature; Anisotropy, Effect of anisotropy; Friction in rocks.	8 Hours
Unit-3:	<ul> <li>Physical Properties of rocks: Definition &amp; determination – Density, Porosity, Permeability and Water absorption.</li> <li>Mechanical Properties of rocks: Definition &amp; determination – Compressive strength, Elastic modulus, Tensile strength (Brazilian test), Abrasion Resistance test by using Los Angeles abrasion test machine, Attrition test by Deval's Attrition test machine, Impact test for toughness, Crushing strength test, Triaxial shear test.</li> </ul>	8 Hours
Unit-4:	<b>Field &amp; In situ Strength test of Rocks:</b> Necessity & requirement; In situ properties of rocks & common in situ tests - Field direct shear test, Field Triaxial strength test, Plate load test, Bore hole test; General structural & mechanical properties of rocks influencing the Civil engineering foundation -Heterogeneity; Discontinuities.	8 Hours
Unit-5:	Methods of improving properties of rock masses – Grouting - Pressure grouting for dams & tunnels, consolidation grouting; Rock reinforcement; Rock freezing; Rock bolting - Principle of rock bolting, various types of rock bolting, application of rock bolting.	8 Hours
<u>Text Books:</u>	1. Hudson J A & Harrison J P, Engineering Rock Mechanics- An	
<u>Reference</u> <u>Books:</u>	<ol> <li>Jaejer and Cook: Fundamentals of Rock Mechanics.</li> <li>Stagg K. G. and Zienkiewicz O. C.: Rock Mechanics in Engineering Practice.</li> <li>Fairhurtz C.: Design Methods in Rock Mechanics.</li> <li>Krynine, D P, &amp;Judd,W R: Engineering Geology &amp;Geotectonics, Mc-Graw Hill, New York.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	

	Program Elective- IV	
Course Code:		L-3 T-0
ECE815	B.Tech (Civil) - Semester-VIII	P-0
LeLone	Bridge Engineering	C-3
Course		
Outcomes:	On completion of the course, the students will be:	
	Understanding the functioning of various bearings, joints and	
CO1.	appurtenances.	
CO2.	Applying bridge loading standards in the design of bridges.	
CO3.	Applying all the factors to be considered in the investigation, design,	
	construction and maintenance of highway bridges.	
<u> </u>	Analyzingthe reinforced concrete Bridges.	
<u> </u>	Analyzing the pre-stressed concrete highway bridges.	
Course		
Content:	Introduction and Investigation for Dridges	
	Introduction to Bridge Engineering - Definition Components	
	Classification Standard Specifications: Investigation for Bridges –	8
Unit-1:	Selection of Bridge Site Determination of Design Discharge	o Hours
	Economical Span, Subsoil Exploration, Traffic Projection, Selection of	nours
	Bridge Types.	
	Bridge Loading Standards	
Unit 2.	Indian Roads Congress Bridge Loading Standards, Highway Bridge	8
01111-2.	Loading Standards of Different Countries, Design Loads to be	Hours
	considered. Design of Reinforced Concrete Box Culvert.	
<b>TI I I I</b>	Reinforced Concrete Bridges	8
Unit-3:	Types and Description of Reinforced Concrete Bridges, T-Beam Bridges	Hours
	- Design of 1-Beam Bridges	
	General Aspects Advantages of Pre-Stressed Concrete Bridges Pre-	
Unit-4:	tensioned Pre-stressed Concrete Bridges, Post-tensioned Pre-stressed	8
	Concrete Bridge Decks, Design of Post-tensioned Pre-stressed Concrete	Hours
	Bridge Deck.	
	Bearings, Joints and Appurtenances	
	Categories of Bearings- Fixed Bearings, Expansion Bearings,	
Unit-5:	Elastomeric Bearings; Joints- Expansion Joints; Appurtenances -	8
	Handrails, Footpaths on Bridges, Drainage Arrangements, Wearing	Hours
	Lourse, Approach Slab, River Training Works.	
<u>Text Books:</u>	1. Victor D J, Essentials of Bridge Engineering, Oxford & IBH.	
	1. Bureau of Indian Standards (BIS) Publications on Highway	
	Materials.	
	2. Specifications for Road and Bridges, MOST (India).	
Reference	3. Ponnuswamy S, "Bridge Engineering", McGraw Hill.	
Books:	4. Raina V K, "Concrete Bridge Practice", McGraw Hill.	
	5. Raju N K, "Design of Bridges", Oxford & IBH.	
	*Latest editions of all the suggested books are recommended.	
Additional		
Electronic	https://www.youtube.com/watch?v=Pt1ZVgEFmOQ	
Reference	https://www.youtube.com/watch?v=PEdLjevUcyU https://www.youtube.com/watch?v=3PythENyEDM	
<u>Material</u>	<u>https://www.youtube.com/waten:v=5DAutDivAFDIvi</u>	

	Program Elective- IV	т о
Course Code:	B.Tech (Civil) - Semester-VIII	L-3 T-0
ECE816	<b>Environmental Impact Assessment and Management</b>	Р-0 С-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	<b>Understanding</b> the impacts of the various developmental projects on the environment.	
CO2.	<b>Understanding</b> the impacts of the various developmental projects on the environment.	
CO3.	Understanding environmental clearance procedure in India.	
CO4.	Applying the mitigation measures.	
CO5.	Analyzing an EIA report successfully.	
Course Content:		
Unit-1:	<b>National Environmental Policy Act and its Implementation</b> : Introduction to EIA, Contents of an impact statement-Screening, scoping and consideration of alternative, baseline data collection, Impact prediction, Assessment of alternatives, Public Hearing, Environment management plan, Decision making, Monitoring and clearance condition	8 Hours
Unit-2:	<b>Frame work for Environmental Assessment</b> : Environmental Assessment Process, Basic to the process. Indian EIA, Role of Environmental protection agency, Technical and procedural aspects of Environmental Impact assessment.	8 Hours
Unit-3:	<b>Prediction and Assessment of Impacts on the Environment:</b> Impacts on -Air, Water, Noise, soil, Landscape, Land use, Drainage pattern, ecology/flora/fauna, Historic and cultural heritage, impacts on people and communities, impact on transport system.	8 Hours
Unit-4:	<b>Methodology of Impact Analysis:</b> Purpose of Environment assessment method, steps in conducting social impact assessment, principals of social impact assessment, social impact assessment: methods and tools, format of a social impact assessment report.	8 Hours
Unit-5:	<b>Public participation and EIA Auditing</b> : Public participation in Environmental Decision making, Environmental Clearance Procedure in India, Environmental Management Plan, EIA monitoring and auditing	8 Hours
<u>Text Books:</u>	<ol> <li>Barthwal, <u>R.R.</u>, "Environmental Impact Assessment", Newage International Publisher.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Kiely Gerard, "Environmental Engineering," Tata McGraw Hill Education Private Ltd, New Delhi</li> <li>"Impact Assessment Manual", Ministry of Environment and Forests, Government of India.</li> <li>Canter, Larry W "Environmental Impact Assessment", Tata McGraw Hill Inc</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
Additional	https://www.youtube.com/watch?v=sJarzqgd2vM	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=3fbEVytyJCk	
	https://www.youtube.com/watch?v=RWtT0EfhNsE	

	Program Flactiva IV	
Course Code: ECE817	B.Tech (Civil) - Semester-VIII Plastic Analysis of Steel Structures	L-3 T-0 P-0 C-3
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the concept of plastic analysis and related theorems.	
CO2.	Understanding the minimum weight analysis.	
СО3.	<b>Understanding</b> the effect of axial & shear force on plastic moment of resistance.	
CO4.	Analyzing continuous beams and portal frames.	
CO5.	Analyzing continuous beams and portal frames for plastic moment distribution	
Course Content:		
Unit-1:	<b>Introduction:</b> Plastic behavior, review curves of structural steel, plastic moments, shape factors, load factor, plastic hinge, types of collapse, collapse mechanisms, collapse load factor	8 Hours
Unit-2:	Upper and lower bound, uniqueness theorem, principle of virtual work, statically method, minimum and maximum theorems and step by step method	8 Hours
Unit-3:	Plastic Moment distribution applied to continuous beams & portal frames (Max. Two bays single storey).	8 Hours
Unit-4:	Effect of Axial force & Shear force on plastic moment of resistance	8 Hours
Unit-5:	Design of beams, continuous beams, Minimum weight analysis,	8 Hours
<u>Text Books:</u>	<ol> <li>Duggal S K "Limit State Design of Steel Structures" Mc Graw Hill.</li> </ol>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Baker J, Horne M R &amp;Heyman J "Steel Skelton" Vol. 2, Cambridge University Press.</li> <li>Hodge "P G Plastic Analysis of Structures" McGraw Hill.</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=Rat9uIM3BFI	

	Program Elective- IV	
Course Code		L-3
ECF818	B.Tech (Civil) - Semester-VIII	1-0 P_0
LCE010	<b>Advanced Foundation Design</b>	C-3
Commo		
Outcomes:	On completion of the course, the students will be:	
C01.	Understanding limitations and uncertainties in geotechnical design.	
CO2.	Understanding a suitable foundation system for a structure.	
CO3.	Analyzing bearing capacity of soil.	
CO4.	Analyzing and designing pile foundations.	
CO5.	Evaluating suitable soil parameters required for foundation design.	
Course Content:		
Unit-1:	Vertical pressures under surface loads, Elastic Solution, Bousinesq and New Mark Charts, Westergaard's equation, approximate solution.	8
		Hours
Unit-2:	Bearing capacity and settlement analysis of shallow foundations: Meyerhof and Hansen's bearing capacity equations, BIS bearing capacity equation, immediate and consolidation settlements in cohesive soil, De- Beer and Schmmertman's methods of settlement prediction in non- cohesive soil	8 Hours
Unit-3:	Classification of piles, load carrying capacity of single piles in clay, silt and sand by dynamic and static methods, Pile load test, Pile group, Negative skin friction, Settlement of pile group.	8 Hours
Unit-4:	Foundation on expansive soil, Construction on expansive soil, Alteration of soil condition, under-reamedpiles. Elements of well foundation, Shape, Depth of scour, Well sinking, Tilt, shift and their prevention	8 Hours
Unit-5:	Stability of slopes, Limit equilibrium method, Method of slices, Simplified Bishop method, Stability Charts. Machine foundation: classification, definitions, design principle in brief, Barken's method	8 Hours
<u>Text Books:</u>	<ul> <li>Ranjan Gopal and Rao A. S. R. "Basic and Applied Soil Mechanics".</li> </ul>	
<u>Reference</u> <u>Books:</u>	<ol> <li>Bowles J. E., "Analysis and Design of Foundation".</li> <li>Murthy V. N. S. "Soil Mechanics and Foundation Engineering".</li> <li>Das B. M. "Foundation Engineering", CENGAGE Learning.</li> <li>Arora, K. R. "Soil Mechanics &amp; Foundation Engineering"</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	http://www.infocobuild.com/education/audio-video- courses/architectural-and-civil- engineering/AdvancedFoundationEngineering-IIT-Kharagpur/lecture- 15.html	

	Program Elective- V	
Course Code:	B. Tech (Civil)- Semester-VIII	L-3 T-1
ECE831		P-0
	Machine learning & Data Analytics	C-4
Course		
<b>Outcomes:</b>	On completion of the course, the students will be :	
CO1.	<b>Understanding</b> concepts of machine learning and data analytics like bagging and boosting, clustering.	
CO2.	Understanding Bayesian learning and Bayesian Network.	
СОЗ.	ApplyingKmeans Clustering and Agglomerative Hierarchical Clustering	
CO4.	Applying decision trees for problem solving.	
CO5.	Analysing a variety of learning algorithms.	
Course Content:		
Unit-1:	Introduction, Different Types of Learning, Hypothesis Space & Inductive Bias, Evaluation and Cross- Validation, Linear Regression, Introduction to Decision Trees, Learning Decision Tree, Over fitting	8 Hours
Unit-2:	K- Nearest Neighbour, Feature Selection, Feature Extraction, Collaborative Filtering, Bayesian Learning, Naïve Bayes, Bayesian Network	8 Hours
Unit-3:	Logistic Regression, Introduction of Support Vector machine, The Dual Formulation, Maximum Margin with Noise, Nonlinear SVM & Kernel Function, Solution to the Dual Problem.	8 Hours
Unit-4:	Multilayer Neural Network, Neural Network and Back propagation Algorithm, Deep Neural Network Introduction to Computational Learning Theory, Sample Complexity: Finite Hypothesis Space, VC Dimension	8 Hours
Unit-5:	Introduction to Ensembles, Bagging and Boosting, Introduction to Clustering, Kmeans Clustering, Agglomerative Hierarchical Clustering.	8 Hours
<u>Text Books:</u>	1. Machine Learning by Tom M. Mitchell, Mc Graw Hill Publication.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Machine Learning: A Probabilistic Perspective (Adaptive Computation and Machine Learning series) by Kevin P. Murphy, MIT Press.</li> <li>Deep Learning (Adaptive Computation and Machine Learning series) by Ian Good fellow, YoshuaBengio and Aaron Courville, MIT Press.</li> <li>Introduction to Machine Learning with Python: A Guide for Data Scientists by Andreas Muller</li> <li>*Latest editions of all the suggested books are recommended.</li> </ol>	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=Db24-JRN3ls https://www.youtube.com/watch?v=0cSFjaXMHpM	

Course Code: EHM832	Program Elective- V B. Tech (Civil)- Semester-VIII Total Quality Management	L-3 T-1 P-0 C-4
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding basic and modern concepts of quality and TQM.	
CO2.	Understanding importance of human factor in quality	
СОЗ.	<b>Understanding</b> the concept of TPM and six sigma along with the applications.	
CO4.	<b>Applying</b> quality control techniques like control charts, 7 QC & 7 New QC tools.	
CO5.	Analysing quality related costs.	
Course Content:		
Unit-1:	<b>Quality Concepts</b> : Introduction; Meaning; Quality characteristics of goods and services; Evolution of Quality control, TQM; Modern concept, Basic concepts of quality; Dimensions of quality; Juran's quality trilogy; Deming's 14 principles; PDCA cycle; Total quality management (TQM) models.	8 Hours
Unit-2:	<b>Quality Management</b> : Organizational structure and design; Quality function; Decentralization; Designing and fitting organization for different types products and company; Human Factor in Quality: Attitude of top management; Co-operation of groups; Operators attitude, responsibility; Causes of operators error and corrective methods; Quality circles.	8 Hours
Unit-3:	<b>Quality improvement and cost reduction</b> : 7 QC tools and new QC tools; Economics of quality value and contribution; Quality cost; Optimizing quality cost; Quality assurance.	8 Hours
Unit-4:	<b>Control Charts</b> : Theory of control charts; Control charts construction: Construction of Mean & Range charts, fraction defective chart and number of defective charts; Attributes control charts: Defects, construction and analysis of c-chart.	8 Hours
Unit-5:	<b>ISO-9000, Six sigma and TPM</b> : ISO 9000 series; Concept of Six Sigma and its application; Total Productive Maintenance (TPM).	8 Hours
<u>Text Books:</u>	1. Sharma D. D Total Quality Management, S. Chand.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Menon, H.G., TQM in New Product Manufacturing, McGraw Hill.</li> <li>LaI H., Total Quality Management, Wiley Eastern Limited.</li> <li>Greg Bounds, Beyond Total Quality Management, McGraw Hill*Latest editions of all the suggested books are recommended.</li> </ol>	
Additional <u>Electronic</u> <u>Reference</u> <u>Material</u>	https://www.youtube.com/watch?v=yWlAOFs04go	

	Program Elective- V		
<u>Course Code:</u> EHM833	e: B. Tech (Civil)- Semester-VIII		
	Entrepreneurship	C-4	
Course Outcomes:	On completion of the course, the students will be:		
CO1.	<b>Understanding</b> the concepts and skills needed to run a business successfully.		
CO2.	Applying the steps of project formulation and market research.		
CO3.	Analyzing the techno economic feasibility of a project.		
CO4.	Analyzingvarious growth strategies in small scale industry.		
CO5.	<b>Evaluating</b> breakeven point, working capital requirements, and taxes.		
Course Content:			
Unit-1:	<b>Entrepreneurship:</b> Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.	8 Hours	
Unit-2:	Motivation: Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.	8 Hours	
Unit-3:	Business:Small Enterprises – Definition, Classification – Characteristics,Ownership Structures – Project Formulation – Steps involved in settingup a Business – identifying, selecting a Good Business opportunity,Market Survey and Research, Techno Economic FeasibilityAssessment – Preparation of Preliminary Project Reports – ProjectAppraisal – Sources of Information – Classification of Needs andAgencies.		
Unit-4:	<b>Financing and Accounting:</b> Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.	8 Hours	
Unit-5:	Support to Entrepreneurs: Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.	8 Hours	
<u>Text Book:</u>	<ol> <li>Khanka. S.S., "Entrepreneurial Development" S. Chand &amp; Co. Ltd., Ram Nagar, New Delhi.</li> </ol>		
Reference Books: Additional Electronic Reference	<ol> <li>Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill.</li> <li>Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech.</li> <li>Rajeev Roy, 'Entrepreneurship', Oxford University Press.</li> <li>Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", Cengage Learning.</li> <li>*Latest editions of all the suggested books are recommended.</li> <li>https://ocw.mit.edu/courses/sloan-school-of-management/15- 390-new-enterprises-spring-2013/video-tutorials/lecture-1/</li> </ol>		
Material			

## **Evaluation Scheme:**

Internal Evaluation	External Evaluation	Total Marks
40 Marks	60 Marks	
<ul> <li>The Internal evaluation will be performed by the internal faculty on the basis of the below mentioned parameters:</li> <li>Problem Identification</li> <li>Data Collection and Data Analysis</li> <li>Case study</li> <li>Proposal of innovative Business idea</li> </ul>	External evaluation will be performed by the external examiner on the basis of following parameters: Report Presentation VIVA	100

	Program Elective- V	
Course Code: ECE834	B. Tech (Civil)- Semester-VIII	L-3 T-1 P-0
	<b>Marine Structures &amp; Airport Engineering</b>	C-4
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding natural phenomena in planning of harbor.	
CO2.	Understanding dredging works in harbor	
СОЗ.	<b>Understanding</b> importance of navigational aids used in harbor and Airport engineering	
CO4.	Creating the layout of airport including runway and terminal building.	
CO5.	Creating the layout of commercial ports.	
Course		
Content:		
Unit-1:	<b>Introduction:</b> History and development of water transportation; Types of water transportation; Advantages and disadvantages Ports Classification, based on location & utility; differences between port & harbour and their requirements; selection of site for harbours; Essential features of a good harbour – size, depth, turning basin, harbour entrances. Natural phenomena in harbour engineering: Tides, wind and waves, littoral drift.	8 Hours
Unit-2:	<ul> <li>Harbour Works: Breakwaters – different types and their construction,</li> <li>Wharves, Piers, Jetties; Quays – Forces on quay walls, construction</li> <li>Berthing Structures – Dolphins, Trestles, Moles, Moorings accessories,</li> <li>Apron, Transit sheds and Warehouses – essential features, Dredging –</li> <li>different types and their operation; choice of dredgers, Navigational aids</li> <li>– Necessity, different types and requirements.</li> <li><b>Docks:</b> Types of Docks – Wet Docks, Tidal Basins, Repair Docks, Dry</li> <li>Docks, Floating Docks; Marine railway; Lift Docks, Locks and Lock</li> <li>Gates.</li> </ul>	8 Hours
Unit-3:	<ul> <li>Airways: Introduction: History &amp; development of air transport; Advantages &amp; disadvantages;</li> <li>Airport Planning: Regional planning, Factors affecting site selection, Surveys for site selection; Airport classification.</li> <li>Airport Obstructions: Zoning laws, classification of obstructions, Imaginary surfaces, approach zone, turning zone</li> </ul>	8 Hours
Unit-4:	<b>Runway:</b> Orientation – Windows diagram, Basic runway length corrections for elevation. Temperature and gradient, Geometric design, cruising speed, airspeed beaufort scale, different types of runways, Airport capacity.	8 Hours
Unit-5:	Terminals: Terminal area – Building functions; Apron, Hanger, Aircraft parking system, Typical Airport layouts Air Traffic Control & Visual Aids: Airport marking and landings; Landing systems; Landing aids, Instrument landing system.	8 Hours
Text Books:	1. Khanna S. K. & Arora M. G.: Airport Planning & Design.	
<u>Reference</u> <u>Books:</u>	<ol> <li>Srinivasan R., Harbour, Dock &amp; Tunnel Engineering.</li> <li>Bindra S. P., A Course in Docks &amp; Harbour Engineering.</li> <li>Oza H. P., Dock and Harbour Engineering.</li> </ol>	
	*Latest editions of all the suggested books are recommended.	
<u>Additional</u> <u>Electronic</u> <u>Reference</u> <u>Material</u>	http://www.digimat.in/nptel/courses/video/114106037/L19.html https://www.youtube.com/watch?v=EL4NqFPtsew	

