

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI**

CIVIL ENGINEERING

B.TECH REGULAR FOUR YEAR DEGREE COURSE

(for the batches admitted from 2010-11)

&

B.TECH (LES) *(for the batches admitted from 2011-12)*



**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

(Affiliated to JNTU Anantapur, Approved by AICTE)

Sree Sainath Nagar, A.Rangampet,

Near Tirupati - 517 102. A.P.

VISION

To be one of the Nation's premier Engineering Colleges by achieving the highest order of excellence in Teaching and Research.

MISSION

- To foster intellectual curiosity, pursuit and dissemination of knowledge.
- To explore students' potential through academic freedom and integrity.
- To promote technical mastery and nurture skilled professionals to face competition in ever increasing complex world.

QUALITY POLICY

Sree Vidyanikethan Engineering College strives to establish a system of Quality Assurance to continuously address, monitor and evaluate the quality of education offered to students, thus promoting effective teaching processes for the benefit of students and making the College a Centre of Excellence for Engineering and Technological studies.

Department of Civil Engineering

VISION

To become a leading centre of excellence in Civil Engineering education through teaching and research.

MISSION

To impart strong basic and advanced knowledge for a successful career in civil engineering and provide skills in state-of-the-art research and design for creating innovative solutions to serve industry and community. The department is established to inculcate intellectual curiosity, integrity and communication for individual development and produce outstanding Civil Engineering graduates with highest ethics. The department will support and encourage faculty, staff and students to improve in their respective interested fields of study and perform to the best of their abilities.

PROGRAM EDUCATIONAL OBJECTIVES

After few Years of Completion of graduation, the graduate will be able to:

1. Pursue higher education in the areas of their interest.
2. Address the contemporary issues in Civil Engineering and provide appropriate solutions through professional career
3. Exhibit leadership qualities, participate in continuing educations programmes for lifelong learning and contribute individually and as a member in multidisciplinary teams to meet social and ethical constraints.

PROGRAM OUTCOMES

After the completion of the program, a successful student will be able to:

1. Acquire the knowledge of mathematics, basic sciences and engineering principles required to identify, formulate and solve basic Civil Engineering problems.
2. Analyze and interpret scientific and technical data pertaining to processes and systems of Civil Engineering using advanced techniques.
3. Design and develop systems and processes to meet the needs of the society for sustainable development.
4. Analyze, design and give solutions to Civil Engineering problems
5. Create and develop cutting edge tools and technologies and suggest innovative solutions in Civil Engineering.
6. Address the developmental issues in a global context and responsible for the best practices in civil engineering.
7. Understand the effect of civil engineering projects on the environment and provide solutions in the view of environmental sustainability.
8. Practice engineering with professional, social, moral and ethical responsibilities.
9. Function as a Civil Engineer in multi/ inter-disciplinary teams, with a spirit of tolerance and patience.
10. Communicate effectively for a quality engineering practice.
11. Blend the knowledge of engineering for effective project management.
12. Upgrade skills and knowledge by participating in continuing education for lifelong learning.

The Challenge of Change

“Mastery of change is in fact the challenge of moving human attention from an old state to a new state. Leaders can shift attention at the right time and to the right place. The real crisis of our times is the crisis of attention. Those who lead are the ones who can hold your attention and move it in a purposeful way. Transformation is nothing but a shift in attention from one form to another. The form of a beautiful butterfly breaks free from a crawling caterpillar. If you pay enough attention, you would be able to see how the butterfly hides within the caterpillar. The leader points out a butterfly when the follower sees only a caterpillar”.

- Debashis Chatterjee

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)

(Affiliated to J.N.T. University Anantapur)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme

(for the batches admitted from the academic year 2010–11)

&

B.Tech. (Lateral Entry Scheme)

(for the batches admitted from the academic year 2011–12)

For pursuing four year undergraduate Bachelor Degree programme of study in Engineering (B.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

- 1. Applicability** : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2010-2011 onwards. Any reference to "College" in these rules and regulations stands for Sree Vidyanikethan Engineering College (Autonomous).
- 2. Extent** : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sree Vidyanikethan Engineering College shall be the Chairman, Academic Council.
- 3. Admission** :
 - 3.1. Admission into first year of Four Year B.Tech. Degree programme of study in Engineering:**
 - 3.1.1. Eligibility** : A candidate seeking admission into the First Year of four year B.Tech. Degree Programme should have
 - (i) passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by JNTUA, Anantapur) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Anantapur) for admission as per the guidelines of APSICHE.

- (ii) secured a rank in the EAMCET examination conducted by A.P. State Council for Higher Education for allotment of a seat by the Convener, EAMCET, for admission.

3.1.2. Admission Procedure: Admissions are made into the first year of four year B.Tech. Degree programme as per the stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

(a) By the Convener, EAMCET,
(for Category-A Seats).

(b) By the Management
(for Category-B Seats).

3.2. Admission into the Second Year of Four year B.Tech. Degree programme in Engineering

3.2.1. Eligibility: Candidates qualified in ECET (FDH) and admitted by the Convener, ECET (FDH).

In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained.

3.2.2. Admission Procedure: 10% of the sanctioned strength in each programme of study as lateral entry students or as stipulated by APSCHE shall be filled by the Convener, ECET (FDH).

4. Programmes of study offered leading to the award of B.Tech. degree

Following are the four year undergraduate Degree programmes of study offered in various branches in SVEC (Autonomous) leading to the award of B.Tech. (Bachelor of Technology) Degree:

- 1) B.Tech. (Biotechnology)
- 2) B.Tech. (Civil Engineering)
- 3) B.Tech. (Computer Science & Engineering)
- 4) B.Tech. (Computer Science & Systems Engineering)
- 5) B.Tech. (Electrical & Electronics Engineering)
- 6) B.Tech. (Electronics & Communication Engineering)
- 7) B.Tech. (Electronics & Control Engineering)
- 8) B.Tech. (Electronics & Instrumentation Engineering)
- 9) B.Tech. (Information Technology)
- 10) B.Tech. (Mechanical Engineering)

5. Academic Year: The College shall follow Year-wise pattern for First year course of four year B.Tech programme and Semester system from second year onwards for conducting all its curricula. An academic year shall consist of a first semester and a second semester from second year onwards and the summer term follows in sequence.

The first year of four year B.Tech programme shall have a duration to accommodate a minimum of 31 instructional weeks. The first and second semesters (from second year onwards) shall have the duration to accommodate a minimum of 17 instructional weeks per semester.

First Year B.Tech (38 weeks)	Instruction Period: I Spell : 11 weeks II Spell : 10 weeks III Spell : 10 weeks	34 weeks	
	Mid Examinations: I Mid : 1 week II Mid : 1 week III Mid : 1 week		
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
	Summer vacation	4 weeks	
First Semester (23 weeks)	Instruction Period: I Spell : 9 weeks II Spell : 8 weeks	19 weeks	
	Mid Examinations: I Mid : 1 week II Mid : 1 week		
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
	Semester Break	2 weeks	
Second Semester (23 weeks)	Instruction Period: I Spell : 9 weeks II Spell : 8 weeks	19 weeks	
	Mid Examinations: I Mid : 1 week II Mid : 1 week		
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
	Summer vacation		4 weeks

6. Course Structure : Each programme of study shall consist of:

- i. Language / Communication Skills
- ii. Humanities and Social Sciences
- iii. Economics and Principles of Management
- iv. Environmental Sciences

- Basic Science Courses comprising of the following:
 - i. Computer Literacy with Numerical Analysis
 - ii. Mathematics
 - iii. Physics
 - iv. Chemistry

The above courses are common to all branches.

- Core Engineering Courses comprising of the following, depending on the branch:
 - i. Engineering Graphics
 - ii. Workshop Practice
 - iii. Engineering Mechanics
 - iv. Electrical Sciences
 - v. Thermodynamics and Heat Transfer
 - vi. Material Sciences and Engineering
 - vii. Engineering Systems Design
 - viii. Building Materials
 - ix. Surveying
 - x. Transport Phenomena
 - xi. Basic Electronics
 - xii. Computer Programming

- Compulsory Discipline Courses:

The list of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

- Elective Courses:

Electives will be offered to the students to diversify the spectrum of knowledge. The electives can be chosen based on the interest of the student to broaden his individual skill and knowledge.

The students shall complete:

- A mini project in an industry during the summer term following the second semester of third year B.Tech. programme for a period of 4 weeks. A report shall be submitted to the Department after successful completion of the mini project.

Every programme of study shall be designed to have 40-42 theory courses and 14-16 laboratory courses. Distribution of types of courses is indicated below:

General Courses	5-10%
Basic Science Courses	15-25%
Core Engineering Courses	15-25%
Compulsory Discipline Courses	45-55%
Elective Courses	10-15%

Note: All components prescribed in the curriculum of any programme of study shall be conducted and evaluated.

Contact Periods : Depending on the complexity and volume of the course, the number of contact periods per week will be assigned.

7. **Credit System:** Credits are assigned based on the following norms.

Norms for assigning credits are shown below :

Subject	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Mini Project	--	--	--	02
Seminar	--	--	--	02
Comprehensive Viva-Voce	--	--	--	02
Final Year Project	--	--	--	12

- i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned in semester system. In yearly pattern **two credits** for one contact period per week is assigned.
 - ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week in semester pattern. In yearly pattern **four credits** will be assigned for three contact periods per week.
 - iii. Tutorials do not carry any credits. However, each of the analytical and problem oriented courses will have one tutorial hour per week. Audit courses do not carry any credits.
 - iv. For courses like Mini Project/Project/Seminar/Comprehensive Viva-Voce, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.
 - The four year curriculum of any B.Tech. programme of study shall have total of 220 credits. The exact requirements of credits for each course will be as recommended by the concerned Board of Studies and approved by the Academic Council.
 - In the case of lateral entry students, B.Tech. programme for II, III, IV years of study shall have a total 170 credits.
8. **Examination System** : All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as year-end/semester-end examination.

8.1. Distribution of Marks:

S.No.	Examination	Marks	Examination and Evaluation	Scheme of examination
1	Theory	70	Year-end / Semester-end examination (external evaluation)	The examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall be of descriptive type with 8 questions out of which 5 are to be answered in 3 hours duration of the examination.
		30	20	<p>Mid - Examination of 90 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 3 are to be answered and evaluated for 20 marks.</p> <p>For I B.Tech: Three (03) mid-term exams, each for 20 marks are to be conducted. For a total of 20 marks, average of the best two mid-term exams shall be considered. Mid-I: After first spell of instructions (I and II Units). Mid-II: After second spell of instructions (III to V Units). Mid-III: After third spell of instructions (VI to VIII Units)</p> <p>For a Semester: Two midterm exams , each for 20 marks are to be conducted. For a total of 20 marks, better of the two shall be considered. Mid-I: After first spell of instructions (I to IV Units). Mid-II: After second spell of instructions (V to VIII Units).</p>

			10	Assignment Tests (Internal evaluation)	<p><u>For I B.Tech:</u> Three assignment tests each of 10 marks shall be conducted. Average of best two assignment tests shall be taken as internal marks for the assignments.</p> <p><u>For a Semester:</u> Two assignment tests each of 10 marks shall be conducted. Better of the two assignments shall be internal marks for the assignments.</p>
2	Laboratory	50	Year-end / Semester-end Lab Examination (External evaluation)		50 marks are allotted for laboratory/drawing examination during year-end / semester-end.
			15	Day-to-Day evaluation	Performance in laboratory experiments/drawing and record.
		25	10	Internal evaluation	Practical Tests. (For first year three tests and for semester two tests.)
3	a) Seminar	75	75	Internal evaluation	Continuous evaluation during a semester by the Departmental Committee (DC).
	b) Comprehensive Viva-Voce	100	100	Internal evaluation	Viva-Voce examination will be conducted during IV year II semester by a committee consisting of HOD and two senior faculty members of the department
4	Mini Project	75	50	External evaluation	Semester-end Mini-Project Viva-Voce examination will be conducted in the manner similar to external evaluation of laboratory course by HOD and supervisor as examiners.
			25	Internal evaluation	Continuous evaluation by the DC

5	Project Work	225	150	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 8.2.
			75	Internal evaluation	Continuous evaluation by the DC

8.2 Seminar/ Project Work / Machine Drawing/Audit Course Evaluation:

- i. There shall be a seminar presentation in III year II Semester. For the seminar, the student shall collect information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department before presentation. The report and the presentation shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member. There shall be no external examination for seminar.
- ii. The Semester-End Examination (Project viva-voce) shall be conducted by a Committee consisting of an External examiner nominated by the Chief Controller of Examinations, HOD & Supervisor. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the Departmental Committee, on the basis of two seminars presented by each student on the topic of his project.
- iii. For the subject Machine Drawing, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The internal evaluation will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 3 hours each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. End examination will be conducted for 4 hours.
- iv. For audit courses, attendance has to be considered like in case of any regular subject. For theory subjects course files and for laboratory subjects laboratory manuals and student observations have to be maintained. Two internal tests per semester (three in case of yearly pattern) have to be conducted by the subject teacher, preferably just before regular mid-term examinations. Students may be encouraged to give seminars on the course topics.

8.3. Eligibility to appear for the Year-end / Semester-end examination:

1. A student shall be eligible to appear for year-end / semester-End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a year/ semester.
2. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in first year or each semester may be granted by the College Academic Committee.
3. Shortage of Attendance below 65% in aggregate shall in no case be condoned.
4. Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their Semester-end examination of that class and their registration shall stand cancelled.
5. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable. The student may seek readmission for the year/ semester when offered next. He will not be allowed to register for the subjects of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
6. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

- 8.4. Evaluation:** Following procedure governs the evaluation.
- 8.4.1.** Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-end examinations. The marks for the internal evaluation components will be added to the external evaluation marks secured in the year/semester-end examinations, to arrive at total marks for any subject in that year/semester.
- 8.4.2.** Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks lists are finalized. Total marks obtained in each course are converted into letter grades.
- 8.4.3.** Student-wise tabulation is done and student-wise memorandum of grades (Grade Sheet) is generated which is issued to the student.
- 8.5. Personal verification / Revaluation / Recounting :**
Students shall be permitted for personal verification/request for recounting/ revaluation of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a letter or a notice.
- 8.6. Supplementary Examination:**
In addition to the regular year-end / semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other year/ semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.
- 9. Academic Requirements for promotion/ completion of regular B.Tech Programme of study:**
The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Programme of study.
- For students admitted into B.Tech. (Regular) programme:**
- i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar he should secure 40% of marks in the internal evaluation.

- ii. A student shall be promoted from second year to third year of programme of study only if he fulfils the academic requirement of securing 39 credits from
 - a. One regular and one supplementary examinations of first year
 - b. One regular examination of second year first semester
 irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study.
- iii. A student shall be promoted from third year to fourth year of programme of study only if he fulfils the academic requirements of securing 67 credits from
 - a. Two regular and two supplementary examinations of first year
 - b. Two regular and one supplementary examinations of second year first semester
 - c. One regular and one supplementary examinations of second year second semester
 - d. One regular examination of third year first semester
 irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study and in case of getting detained for want of credits by sections 9(ii) and 9(iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III year I semester or IV year I semester respectively.
- iv. A student shall register for all the 220 credits and earn all the 220 credits. Marks obtained in all the 220 credits shall be considered for the award of the class basing on CGPA.
- v. A student who fails to earn 220 credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.
- vi. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

For Lateral Entry Students (batches admitted from 2011–2012):

- i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 40% of marks in the semester-End examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar he should secure 40% of marks in the internal evaluation.
- ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing 42 credits from :
 - a. Two regular and one supplementary examinations of II year I semester
 - b. One regular and one supplementary examinations of II year II semester
 - c. One regular examination of III year I semester.irrespective of whether the candidate appear the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I semester.
- iii. A student shall register for all 170 credits and earn all the 170 credits. Marks obtained in all 170 credits shall be considered for the award of the class basing on CGPA.
- iv. A student who fails to earn 170 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.
- v. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of classwork with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

10. Transitory Regulations:

Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted.

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **eight years**, and a lateral entry student within **six years**, for the award of B.Tech. Degree.

11. Grades, Grade Point Average and Cumulative Grade Point Average:

11.1. Grade System: After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a "**10 point scale**" described below.

Grades conversion and Grade points attached

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥ 95	O+	Extraordinary	10
≥ 90 & < 95	O	Outstanding	9
≥ 80 & < 90	A+	Excellent	8
≥ 70 & < 80	A	Very Good	7
≥ 60 & < 70	B	Good	6
≥ 50 & < 60	C	Fair	5
≥ 40 & < 50	D	Pass	4
Less than 40	F	Fail	0
Not Appeared	N	Absent	0

- **Pass Marks:** A student is declared to have passed theory and/or laboratory subject, if he secures minimum of 40% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise he will be awarded fail grade - **F** in such a course irrespective of internal marks.

F is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for clearing this subject.

11.2. Grade Point Average (GPA):

Grade Point Average (GPA) will be calculated as given below on a "10 point scale" as an index of the student's performance at the end of 1 year/ each semester:

$$GPA = \frac{\sum(C \times GP)}{\sum C}$$

where **C** denotes the credits assigned to the courses undertaken in that Year/ semester and **GP** denotes the grade points earned by the student in the respective courses.

Note: GPA is calculated for the candidates who passed all the courses in that Year/Semester.

11.3. Cumulative Grade Point Average (CGPA):

At the end of every year / semester, a Cumulative Grade Point Average (CGPA) on a 10 point scale is computed considering all the courses done up to that point as an index of overall performance up to that point as given below:

$$CGPA = \frac{\sum(C \times GP)}{\sum C}$$

where **C** denotes the credits assigned to courses undertaken upto the end of the current year/semester and **GP** denotes the grade points earned by the student in the respective courses.

Note: The CGPA is awarded only when the student passes in all the courses prescribed for the programme.

Grade Sheet: A grade sheet (Marks Memorandum) will be issued to each student indicating his performance in all courses registered in that semester/year indicating the GPA.

12. **Transcripts:** After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued upto any point of study to a student on request.

13. **Award of Degree:** The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of SVEC (Autonomous).

13.1. Eligibility: A student shall be eligible for the award of B.Tech. Degree, if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

13.2. Award of Class: Declaration of Class is based on CGPA.

Cumulative Grade Point Average	Class
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class
> = 4.0 and < 5.0	Pass Class

14. Additional academic regulations:

- i. A student can appear for any number of supplementary examinations till he clears all courses in which he could not clear in the first attempt.
- ii. A regular student has to complete all the eligibility requirements within the maximum stipulated period of **eight** years, and a lateral entry student within **six** years.
- iii. A grade sheet (marks memorandum) will be issued to the student indicating his performance in all the courses of that year/semester along with the GPA and CGPA.
- iv. A transcript containing the performance in all the components required for eligibility for award of the Degree will be issued to the student.
- v. Any attempt to impress upon the examiners, faculty and staff or Controller of Examinations, canvassing in any form either for marks or attendance will be treated as malpractice and the student shall be summarily debarred from the College.
- vi. Courses like Projects / Mini-Projects / Seminars can be repeated only by re-registering for all the components in that semester.

vii. When a student is absent for any examination (internal or external) he is treated as to have appeared and obtained **zero** marks in that component (course) and grading is done accordingly.

viii. When a component is cancelled as a penalty, he is awarded zero marks in that component.

15. Amendments to regulations:

The Academic Council of Sree Vidyanikethan Engineering College (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

16. General:

Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

Note : *Failure to read and understand the regulations is not an excuse.*

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)

COURSE STRUCTURE (2010-2011)
I Year B.Tech. (Yearly Pattern)

CIVIL ENGINEERING

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT1HS01	Technical English	2	-	-	4	30	70	100
10BT1BS01	Engineering Physics	2	1	-	4	30	70	100
10BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
10BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
10BT10101	Engineering Mechanics	3	1	-	6	30	70	100
10BT1EC01	Problem Solving and Computer Programming	3	1	-	6	30	70	100
10BT1EC02	Engineering Drawing	-	1	3	4	25	50	75
10BT1EC03	Computer Programming Lab	-	-	3	4	25	50	75
10BT1BS06	Engineering Physics & Engineering Chemistry Lab	-	-	3	4	25	50	75
10BT1HS02	English Language & Communication Skills Lab	-	-	3	4	25	50	75
10BT1EC04	Engineering & IT Workshop	-	-	3	4	25	50	75
	TOTAL	15	6	15	50	305	670	975
		36						

**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

Sree Sainath Nagar, A.Rangampet - 517 102.

COURSE STRUCTURE : II B.Tech., I Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT3BS04	Matrices and Numerical Methods	4	1	-	4	30	70	100
10BT30101	Mechanics of Solids	4	1	-	4	30	70	100
10BT30102	Building Materials and Concrete Technology	4	-	-	4	30	70	100
10BT30103	Basics of Electrical and Mechanical Technology	4	-	-	4	30	70	100
10BT30104	Surveying	4	1	-	4	30	70	100
10BT30105	Fluid Mechanics - I	4	1	-	4	30	70	100
10BT30111	Surveying Lab – I	-	-	3	2	25	50	75
10BT30112	Strength of Materials Lab	-	-	3	2	25	50	75
	TOTAL	24	4	6	28	230	520	750
			34					

COURSE STRUCTURE : II B.Tech., II Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT3BS01	Probability and Statistics	4	1	-	4	30	70	100
10BT40101	Structural Analysis - I	4	1	-	4	30	70	100
10BT40102	Fluid Mechanics - II	4	1	-	4	30	70	100
10BT40103	Reinforced Cement Concrete Structures - I	4	1	-	4	30	70	100
10BT40104	Construction, Planning and Project Management	4	-	-	4	30	70	100
10BT3BS02	Environmental Sciences	4	-	-	4	30	70	100
10BT40111	Surveying Lab - II	-	-	3	2	25	50	75
10BT40112	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2	25	50	75
	TOTAL	24	4	6	28	230	520	750
			34					

**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

Sree Sainath Nagar, A.Rangampet - 517 102.

COURSE STRUCTURE : III B.Tech., I Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT4HS01	Managerial Economics and Principles of Accountancy	4	-	-	4	30	70	100
10BT50101	Structural Analysis – II	4	1	-	4	30	70	100
10BT50102	Reinforced Cement Concrete Structures – II	4	1	-	4	30	70	100
10BT50103	Engineering Hydrology	4	-	-	4	30	70	100
10BT50104	Soil Mechanics	4	-	-	4	30	70	100
10BT50105	Engineering Geology	4	-	-	4	30	70	100
10BT50111	Computer Aided Building Drawing	-	-	3	2	25	50	75
10BT50112	Engineering Geology Lab	-	-	3	2	25	50	75
10BT4HS02	Advanced English Communication Skills*	-	3	-	-	-	-	-
	TOTAL	24	5	6	28	230	520	750
					35			

*Audit Course

COURSE STRUCTURE : III B.Tech., II Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT60101	Estimation and Quantity Surveying	4	-	-	4	30	70	100
10BT60102	Steel Structures - I	4	1	-	4	30	70	100
10BT60103	Water Resources Engineering	4	1	-	4	30	70	100
10BT60104	Environmental Engineering - I	4	-	-	4	30	70	100
10BT60105	Transportation Engineering	4	-	-	4	30	70	100
10BT60106	Foundation Engineering	4	-	-	4	30	70	100
10BT60111	Geotechnical Engineering Lab	-	-	3	2	25	50	75
10BT60112	Environmental Engineering Lab	-	-	3	2	25	50	75
10BT60113	Seminar	-	-	-	2	75	-	75
10BT60114	Spread Sheet Applications in Civil Engineering*	-	3	-	-	-	-	-
	TOTAL	24	5	6	30	305	520	825
					35			

* Audit Course

**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

Sree Sainath Nagar, A.Rangampet - 517 102.

COURSE STRUCTURE : IV B.Tech., I Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT70101	Remote Sensing and GIS	4	-	-	4	30	70	100
10BT70102	Environmental Engineering - II	4	-	-	4	30	70	100
10BT70103	Steel Structures - II	4	1	-	4	30	70	100
10BT70104	Traffic Engineering and Management	4	-	-	4	30	70	100
	ELECTIVE - I	4	1	-	4	30	70	100
10BT70105	Advanced Structural Analysis							
10BT70106	Soil Dynamics and Machine Foundations							
10BT70107	Design and Drawing of Irrigation Structures							
10BT70108	Environmental Impact Assessment and Management							
10BT70109	Design of Bridges							
	ELECTIVE - II	4	1	-	4	30	70	100
10BT70110	Industrial Structures							
10BT70111	Ground Improvement Techniques							
10BT70112	Water Resources System Planning and Management							
10BT70113	Air Pollution and Control							
10BT70114	Transportation Planning and Pavement Design							
10BT70115	GIS and Computer Aided Design and Detailing Lab	-	-	3	2	25	50	75
10BT70116	Concrete and Highway Engineering Lab	-	-	3	2	25	50	75
10BT70117	Mini Project	-	-	-	2	25	50	75
	TOTAL	24	3	6	30	255	570	825
			33					

**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

Sree Sainath Nagar, A.Rangampet - 517 102.

COURSE STRUCTURE : IV B.Tech., II Semester

Code	SUBJECT	Periods/Week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Marks	External Marks	Total
10BT6HS01	Management Science	4	-	-	4	30	70	100
	ELECTIVE – III	4	1	-	4	30	70	100
10BT80101	Earthquake Resistant Design							
10BT80102	Advanced Foundation Engineering							
10BT80103	Watershed Management							
10BT80104	Environmental Sanitation							
10BT80105	Architecture and Town Planning							
	ELECTIVE – IV	4	1	-	4	30	70	100
10BT80106	Prestressed Concrete							
10BT80107	Water Power Engineering							
10BT80108	Ground Water Development and Management							
10BT80109	Industrial Waste Water Treatment							
10BT80110	Natural Disaster Mitigation and Management							
10BT80111	Comprehensive Viva	-	-	-	2	100	-	100
10BT80112	Project Work	-	-	12	12	75	150	225
	TOTAL	12	2	12	26	265	360	625
			26					

B.Tech I Year

10BT1HS01: TECHNICAL ENGLISH

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, E Con E, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
2 - - 4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills.

COURSE DESCRIPTION: Heaven's Gate and Mokshagundam Visvesvaraya; Sir C.V.Raman and Mother Teresa; The Connoisseur and Dr. Amartya Kumar Sen; The Cuddalore Experience and Kalpana Chawla; Bubbling Well Road and Nandan Nilekani; The Odds Against us and Charles Chaplin; Exercises on Reading and writing skills and Remedial Grammar.

COURSE OUTCOMES: After completion of the course, a successful student will be able to:

- Acquire fundamental and functional knowledge of English Language, Grammar and Communication Skills.
- Analyze and judge the situation through productive skills (speaking and writing) and receptive skills (listening and reading) of English Language for effective communication and practice.
- Communicate effectively with the engineering community and society to deliver effective solutions for professional practice.

Detailed Syllabus:

UNIT – I:

Lesson entitled **Heaven's Gate** from **Enjoying EverydayEnglish**, Published by Sangam Books, Hyderabad.

Lesson entitled **Mokshagundam Visvesvaraya** from **Inspiring Lives**, Published by Maruthi Publications, Guntur.

UNIT – II:

Lesson entitled **Sir CV Raman: a Path breaker in the Saga of Indian Science** from **Enjoying Everyday English**, Published by Sangam Books, Hyderabad.

Lesson entitled **Mother Teresa** from **Inspiring Lives**, Published by Maruthi Publications, Guntur.

UNIT – III:

Lesson entitled **The Connoisseur** from **Enjoying Everyday English**, Published by Sangam Books, Hyderabad

Lesson entitled **Dr. Amartya Kumar Sen** from **Inspiring Lives**, Published by Maruthi Publications, Guntur

UNIT – IV:

Lesson entitled **The Cuddalore Experience** from **Enjoying Everyday English**, Published by Sangam Books, Hyderabad
Lesson entitled Kalpana Chawla from Internet

UNIT – V:

Lesson entitled **Bubbling Well Road** from **Enjoying Everyday English**, Published by Sangam Books, Hyderabad
Lesson entitled **Nandan Nilekani** from Internet.

UNIT – VI:

Lesson entitled **The Odds against Us** from **Enjoying Everyday English**, Published by Sangam Books, Hyderabad
Lesson entitled **Charles Chaplin** from **Inspiring Lives**, Published by Maruthi Publications, Guntur
Exercises from the lessons not prescribed shall also be used for classroom tasks.

UNIT – VII:**Exercises on Reading and Writing Skills :**

Reading Comprehension
Letter writing
Essay writing

UNIT – VIII:**Practice Exercises on Remedial Grammar :**

Common errors in English
Subject-Verb agreement
Articles
Prepositions
Tenses
Active/Passive Voice
Reported Speech

TEXT BOOKS:

1. **Detailed study** : Enjoying Everyday English, Sangam Books, 2009.
2. **Non-detailed study** : Inspiring Lives, Maruthi Publications, 2009.

REFERENCE BOOKS:

1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman, 2005
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, and P Sreehari, Published by Pearson.

4. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw-Hill, 2008.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman, 1989
6. Technical Communication, Meenakshi Raman and Sangeetha Sharma, Oxford University Press, 2009.
7. Objective English, Edgar Thorpe & Showick Thorpe, Pearson Education, 2009.
8. Grammar Games, Renuvolcuri Mario, Cambridge University Press, 2008.
9. Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2004.
10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt. Ltd., 2005.
11. ABC of Common Errors, Nigel D Turton, Mac Millan Publishers
12. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw-Hill, 2009.
13. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO.
14. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education, 2003
15. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt. Ltd.
16. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers, 2008.
17. Learning English A Communicative Approach, Orient Longman, 2005.

B.Tech I Year

10BT1BS01: ENGINEERING PHYSICS

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
2 1 - 4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: Crystallography; principles of quantum mechanics; band theory of solids; semiconductors, properties; applications of magnetic materials; dielectric materials; acoustics of buildings; superconductors; different lasers; optical fibers ; holograms; nano materials.

COURSE OUTCOMES: After completion of the course, a successful student will be able to:

- Acquire basic knowledge of crystallography, quantum mechanics, semiconductors, magnetic materials, dielectrics, acoustics, superconductors, lasers, optical fibers, holography, and nanomaterials.
- Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
- Develop problem solving skills in engineering context

Detailed Syllabus:

UNIT – I:

Crystal Structures and X-Ray Diffraction : Introduction, space lattice, basis, unit cell, lattice parameter, Bravais lattices, crystal systems, structure of simple cubic, body centered cubic, face centered cubic crystals, Miller indices of planes and directions in crystals, separation between successive (hkl) planes.

Crystal Defects: Point defects, line defects, Burger's vector, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT – II:

Principles of Quantum Mechanics: Waves and particles, de-Broglie's hypothesis, G.P.Thomson experiment, He Isenberg's uncertainty principle, significance of wave function, Schrödinger's one dimensional wave equation (time independent), particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment only), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment only), origin of energy band formation in solids, distinction between metals, semiconductors and

insulators based on band theory.

UNIT – III:

Semiconductors : Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy diagram of p-n diode, diode equation, LED, LCD and photo diode.

UNIT – IV:

Magnetic Properties: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials, magnetic bubbles memory.

Dielectric Properties: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment only), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment only), ferro and piezo electricity.

UNIT – V:

Acoustics of Buildings and Acoustic Quieting: Basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), measurement of absorption coefficient of a material, factors affecting the architectural acoustics and their remedies.

Acoustic Quieting: Aspects of acoustic quieting, methods of quieting, quieting for specific observers, mufflers and sound proofing.

UNIT – VI:

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Lasers: Introduction, characteristics of laser, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers in industry, scientific and medical fields.

UNIT – VII:

Fiber Optics: Introduction, principle of optical fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers and refractive index profiles, optical fiber communication systems, application of optical fibers.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram and applications.

UNIT – VIII:

Nanomaterials: Introduction, basic principles of nanomaterials, preparation of nanomaterials, ball milling, plasma arching, chemical vapour deposition method, sol-gel method, fabrication of nanomaterials, properties of nanomaterials, carbon nanotubes, properties and applications of carbon nanotubes, applications of nanomaterials.

TEXT BOOKS:

1. Applied Physics, S. Mani Naidu, Pearson Education, 1st Edition.
2. Engineering Physics, P.K. Palaniswamy, Scitech Publications India Private Limited, 2009.
3. Engineering Physics, M.R. Srinivasan, New Age Publications International (P) Limited, 1st Edition.

REFERENCE BOOKS:

1. Applied Physics, S.O. Pillai and Sivakami, New Age International (P) Ltd., 2nd Edition.
2. Introduction to Nanoscience and Nano technology, K.K. Chatopadhyaya and A.N. Benarjee, Prentice Hall of India, 1st Edition.
3. Introduction to Solid State Physics, C. Kittel, John Wiley & Sons, Inc., 7th Edition.
4. Solid State Physics, A.J. Dekker, Macmillan India Limited, 1996
5. Engineering Physics, V. Rajendran and K. Thyagarajan, TataMcGraw Hill Education, 2010.

B.Tech I Year
10BT1BS02: ENGINEERING CHEMISTRY
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and
IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
2 1 - 4

PREREQUISITE: Intermediate/Senior Secondary Chemistry.

COURSE DESCRIPTION: Chemistry of Engineering materials; Polymer science and technology; Electrochemistry; Corrosion and its control; Surface chemistry; Chemistry of nanomaterials; Analytical techniques and Water technology.

COURSE OUTCOMES: After completion of the course, a successful student will be able to:

- Acquire basic knowledge in chemistry of Engineering materials, Polymer science and technology, Electro chemistry, Corrosion and its control, Surface chemistry , Chemistry of nanomaterials, Analytical techniques and Water technology.
- **Develop analytical skills in:**
 - a. Determination of hardness of water.
 - b. Determination of viscosity, flame and fire points, cloud and pour points.
- **Develop skills in design of:**
 - a. Methods for control of corrosion
 - b. Chemical methods for the synthesis of Nanomaterials.
 - c. Analysis of the structure of compounds using various Analytical techniques.
- **Develop skills for providing solutions through:**
 - a. Newer Nanomaterials for specific applications
 - b. Mitigation of hardness of water
- **Acquire awareness to societal issues on:**
 - a. Quality of water.
 - b. Chemical materials utility and their impact.
 - c. Phenomenon of corrosion.

Detailed Syllabus:

UNIT – I:

Chemistry of Engineering Materials:

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricant s-viscosity, flash and fire points, cloud and pour points, Aniline point, neutralization number and mechanical strength.

Liquid Crystals: Definition, structure, classification and engineering applications of liquid crystals.

Insulators: Definition, classification, characteristics of insulating material and their engineering applications.

UNIT – II:

Polymer Science and Technology: Introduction, classification of polymers, functionality, polymerization and types of polymerization, plastics-thermoplastics, thermo settings, composition, preparation and engineering applications of PVC, Teflon and Bakelite.

Rubber: Vulcanization of rubber.

Elastomers: BUNA-N, BUNA-S and polyurethane.

Conducting Polymers: Definition, classification and engineering applications.

UNIT – III:

Electrochemistry: Introduction, conductivity, equivalent conductivity and molar conductivity. Redox reactions, electrode potential and measurement of electrode potential (Nernst equation). Electrochemical series, electrochemical cell and measurement of EMF of electrochemical cell. Concentration cell, **Reference Electrodes:** hydrogen and calomel electrodes. **Batteries:** Introduction, Ni-Cd batteries, Lithium batteries. **Fuel cells:** Introduction, Hydrogen-Oxygen fuel cell, Methanol-Oxygen fuel cell.

UNIT – IV:

Corrosion and its Control: Introduction, definition, types of corrosion; dry corrosion, wet corrosion, concentration cell corrosion, galvanic series, galvanic corrosion, pitting corrosion, factors influencing the corrosion. Control of corrosion; cathodic protection, sacrificial anodic protection, impressed current cathodic protection, uses of inhibitors, electroplating and electroless plating.

UNIT – V:

Surface Chemistry: Adsorption, types of adsorption, adsorption of gases on solids, adsorption from solutions, applications of adsorption, Langmuir theory of adsorption. Colloids, types of colloidal systems, applications of colloids. Emulsions and micelles.

UNIT – VI:

Chemistry of Nanomaterials: Introduction to nanochemistry, classification of nanomaterials, size and scale, units, scaling laws, properties of nanomaterials, methods of synthesis - top down and bottom up methods, sol-gel process, plasma enhanced vapor decomposition process, applications of nanomaterials.

UNIT – VII:

Analytical Techniques: Introduction to spectroscopy.

U.V. Visible Spectroscopy: Basic principle, origin of absorption bands, chromophores and their absorption values.

I.R. Spectroscopy: Principle, modes of vibration, group frequencies.

NMR Spectroscopy: Principle, shielding and deshielding of protons, chemical shift and applications of NMR spectroscopy.

Atomic Absorption Spectroscopy: Principle and applications.

Flame photometry: Principle and applications.

UNIT – VIII:

Water Technology: Introduction, sources of water, types of impurities in water, hardness of water- temporary and permanent hardness, units of hardness, disadvantages of hard water. Estimation of hardness by EDTA method, boiler troubles.

Softening methods: Internal treatment, external treatment; zeolite process, ion exchange process, desalination of brackish water - reverse osmosis.

TEXT BOOKS:

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanpat Rai Publishing Company, 15th Edition.
2. Engineering Chemistry, K.N. Jayaveera, G.V.Subba Reddy and C.Ramachandraiah, Tata McGraw Hill Education, 1st Edition.
3. A Text Book of engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company, 15th Edition.

REFERENCE BOOKS:

1. A Text Book of Engineering Chemistry, S.S.Dara, S.Chand and Co., 10th Edition.
2. Engineering Chemistry (Vol 1&2), J.C.Kuriacose and Rajaram, Tata McGraw Hill, 2nd Edition.
3. Chemistry of Engineering Materials, C.V. Agarval, Tara Publication, 15th Edition.
4. Nanomaterials, A.K.Bandyopadhyay, New Age International publishers, 2nd Edition.
5. Hand book of Nanostructured Materials and Nanotechnology, H.S. Nalwa, Volumes - (I to V), Academic press, 2001.

B.Tech I Year

10BT1BS03: ENGINEERING MATHEMATICS

(Common to CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
3 1 - 6

PREREQUISITE: Intermediate/ senior secondary Mathematics.

COURSE DESCRIPTION: Differential equations of first and higher order; Partial differentiation; Applications of derivatives, integrals; Laplace transforms; fundamentals of vector calculus.

COURSE OUTCOMES: After completion of the course, a successful student will be able to:

- **Acquire knowledge in**
 - a) Different types of higher order differential equations.
 - b) Finding maxima and minima values of functions of several variables with constraints.
 - c) Finding center, radius, and circle of curvatures for different curves.
 - d) Solving differential equations through Laplace transforms.
 - e) Differentiation and integration of vector functions.
- **Develop analytical skills in providing solutions for**
 - a) Higher order differential equations.
 - b) Work done, Flux, linear, surface and volume integrals vector methods.
 - c) Line, surface and volume integrals.
 - d) Length of curve, area of surface and volume of solids of revolution
 - e) Problems involving LRC oscillatory circuits, deflection of beams,
 - f) Problems involving maxima and minima for functions of two variables with constraints.
 - g) Circle of curvature, evolutes and envelopes for families of curves.
 - h) Differential equations using Laplace transform.
- **Design mathematical model equations which involve**
 - a) LRC circuits.
 - b) Deflection of beams.
 - c) Newton's laws of cooling and heat transfer

Detailed Syllabus:

UNIT – I:

First Order Differential Equations: Ordinary differential equations of first order and first degree: Linear and Bernoulli type equations, exact equations and reducible to exact. Applications of first order equations to orthogonal trajectories (both Cartesian and polar forms), law of natural growth and decay, Newton's law of cooling.

UNIT – II:

Higher Order Differential Equations: Non-homogeneous linear differential equations of second and higher order with constant coefficient s. Methods of finding the particular integrals for $Q(x)=e^{ax}$, $\sin ax$, $\cos ax$, x^n , $e^{ax} V(x)$, $x V(x)$ and $x^n V(x)$. Method of variation of parameters. Applications to L-R-C circuits, deflection of beams.

UNIT – III:

Partial Differentiation : Functions of two or more variables, homogeneous functions, total derivatives, derivatives of implicit function, jacobian, errors and approximations, maxima and minima of functions of two variables with and without constraints, Lagrange's method of undetermined multipliers.

UNIT – IV:

Applications of Derivatives : Radius, centre and circle of curvature, evolutes and envelopes. Tracing of curves in cartesian, parametric and polar forms.

UNIT – V:

Laplace Transformations: Laplace transforms of standard functions. Properties of LTs, first and second shifting theorems, LTs of derivatives and integrals, LTs of periodic functions. Unit step function, dirac delta function. Inverse transforms and convolution theorem.

UNIT – VI:

Applications of Laplace Transformations : Applications of LTs to ordinary differential equations of first and second order, Heaviside's partial fraction expansion theorem.

UNIT – VII:

Applications of Integration: Applications of integration to lengths of curves, areas of surfaces and volumes of solids and to surfaces and solids of revolutions. Double and Triple integrals - change of variables, change of order of integration and volume as double integral.

UNIT – VIII:

Vector Calculus : Vector differentiation, tangent and normal to curves, gradient, divergence, curl and vector identities. Laplacian operator, vector integration. Line integrals independent of path, work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals, verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

TEXT BOOKS:

1. Engineering Mathematics volume-1, T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company, 9th Edition.

REFERENCE BOOKS:

1. Higher engineering mathematics, B.S.Grewal, Khanna publishers, 36th Edition.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & sons, Inc. 8th Edition.
3. Engineering Mathematics for JNTU, B.V.Ramana, Tata McGraw Hill, 3rd Edition.

B.Tech I Year
10BT10101: ENGINEERING MECHANICS

(Common to Civil & Mechanical Engineering)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
3 1 - 6

PREREQUISITE: Intermediate /senior secondary Mathematics and Physics.

COURSE DESCRIPTION: Static analysis and computation of resultant forces, the equations for equilibrium of particles and rigid bodies, friction; computations for centroids and moments of inertia; dynamic analysis of particles and rigid bodies in rectilinear and curvilinear motions considering kinematics and kinetics.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Apply knowledge of trigonometry, calculus, and algebra to obtain solutions of elementary problems in engineering mechanics.
- Analyze select multi-body systems by drawing free-body diagrams, calculate kinematic characteristics, and derive conditions of static/dynamic equilibrium.
- Provide preliminary information useful in design of components in a multi-body system under constraints.

Detailed Syllabus:

UNIT – I:

Statics of particles: Basic concepts, system of units, system of concurrent coplanar forces in plane, resultant of forces, laws of mechanics, equilibrium of forces, Lami's theorem, vectorial representation of forces.

UNIT – II:

Statics of Rigid Bodies: Moment of a force, Varignon's theorem, moment of a couple, vectorial representation of moments and couples, coplanar non-concurrent forces, equilibrium of rigid bodies, types of supports and loads, principle of virtual work, work done by forces and moments.

UNIT – III:

Perfect Frames :Types of frames, free body diagram, degree of indeterminacy, analysis by method of joints and method of sections, tension coefficient method.

UNIT – IV:

Friction: Types of friction, frictional force, laws of friction, coefficient of friction, angle of friction, angle of repose, cone of friction, application, body on horizontal/inclined plane, two bodies in contact, Ladder friction, Screw friction, Belt friction, Wedge friction.

UNIT – V:

Centroid and Centre of Gravity: Determination of centroid: method of moments, method of integration, graphical method, theorem of Pappu's, centroid of a line, centroid of a volume, centre of gravity of rigid bodies.

UNIT – VI:

Moment of Inertia: Parallel and perpendicular axis theorems, moment of inertia of composite sections, product of inertia, transfer of axes, principal axes of Inertia, mass moment of Inertia.

UNIT – VII:

Kinematics of Particles: Basics of dynamics, rectilinear motion, motion with constant acceleration, freely falling bodies, curvilinear motion, motion of a projectile, uniform circular motion, relative motion.

UNIT – VIII:

Kinetics of Particles: Kinetics of rectilinear motion, Newton's law of motion, D'Alembert's principle, motion of a lift, motion on an inclined plane, kinetics of circular motion, centrifugal force, super elevation of curves, rotation.

TEXT BOOKS:

1. Engineering Mechanics, S. S. Bhavikatti and K. G.Rajashekarappa, New Age International (P) Ltd., 3rd Edition
2. Engineering Mechanics: Statics (Vol. 1), Dynamics (Vol. 2), J. L. Meriam and L. G. Kraige, John Wiley & Sons Ltd., 5th Edition.

REFERENCE BOOKS:

1. Engineering Mechanics - Statics and Dynamics, Arthur P. Boresi and Richard J. Schmidt, Cengage Learning, 1st Edition.
2. Engineering Mechanics - Statics and Dynamics, S. Rajasekaran and G. Sankarasubramanian, Vikas Publishing House Pvt. Ltd., 3rd Edition.
3. Singer's Engineering Mechanics - Statics and Dynamics, K. Vijaya Kumar Reddy and J. Suresh Kumar, BS Publications, 3rd Edition.
4. Engineering Mechanics, S. Timoshenko, D. H. Young and J. V. Rao, Tata McGraw-Hill Education Pvt. Ltd., Revised 4th Edition.

B.Tech I Year
**10BT1EC01: PROBLEM SOLVING AND COM-
PUTER PROGRAMMING**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and
IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
3 1 - 6

PREREQUISITE: Logical thinking and Aptitude.

COURSE DESCRIPTION: Algorithm, Flowchart; Top-down design concepts; Types of operators, Structure of C program; Control statements; Searching and Sorting, String manipulation functions; Structures, Unions; Pointer arithmetic; Operations on Files, Overview of data structures.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Gain knowledge on developing algorithms and problem solving techniques.
- Analyze and develop programs using the basic elements like control statements, arrays, functions and strings.
- Develop C Programs for software applications.
- Skills to solve problems using pointers and strings and Implement the concepts of data structures like stacks, queues and linked lists for solving real time problems.

Detailed Syllabus:

UNIT – I:

Introduction to Computers: Computer systems, computer hardware, computer software, computing environments, computer languages, writing, editing, compiling and linking programs, program execution, algorithm and flowchart.

Introduction to Problem Solving: The problem solving aspect, top-down design, implementation of algorithms, program verification and efficiency of algorithms.

UNIT – II:

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – III:

Selection - Making Decisions: Two way selection: if, if-else and nested if-else.

Multi-way selection: else-if ladder and switch statements.

Repetition : concept of loop, pre-test and post-test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

UNIT – IV:

Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT – V:

Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.

Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

UNIT – VI:

Functions: Designing structured programs, functions in C, user-defined functions, types of functions, call by value and call by reference, recursion, factorial using recursion, standard library functions, scope, storage classes and preprocessor directives.

Derived Types: Type definition (typedef), enumerated types, structure, accessing structures,

Complex Structures: Nested structures, structures containing arrays, array of structures.

Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

UNIT – VII:

Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to arrays, pointers and functions, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – VIII:

Files : introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear queue operations (insertion, deletion), circular queues, singly linked list, doubly linked list and circular linked list.

TEXT BOOKS:

1. A Structured Programming Approach using C, Behrouz A. Forouzan and Richard F. Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by Computer, R.G. Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D. Samanta, Prentice Hall of India Private Limited, 2004.
2. C and Data Structures, P. S. Deshpande and O. G. Kakde, ILEY-dreamtech India Pvt. Ltd. 2005.
3. Programming in C, Pradip Dey and Manas Ghosh, Oxford University Press, 2007.
4. C Programming with Problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech I Year
10BT1EC02: ENGINEERING DRAWING

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE
and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L T P C
- 1 3 4

PREREQUISITE: Nil

COURSE DESCRIPTION: Essentials of engineering drawing; free hand sketching; geometrical constructions; projection of points; line; planes; solids; development of surfaces; interpenetration of solids; perspective projections; isometric views and projections; orthographic views; introduction to basic AutoCAD commands.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Convey visual perception information regarding relative locations of objects through an orthographic/isometric view.
- Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.
- Create feasible designs of simple objects with drawing tools and/or free-hand.

Detailed Syllabus:

UNIT – I:

Scales and Curves :

Scales: Full size, reduced and enlarged scales, representative fraction, plain, diagonal scales, scale of chords.

Curves: Curves used in engineering practice, conic sections-ellipse, parabola and hyperbola, construction-general method only.

UNIT – II:

Projections of Points and Lines : Introduction, representation of three dimensional objects, general principles of orthographic projection, importance of multiple views and their placement, first angle and third angle projections, projections of points, two view and three view projections. Projection of lines inclined to one plane, inclined to both the planes, finding true lengths, true inclinations and traces of lines.

UNIT – III:

Projections of Planes and Solids : Projections of regular plane surfaces, planes parallel to one plane, planes inclined to one plane and inclined to both the planes, projections on auxiliary planes. Projections of regular solids (prism, cylinder, pyramid and cone), solids inclined to one plane and both planes, auxiliary views.

UNIT – IV:**Sections of Solids and Development of Surfaces :**

Sections of Solids: Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone. True shapes of the sections.

Development of surfaces : Right regular solids- prisms, cylinder, Pyramids, cone and their sectional parts.

UNIT – V:

Isometric Projections: Principles of isometric projections, isometric scale, isometric views, conventions. Isometric views of planes, simple solids. Isometric projections of spherical parts. Conversion of isometric views into orthographic views.

UNIT – VI:

Perspective Projections : Perspective view of plane figures and simple solids, vanishing point method and visual ray methods.

UNIT – VII:

Introduction to Computer Aided Drafting : Introduction to AutoCAD, beginning a new drawing, exploring and interacting with the drawing window, saving and opening a file, coordinate systems (Cartesian, polar and relative co-ordinate system) , introduction to draw commands and modify commands, dimension commands, display commands and miscellaneous commands.

UNIT – VIII:

Drafting Of 2D and 3D Figures : Generation of curves, points, lines, polygons, simple solids with dimensioning. Drawing of simple building plans.

TEXT BOOKS:

1. Engineering Drawing, P. Khanniah, K.L. Narayana and K. Venkata Reddy, Radiant Publishing House, 2009.

2. Engineering Drawing, N.D. Bhatt, Charotar Publishing House Private Limited, 2008.

REFERENCE BOOKS:

1. Engineering Drawing, Johle, Tata McGraw Hill, 2009.
2. Engineering Drawing, Shah and Rana, Pearson Education, 2nd Edition.
3. Engineering Drawing and Graphics, K. Venugopal, New age International Publishers, 5th Edition.
4. Computer Aided Engineering Drawing, Trymbaka Murthy, I.K. International, 1st Edition.
5. AutoCAD, Shyam Tikko, Autodesk Press, 1st Edition.

B.Tech I Year

10BT1EC03: COMPUTER PROGRAMMING LAB

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L T P C
- - 3 4

PREREQUISITE: --

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures - stack and queue, searching and sorting in C language. Each exercise is designed to reinforce the theory through practical hands on experience.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Select the appropriate data structure and algorithm design method for a specified problem.
- Design, code, test, debug, and execute programs in C.
- Implement and use common features found in C programs -arrays, pointers, strings, stacks and Queues, linked list

Detailed Syllabus:

WEEK– 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

- i. $a + b$
- ii. $a - b$
- iii. $a * b$
- iv. a / b
- v. $a \% b$

b. Write a program that evaluates the following algebraic expressions after reading necessary values from keyword.

- i) $(ax + b)/(ax - b)$
- ii) $2.5 \log x + \cos 32^\circ + |x^2 + y^2| + \sqrt{2xy}$
- iii) $x^5 + 10x^4 + 8x^3 + 4x + 2$
- iv) ae^{kt}

WEEK– 2:

- a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula $I = P T R / 100$)
- b. A cashier has currency notes of denominations Rs. 10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.
- c. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

WEEK– 3:

- a. Write a program that prints the given 3 integers in ascending order using if - else.
- b. Write a program to calculate commission for the input value of sales amount.
Commission is calculated as per the following rules:
 - i. Commission is NIL for sales amount Rs. 5000.
 - ii. Commission is 2% for sales when sales amount is >Rs. 5000 and < = Rs. 10000.
 - iii. Commission is 5% for sales amount > Rs. 10000.
- c. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shown the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
A - z	97 - 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91 - 96, 123 - 127

WEEK– 4:

- a. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.
- b. An insurance company calculates premium as follows:
 - i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.
 - ii. If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs. 1 lack.
 - iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000
 - iv. In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

WEEK– 5:

- a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, %, use switch statement)
- b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:
 - i. If the student gets first class and the number of subjects failed in is >3 , then no grace marks are awarded.. If the number of subjects failed in is $<$ or $= 3$ then the grace is 5 marks per subject.
 - ii. If the student gets second class and the number of subjects failed in is >2 , then no grace marks are awarded. If the number of subjects failed in is $<$ or $= 2$ then the grace is 4 marks per subject.
 - iii. If the student gets third class and the number of subjects failed in is >1 , then no grace marks are awarded. If the number of subjects failed in is $= 1$ then the grace is 5 marks per subjects.

WEEK– 6:

- a. Write a program to find the sum of individual digits of a positive integer.
- b. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
Write a program to generate the first N terms of the sequence.
- c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

WEEK– 7:

- a. Write a program to calculate the following sum:
$$\text{sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b. i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1, 2, 3 and 6 (i.e., $1+2+3=6$).
ii) An abundant number is one that is less than the sum of its divisors (Ex: $12 < 1+2+3+4+6$).
iii) A Deficient number is one that is greater than the sum of its divisors (Ex: $9 > 1+3$).
Write a program to classify N integers (Read N from keyboard each as perfect, abundant or deficient).

WEEK– 8:

- a. Write a program to find the largest and smallest number in a list of integers.
- b. Write a program to perform the following:
 - i. Addition of two matrices.
 - ii. Multiplication of two matrices.

WEEK– 9:

- a. Write a program to perform the following:
 - i) Linear search
 - ii) Binary search

WEEK– 10:

- a. Write a program to perform the following:
 - i) Bubble sort
 - ii) Selection sort
 - iii) Insertion sort

WEEK– 11:

- a. Write a program that uses functions to perform the following operations:
 - i. To insert a sub-string in main string at a specified position.
 - ii. To delete N characters from a given string from a specified position.
- b. Write a program to determine whether the given string is palindrome or not.

WEEK– 12:

- a. Write a program to display the position or index in the main string S where the sub string T begins. Display - 1 if S does not contain T.
- b. Write a program to count the number of lines, words and characters in a given text.

WEEK– 13:

- a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Ex: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.
- b. Write a program to convert a roman number in to its decimal equivalent using functions.

WEEK– 14:

Write programs to perform the following using recursion.

- i) To find the factorial of a given integer.
- ii) To find the GCD (Greatest common Divisor) of two given integers.
- iii) To solve Towers of Hanoi problem.

WEEK– 15:

Write a program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: Represent complex number using a structure.)

WEEK– 16:

a. Write a program to accept the elements of the structure as :

Employee-name

Basic pay

Display the same structure along with the DA, CCA, and Gross salary for 5 employees.

Note: DA=51% of Basic pay, CCA = Rs.100 consolidated.

b. Define a structure to store employee's data with the following specifications:

Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.

If Basic pay \leq Rs. 5000 then increase it by 15%.

If Basic pay $>$ Rs. 5000 and $< =$ Rs.25000 then it increase by 10%

If Basic pay $>$ Rs. 25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

WEEK– 17:

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

WEEK– 18:

Consider the following text file:

Input File:

S.No	Customer ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	11	2	10
2.	C02	12	5	50
3.	C03	12	5	50
4.	C04	14	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

OUTPUT:

S.V.PROVISION STORES
TIRUPATI

Customer_ID:C01 Date: 12-08-2010

Item	Qty	Price
11	2	20
	Total	20

WEEK– 19:

Write a program to implement stack operations using:

- i) Arrays
- ii) Pointers

WEEK– 20:

Write a program to implement linear queue operations using:

- i) Arrays
- ii) Pointers

WEEK– 21:

Write a program to implement circular queue operations using arrays.

WEEK– 22:

Write a program to implement the following operations on singly linked list.

- a. List Creation
- b. Insertion
- c. Deletion
- d. Display

WEEK– 23:

Write a program to implement the following operations on Doubly Linked List.

- a. List Creation
- b. Insertion
- c. Deletion
- d. Display

WEEK– 24:

Write a program to implement the following operations on circular linked list.

- a. List Creation
- b. Insertion
- c. Deletion
- d. Display

TEXT BOOKS:

1. A Structured programming Approach using C, Behrouz A. Forouzan and Richard F.Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by computer, R.G.Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D.Samanta, Prentice Hall of India Private Limited, 2004.
2. C and Data Structures, P.S.Deshpande and O.G.Kakde, WILEY-Dreamtech India Private Limited, 2005.
3. Programming in C, pradip Dey and Manas Ghosh, Oxford University Press, 2007.
4. C programming with problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech I Year
**10BT1BS06: ENGINEERING PHYSICS &
ENGINEERING CHEMISTRY LABORATORY**
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and
IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L T P C
- - 3 4

PREREQUISITE: Intermediate / Senior secondary Physics and Chemistry.

COURSE DESCRIPTION:

Engineering Physics : Experimental verification of characteristics of p-n junction diode, Photodiode, LED, Thermistor, semiconductor laser diode; Determination of energy gap, carrier concentration of a semiconductor material, wave length of a laser source, B-H curve, size of fine particle, dielectric constant, numerical aperture and bending losses of optical fiber, frequency of a electrically vibration tuning fork, magnetic field along axial line of a current carrying coil; verification of transverse laws of stretched string.

Engineering Chemistry: Estimation of hardness, alkalinity, dissolved oxygen of water samples and estimation of copper by volumetric methods; instrumental methods like potentiometer, conductivity meter and colorimeter, synthesis of polymers.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

Engineering Physics :

- **Acquire analytical skills in the determination of**
 - a) Wave length of laser.
 - b) Divergence angle for laser beam.
 - c) Numerical aperture and bending losses of an optical fibre.
 - d) Hall coefficient for semiconductor material.
 - e) Energy gap of semiconductor material.
 - f) Verifying the laws of stretched string.
 - g) Dielectric constant
 - h) B - H Curve
 - i) Characteristics of p.n. junction diode, photodiode, thermistor and light emitting diode.

Engineering Chemistry:

- a) Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods
- b) Acquire hands-on experience on different instrumental methods for the determination of PH of a solution, EMF of a solution and estimation of iron in cement.
- Develop skills in the designing of synthetic methods for the preparation of polymers.

List of Experiments:

Engineering Physics:

Conduct a minimum of any Twelve experiments.

1. I-V characteristics of a P-N Junction diode
2. Characteristics of LED source.
3. Determination of wavelength of a laser source-diffraction grating
4. Determination of particle size by using a laser source
5. Photo diode - characteristics
6. Thermistor characteristics.
7. Hall effect
8. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
9. Energy gap of a material of a P-N junction
10. B - H curve
11. Determination of dielectric constant
12. Verification of laws of stretched string - sonometer
13. Melde's experiment- transverse and longitudinal modes
14. Characteristics of laser sources.
15. Determination of numerical aperture of an optical fiber
16. Determination of bending losses of an optical fibre

List of Experiments:

Engineering Chemistry:

Conduct a minimum of any Ten experiments.

1. Preparation of standard EDTA and estimation of hardness of water
2. Preparation of standard EDTA and estimation of copper
3. Estimation of alkalinity of water
4. Preparation of standard potassium dichromate and estimation of ferrous iron
5. Preparation of standard potassium dichromate and estimation of copper by iodometry
6. Estimation of iron in cement by colorimetry
7. Conductometric titration of strong acid and strong base.
8. Preparation of phenol-formaldehyde resin.
9. Determination of viscosity of the oils through redwood -viscometer
10. Determination of pH of a given solution by pH metry.
11. Estimation of dissolved oxygen
12. Determination of calorific value of fuel using bomb calorimeter.

TEXT BOOKS:

1. Vogel's Book of Quantitative Inorganic Analysis, ELBS 5th edition
2. Chemistry laboratory manual, K.N. Jayaveera and K.B.Chandra sekhar, S.M. Enterprizes Ltd, 2009.

B.Tech I Year
10BT1HS02: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L T P C
- - 3 4

PREREQUISITE: Basic Grammar and Functional English.

COURSE DESCRIPTION: Introduction to Phonetics; Consonants, Vowels and Diphthongs; Accent and Rhythm; Functional Grammar; Situational Dialogues; Story Telling; Describing People, Objects and Places; Movie Review; Just A Minute and Elocution; Public Speaking and Presentation Skills.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Acquire knowledge in.
 - a. Speech Sounds
 - b. Stress Patterns
 - c. Intonation and Rhythm
- Analyze the functional knowledge of English Grammar for writing and speaking correct English in academic, professional and personal contexts.
- Interpret and synthesize the language functions through:
 - a. Just A Minute
 - b. Impromptu
 - c. Elocution
 - d. Role Plays
 - e. Project Presentations
- Use and create techniques and language lab software for enhancing the language skills.
- Communicate effectively with engineering community and society in formal and informal situations.

Detailed Syllabus:

The following course content is prescribed for the English language laboratory sessions.

1. Introduction to Phonetics.
2. Introduction to Consonants, Vowels and Diphthongs.
3. Introduction to Accent and Rhythm.
4. Functional Grammar.
5. Conversation Starters.
6. Situational Dialogues.
7. Just a Minute (JAM), Elocution, Debate and Impromptu.
8. Story telling.
9. Describing people, places and objects.
10. Movie Review.
11. Public speaking.
12. Presentation Skills.

Suggested Softwares:

- Cambridge Advanced Learners' English Dictionary with CD
- The Rosetta stone English Library.
- Clarity Pronunciation Power - Part-I.
- Mastering English in Vocabulary, Grammar, Punctuation and Composition.
- Dorling Kindersley series of grammar, Punctuation, Composition etc.
- Language in use. Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning To speak English - 4 CDs.
- Microsoft Encarta CD.
- Murphy's English Grammar, Cambridge with CD
- English in Mind, Herbert Puchta and Jeff Strank s with Meredith Levy, Cambridge.
- English Pronunciation Dictionary
- Speech Solutions
- Sky Pronunciation
- Tense Buster

B.Tech I Year
(10BT1EC04) ENGINEERING & IT WORKSHOP
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and
IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L T P C
- - 3 4

PREREQUISITE: --

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT workshop : This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point, Publisher and LaTeX Tool. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are included.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

Engineering workshop :

- Utilize workshop tools for engineering practice.
- Analyze and find out suitable method of fabrication of a given simple component.
- Employ skills acquired to provide quick fixes for routine domestic and/or industrial problems.
- Appreciate the hard work and intuitive knowledge of the manual workers.

IT Workshop :

- Acquire analytical skills in:
 - (a) Identification of functional parts of PC
 - (b) Internet and World Wide Web.
 - (c) Computer security issues and preventive measures.
 - (d) Operating Systems.
- Gain effective communication skills through IT tools.

Detailed Syllabus:

Engineering Workshop:

1. Trades for Exercise:
 - a. **Carpentry Shop:** Two joints: bridle joint, mortise and tenon T-joint.
 - b. **Fitting Shop:** Two joints: Square joint and V-joint.
 - c. **Sheet Metal Shop:** Two jobs: Trapezoidal tray and square tin.
 - d. **House Wiring:** Two jobs: Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp.
Earthing: Concept and establishment, safety precautions while house wiring.
 - e. **Foundry:** Preparation of two moulds: For a single pattern and a double pattern.
2. Trades for Demonstration:
 - i. Welding
 - ii. Metal Cutting
 - iii. Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CD or DVD.

IT Workshop:

PC Hardware:

1. Identifying the peripherals of a Computer, components in a CPU and its functions, block diagram of CPU along with the configuration of each peripheral.
2. Disassembling and assembling the PC back to working condition, videos for assembling and disassembling a PC.

3. Introduction to Operating System (OS) as system software, features of OS, need of OS, components of OS, installation of Microsoft Windows XP Operating System on the personal computer, examples of operating systems.
4. Introduction to UNIX OS and basic commands in UNIX such as cat, ls, pwd, rm, rmdir, ln, head, tail, cd, cp, mv, who, date, cal, clear, man, tty, wc, diff, cmp, grep etc. and vi editors and sample C programs.
5. Hardware and Software Troubleshooting: PC symptoms when computer malfunctions, types of faults, common errors and how to fix them, basic hardware and software troubleshooting steps, PC diagnostic tools.

MS Office 2007: MS Word:

6. Introduction to MS Word, importance of Word as Word Processor, overview of toolbars, saving, accessing files, using help and resources.
Create a word document using the features: Formatting fonts, drop cap, applying text effects, using character spacing, borders and shading, inserting headers and footers, using date and time option.
7. Create a project using MS Word using the features: Inserting tables, bullets and numbering, changing text direction, hyperlink, images from files and clipart, drawing toolbar and word art, mail merge.

MS Excel:

8. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources. Create a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
9. Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.

MS Powerpoint:

10. Introduction to MS PowerPoint, utilities, overview of toolbars, PPT orientation, slide layouts, types of views. Create a PowerPoint presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.
11. Create a PowerPoint presentation using the features: Auto content wizard, hyperlinks, Inserting images, clip art, audio, video, custom animation, slide hiding, tables and charts.

MS Publisher:

12. Introduction to MS Publisher, overview of toolbars, saving files, templates, layouts.
Create a website using the features: Home page, about us, Department, Contact page etc.

LaTeX:

13. Introduction to LaTeX tool: Importance of LaTeX as document preparation system for high quality typesetting, accessing, overview of toolbars, saving files, overview of features like typesetting of article, journal, books, control over large documents, using help and resources..

Internet and World Wide Web:

14. Web Browsers, Search Engines: Introduction to types of networks, customizing web browsers with LAN proxy settings, bookmarks, search toolbars and popup blockers, types of search engines and how to use search engines.
15. Cyber Hygiene: Introduction to various threats on Internet, types of attacks and how to overcome, installation of antivirus software, configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:**Engineering Workshop:**

1. Engineering Workshop practice, V. Ramesh Babu, VRB Publishers Private Limited, 2009.
2. Work shop Manual, P.Kannaiah and K.L.Narayana, SciTech Publishers, 2009.
3. Workshop Practice Manual, K. Venkata Reddy, BS Publications, 2008.

IT Workshop:

1. Introduction to Computers, Peter Norton, Tata McGraw Hill, 4th Edition.
2. IBM PC and Clone-Hardware, Troubleshooting and Maintenance, B. Govindarajulu, Tata McGraw Hill, 2nd Edition
3. Comdex Information Technology Course Kit, Vikas Gupta, WILEY Dreamtech, 2nd Edition.
4. PC Hardware and A + Handbook, Kate J. Chase, Prentice Hall India, 2004.
5. A Document Preparation System LaTeX User's Guide and Reference Manual, Leslie Lamport, Pearson Education, 2nd Edition.

II B.Tech. I Semester

10BT3BS04 : MATRICES AND NUMERICAL METHODS (Common to Biotechnology and Civil Engineering)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisite: Intermediate/ Senior Secondary Mathematics.

Course Description: Matrices and systems of linear equations; Eigen values, Eigen vectors; algebraic and transcendental equations; interpolation; Numerical differentiation and integration; numerical solutions of differential equations; Partial differential equations; Fourier series.

Course Outcomes:

- After completion of the course, a successful student is able to Acquire knowledge in
 - a) Ranks of matrices and linear equations.
 - b) Eigen values and Eigen vectors of matrices.
 - c) Algebraic and transcendental equations numerically.
 - d) Interpolating the data.
 - e) Numerical differentiation and integration.
 - f) Numerical solutions of differential equations.
 - g) Linear Partial differential equations, heat equation, wave and Laplace equations with boundary conditions.
 - h) Fourier series.
- Design mathematical equations for the problems like
 - a) Fitting of different types of curves to the given data.
 - b) Estimation of missing numerical values in the given data.
- Developing skills in solving engineering problems involving
 - a) Algebraic and transcendental equations numerically.
 - b) Linear equations with higher complexity.
 - c) Complex Eigen values and Eigen vectors.
 - d) Interpolating polynomials.
 - e) Fourier series.
 - f) Numerical Differentiation and integration.
 - g) Differential equations of higher complexity, numerically.

DETAILED SYLLABUS :

UNIT – I

MATRICES AND LINEAR SYSTEM OF EQUATIONS : Matrices - Algebra of matrices – Inverse of a square matrix - Rank of a matrix – Echelon form – Normal form - Inverse of a matrix by normal form - Symmetric matrix – Skew-symmetric matrix – Hermitian matrix – Skew Hermitian matrix – Unitary matrix – Orthogonal matrix. Homogenous and Non Homogenous Linear systems – Consistency and solutions of linear system of equations - Direct methods – Gauss elimination method – Gauss-Jordan method.

UNIT - II

EIGEN VALUES AND EIGEN VECTORS : Evaluation of eigen values – Eigen vectors – Properties - Cayley Hamilton theorem (without proof) – Inverse and powers of a matrix using Cayley Hamilton theorem – Diagonalization.

UNIT - III

SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND CURVE FITTING : Solutions of algebraic and transcendental equations by bisection method – False position method – Newton Raphson's Method – Iterative method - Curve fitting by the principle of least squares – fitting of a straight line, parabola, exponential and power curves.

UNIT - IV

INTERPOLATION : Interpolation – Forward difference operator – Backward difference operator – Central difference operator – Relationship between the operators – Newton's forward formula – Newton's backward formula – Interpolation with unequal intervals – Lagrange's interpolation formula.

UNIT - V

NUMERICAL DIFFERENTIATION AND INTEGRATION : Numerical values of derivatives using Newton's forward formula – Newton's backward formula – Numerical integration - Trapezoidal rule - Simpsons 1/3 rule – Simpsons 3/8 rule.

UNIT - VI

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS : Numerical Solutions of ordinary differential equations using Taylor's method – Euler's modified method – Picard's method – Runge-Kutta method – Milne's predictor corrector method.

UNIT - VII

PARTIAL DIFFERENTIAL EQUATIONS : Formation of partial differential equations - Solutions of first order partial differential equation using Lagrange's method - Method of separation of variables – Solutions of one dimensional wave equation - Heat equations.

UNIT - VIII

FOURIER SERIES : Fourier series of functions in $(0, 2\pi)$, $(-\pi, \pi)$, $(0, 2l)$, $(-l, l)$ - Determination of Fourier coefficients – Euler's formulae – Even and odd functions – Periodic continuation – Half-range Fourier sine and cosine expansions.

TEXT BOOKS

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Mathematical Methods*, 5th Revised Edition, S. Chand Group, New Delhi, 2010.

REFERENCES

1. B.S. Grewal, *Higher Engineering Mathematics*, 40th Edition, Khanna Publishers, New Delhi, 2010.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John-Wiley & Sons, New Delhi, 2006.
3. S.S. Sastry, *Introductory Methods of Numerical Analysis*, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2009 .
4. B.V. Ramana, *Mathematical Methods*, 2nd Edition, Tata McGraw Hill, 2010.

II B.Tech. I Semester
10BT30101 : MECHANICS OF SOLIDS

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Engineering Mechanics

Course Description: simple stresses and strains; shear force and bending moment; stresses in beams; combined direct and bending stresses; torsion; springs; thin cylinders and thick cylinders

Course Outcomes:

- Determine the stresses, strains and displacements in structures and deflections in springs under different loading conditions.
- Analyze stress and strains in members of different shapes.
- Design simple bars, beams and circular shafts for analyzing stresses and loads
- Identify the difference between the thin and thick cylinders due to the distribution of stresses

DETAILED SYLLABUS:

UNIT - I

SIMPLE STRESSES AND STRAINS : Elasticity and plasticity – Types of stresses and strains – Hooke's law – Stress-strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – Composite bars –

UNIT-III

STRESSES IN BEAMS :

Flexural Stresses: Theory of simple bending – Basic bending equation– Neutral axis – Bending stresses – Section modulus of rectangular and circular sections, I, T, Angle and Channel sections – Design of simple beam sections – Strain energy due to bending.

Shear Stresses: Basic shear stress equation – Shear stress distribution: Rectangular, circular, triangular, I, T, Angle sections – Strain energy due to shear.

UNIT-III

STRESSES IN BEAMS :

Flexural Stresses: Theory of simple bending – Basic bending equation– Neutral axis – Bending stresses – Section modulus of rectangular and circular sections, I, T, Angle and Channel sections – Design of simple beam sections – Strain energy due to bending.

Shear Stresses: Basic shear stress equation – Shear stress distribution: Rectangular, circular, triangular, I, T, Angle sections – Strain energy due to shear.

UNIT-IV

COMBINED DIRECT AND BENDING STRESSES : Stresses under the combined action of direct loading and bending moment – Core of a section – Stresses in chimneys, retaining walls and dams – Conditions for stability – Stresses due to direct loading and bending moment about both axes.

UNIT-V

TORSION : Theory of pure torsion – Torsional equation – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts.

UNIT-VI

SPRINGS : Deflection of close and open coiled helical springs under axial load and axial twist – Springs in series and springs in parallel – Carriage springs.

UNIT-VII

THIN CYLINDERS : Thin cylindrical shells – Longitudinal and circumferential stresses – Hoop, longitudinal and volumetric strains – Changes in diameter and volume of thin cylinders.

UNIT-VIII

THICK CYLINDERS : Lamé's theory – Distribution of hoop and radial stresses across thickness – Design of thick cylinders – Compound cylinders – Difference of radii for shrinkage.

TEXT BOOKS

1. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *Mechanics of Materials*, 1st Edition, Laxmi Publications (P) Ltd, New Delhi, 2001.
2. Basavarajaiah, B.S. and Mahadevappa.P, *Strength of Materials*, 3rd Edition, Universities Press (India) Pvt. Ltd., Hyderabad, 2010.

REFERENCES

1. Rajput, R.K., *Strength of Materials (Mechanics of Solids)*, 5th Edition, S. Chand Group, New Delhi, 2006.
2. Junnarkar, S. B. and Shah, H. J., *Mechanics of Structures vol. I (Strength of Materials)*, 27th Revised and Enlarged Edition, Charotar Publishing House Pvt. Ltd., Anand, 2008.
3. Bhavikatti, S. S., *Strength of Materials*, 3rd Edition, Vikas Publishing House, New Delhi,
4. Khurmi, R. S., *Strength of Materials*, 23rd Edition, S. Chand Group, New Delhi, 1968.

II B.Tech. I Semester

10BT30102 : **BUILDING MATERIALS AND CONCRETE TECHNOLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Engineering Chemistry

Course Description: Stones, bricks and tiles; lime and cement; timber; other materials in construction; cement concrete; hardened concrete, tests and acceptance criteria; elasticity, creep and shrinkage; mix design; special concretes.

Course Outcomes:

- Understand the various types and properties of building materials.
- Carry out the mix design and also carry out all tests for cement and concrete.
- Gain knowledge on the properties of materials their chemical composition.
- Promote cost effective building materials for construction and develop new construction materials, concrete mixes and analyze their properties.

DETAILED SYLLABUS:

UNIT – I

STONES, BRICKS AND TILES : Properties of building stones – Relation to their structural requirements – Classification of stones – Stone quarrying – Precautions in blasting – Dressing of stone – Composition of good brick earth – Various methods of manufacture of bricks – Qualities of a good brick – Efflorescence in Bricks – Classification of bricks – Characteristics of good tile – Manufacturing methods - Types of tiles.

UNIT – II

LIME AND CEMENT : Various ingredients of lime – Constituents of lime stone – Classification of lime – Various methods of manufacture of lime – Ingredients of cement – Manufacture of OPC –Types of cement and their properties – Various field and laboratory tests on cement.

UNIT-III

TIMBER : Structure – Properties – Seasoning of timber – Classification of various types of woods used in buildings – Defects in timber - Decay of timber – Mechanical treatment – Paints – Varnishes – Distempers - Bituminous wooden products in construction.

UNIT-IV

OTHER MATERIALS IN CONSTRUCTION : Use of Materials like galvanized iron, steel, aluminium, gypsum, copper, glass, bituminous materials, rubber, fiber-reinforced plastics, ceramic products, asbestos and their quality.

UNIT – V

CEMENT CONCRETE : Various ingredients of cement concrete and their importance – Proportioning of concrete - Water-cement ratio – Workability of concrete - Factors influencing workability – Measurement of workability - Effect of time and temperature on workability – Segregation and bleeding – Mixing and vibration of concrete – Quality of mixing water.

UNIT – VI

HARDENED CONCRETE : Nature of strength of concrete – Maturity concept – Strength in tension and compression – Factors affecting strength – Relation between compression and tensile strength - Curing.

TESTS ON HARDENED CONCRETE: Compression test – Tension test – Factors affecting strength – Flexure test – Non-destructive testing methods

UNIT – VII

ELASTICITY, CREEP AND SHRINKAGE : Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep and time – Effects of creep – Shrinkage – Types of shrinkage.

MIX DESIGN : Factors in the choice of mix proportions - BIS and ACI methods of mix design.

UNIT – VIII

SPECIAL CONCRETES : Light weight aggregates - Cellular concrete – No-fines concrete – High density concrete – Fiber reinforced concrete – Different types of fibers – Factors affecting properties of FRC – Applications – Polymer concrete – Types of polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete .

TEXT BOOKS

1. S. K. Duggal, *Building material*, 3rd Edition, New Age International Publishers, 2010.
2. M.S. Shetty, *Concrete Technology*, 6th Edition, S. Chand and Company Ltd., New Delhi, 2011.

REFERENCES

1. Rajput R.K., *Engineering Materials*, 1st Edition, S. Chand and Company Ltd., New Delhi, 2000.
2. P.C. Varghese, *Building Materials*, Prentice-Hall of India Private Ltd., New Delhi, 2011.
3. A.M. Neville, *Properties of Concrete*, 4th Edition, John Wiley and Sons, New Delhi, 1996.
4. M.L. Gambhir, *Concrete Technology*, 3rd Edition, Tata McGraw-Hill Publishers, New Delhi, 2008.
5. A.R. Santha Kumar, *Concrete Technology*, 7th Edition, Oxford University Press, New Delhi, 2011.

II B.Tech. I Semester

10BT30103 : **BASICS OF ELECTRICAL AND MECHANICAL TECHNOLOGY**

PART –A ELECTRICAL TECHNOLOGY

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Engineering physics.

Course Description: Basics of electrical circuits; principle of operation, characteristics and applications of DC machines, transformers, induction motor and alternator.

Course Outcomes:

After completion of the course, students will be able to:

- Gain Knowledge in:
 - a) Basics theorems, properties and postulates of Boolean algebra.
 - b) Minimization of switching functions using Map method and Tubular method.
 - c) Design of combinational and sequential circuits.
 - d) Realization of Boolean functions using PLD's
 - e) ASM Charts.
- Perform analysis of reduction of Boolean functions and implementation using PLDs.
- Design and develop various combinational and sequential circuits.
- Solve engineering problems and arrive at optimal solutions pertaining to Digital Electronics.

DETAILED SYLLABUS:

UNIT - I

ELECTRICAL CIRCUITS AND CABLES : Basic definitions - Types of elements - Ohm's law - Resistive networks - Kirchhoff's laws - Inductive networks - Capacitive networks - Series and parallel circuits - Star-delta and delta-star transformations - Types of cables.

UNIT - II

DC MACHINES : Principle of operation of DC Generator – EMF equation - Types – DC motor types – Torque equation – Applications – Three point starter.

UNIT - III

TRANSFORMERS : Principle of operation of single phase transformers – EMF equation – Losses – Efficiency and regulation.

UNIT - IV

AC MACHINES : Principle of operation of alternators – Regulation by synchronous impedance method – Principle of operation of induction motor – Slip – Torque characteristics – Applications.

TEXT BOOKS

1. M.S Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, Tata McGraw-Hill Publications Ltd., New Delhi, 2009.
2. V.K. Mehta and Rohit Mehta, *Principles of Electrical Engineering*, S. Chand and Company Ltd., New Delhi, 2006.
3. T.K. Nagasarkar and M.S. Sukhija, *Basic Electrical Engineering*, Oxford University Press, New Delhi, 2009.

REFERENCES

1. D.P. Kothari and I. J. Nagrath, *Theory and Problems of Basic Electrical Engineering*, Prentice Hall of India, New Delhi, 2009.
2. P.S. Bimbhra, *Electrical Machinery*, 7th Edition, Khanna Publishers, New Delhi, 2005.

PART - B
MECHANICAL TECHNOLOGY

Course Description: Welding; Types of Welding techniques; IC engines and its classifications; Types of Lubrication Systems; Refrigeration Systems and its classifications; Types of Refrigerants; Types of Air conditioning system; Types of Air compressors; Earth Moving Machines and its Applications.

Course Outcomes:

- Employ the importance of welding techniques in the joining of metals, working of IC engines, refrigeration and air compressors.
- Identify the manageable areas in welding processes, ic engines for their effective utilization.
- Analyze and apply the various types of earth moving machines for th needs of society.
- Propose the eco friendly low NOX, SOX fluids for the utilization the engines.

UNIT - V

WELDING PROCESSES : Introduction, classification of welding processes - Arc welding and gas welding – Equipment, welding fluxes and filler rods – Submerged arc welding, TIG and MIG processes - Soldering and brazing importance – Applications.

UNIT - VI

INTERNAL COMBUSTION ENGINES : Introduction, Classification and Main components of IC Engines – Working principle of petrol and diesel engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Lubrication and fuel systems of petrol and diesel engines.

UNIT - VII

REFRIGERATION AND AIR CONDITIONING : Terminology of refrigeration and air conditioning – Refrigerants and their desirable properties – Methods of refrigeration: Vapour compression and vapour absorption systems - Basic principles of air conditioning – Room air conditioning systems - Comfort air conditioning systems.

UNIT - VIII

AIR COMPRESSORS AND EARTH MOVING MACHINERY : Working principles of air compressors – Reciprocating air compressor: single and multi stage compression – Earth moving machines and mechanical handling equipment – Bull dozers – Power showels – Excavators – Concrete mixer – Belt and bucket conveyors.

TEXT BOOKS

1. R.S. Khurmi, *A Text Book of Thermal Engineering: Mechanical Technology*, S. Chand Group, Delhi, 2008.
2. R. K. Rajput, *Thermal Engineering*, 8th Edition, Laxmi Publishers, New Delhi, 2010.

REFERENCES

1. Khurmi, R. S and Gupta, J.K., *Refrigeration and Air Conditioning*, 5th Edition, S. Chand Group, Delhi, 2011.
2. S.K. Hajra Choudhary and S.K. Bose, *Elements of Workshop Technology – Vol. I and II*, 2nd Edition, Asia Publishing House, Bombay, 2008.
3. Kripal Singh, *Automobile Engineering - Vol. II: Engine and Electrical Equipment*, 12th Edition, Standard Publishers Distributors, New Delhi, 2011.

II B.Tech. I Semester

10BT30104 : SURVEYING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Mathematics, Physics

Course Description: Linear measurements and chain surveying; compass and plane table surveying; leveling and contouring; areas and volumes; theodolite survey; tacheometric survey; curves; electronic distance measurement and GIS

Course Outcomes:

- Apply mathematics, science, and technology in surveying activities.
- Select appropriate surveying technique for solving engineering problems.
- Design simple curves for transportation related problems.
- Perform a boundary survey and preparation of a plot using appropriate standards and laws.

DETAILED SYLLABUS:

UNIT – I

LINEAR MEASUREMENTS AND CHAIN SURVEYING : Principle – Classification - Accuracy and errors - Linear measurements - Direct measurements - Instruments for chaining – Ranging out survey lines – Errors in chaining – Tape corrections - Chain triangulation - Field book - Instruments for setting right angles - Basic problems in chaining - Obstacles for chaining.

UNIT – II

COMPASS AND PLANE TABLE SURVEYING :

Compass Survey: Types of compass – Bearings - Included angles– Declination - Dip and local attraction.

Plane Table Survey: Components – Setting – Methods – Radiation– Traversing - Intersection and Resection.

UNIT – III

LEVELING AND CONTOURING : Types of levels - Dumpy level and tilting level - Temporary and permanent adjustments - Height of instrument and rise and fall methods - Effect of curvature and refraction - Characteristics of contours - Direct and indirect methods of contouring and plotting of contours - Uses of contour maps.

UNIT – IV

COMPUTATION OF AREAS AND VOLUMES :

Areas: Areas dividing into number of triangles - By offsets to a base line - By latitudes and departures (D.M.D. and D.P.D) - By coordinates - Areas from maps.

Volumes : Volume from cross-section - Embankments and cutting for a level section and two level sections with and without transverse slopes - Determination of the capacity of reservoir - Volume of barrow pits - Spot levels from contours.

UNIT – V

THEODOLITE : Description and uses of vernier micrometer – Micro-optic theodolites – Temporary and permanent adjustments of vernier transit – Measurement of horizontal and vertical angles – Heights and distances – Traversing – Closing error and distribution – Gale's traverse table – Omitted measurements.

UNIT – VI

TACHEOMETRIC SURVEYING : Principle of stadia method – Distance and elevation formulae for staff held vertical – Instrumental constants – Anallactic lens – Tangential method – Use of subtense bar – Tacheometric contouring.

UNIT – VII

CURVES : Types of curves - Linear and angular methods of setting out of simple curves – By offsets from long chord – By offsets from tangents - By successive bisection of arcs of chords – By offsets from chords produced – Two theodolite method.

UNIT – VIII

ELECTRONIC DISTANCE MEASUREMENT AND GIS :

Electronic Distance Measurement: Basic concepts - Classification of electronic radiation - Basic principle of electronic distance measurement - Computing the distance from the phase differences - Total station- Instrumental errors in EDM.

Geographical Information System : Introduction to geodetic surveying - Global positioning system (GPS) - Introduction to geographic information system (GIS).

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Surveying - Vol. I, II and III*, 15th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.
2. S. K. Duggal, *Surveying - Vol. I and II*, 3rd Edition, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2010.

REFERENCES

1. R. Subramanian, *Surveying and Leveling*, 1st Edition, Oxford University Press, New Delhi, 2010.
2. Arthur R. Benton and Philip J. Taety, *Elements of Plane Surveying*, 3rd Edition, McGraw Hill, 2010.
3. Arora, K. R., *Surveying - Vol. I, II and III*, 10th Edition, Standard Book House, Delhi, 2011.
4. Chandra, A.M, *Plane Surveying*, 2nd Edition, New Age International Publishers, New Delhi, 2010.
5. Chandra, A M, *Higher Surveying*, 2nd Edition, New age International Publishers, New Delhi, 2010.

II B.Tech. I Semester

10BT30105 : FLUID MECHANICS - I

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Engineering Mechanics

Course Description: Properties of fluids and pressure measurement; hydrostatic forces; fluid kinematics; fluid dynamics; closed conduit flow; measurement of flow; laminar and turbulent flow; hydraulic similitude and model testing

Course Outcomes:

- Solve problems related to buoyancy and hydrostatic pressure using fundamentals of physics and evaluate losses in pipes and design a piping system as per requirement
- Analyze various types of flows and interpret the data and Use various instruments to measure the flows and estimate the losses
- Address the faults in the prototype using the model analysis and Use different models for estimating the losses in pipes
- Recognize the importance of losses in pipe flow and use effectively the principles in industry.

DETAILED SYLLABUS:

UNIT – I

PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENTS :

Dimensions and units – Physical properties of fluids – Mass density- specific weight- specific volume- specific gravity - ideal and real fluids- Newtonian and non-Newtonian fluids – Viscosity - Surface tension - Vapour pressure and their influences on fluid motion - Pressure at a point - Pascal's law - Hydrostatic law - Atmospheric, gauge and absolute pressures - Measurement of pressure - Pressure gauges – Manometers - Differential and micro manometers.

UNIT – II

HYDROSTATIC FORCES : Hydrostatic forces on submerged plane surfaces – Total pressure and centre of pressure on plane and curved surfaces – Calculation of total pressure from pressure diagrams.

UNIT – III

FLUID KINEMATICS : Description of fluid flow - Stream line - Path line and streak lines - Stream tube - Classification of flows - Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one dimensional flows – stream and velocity potential functions - Flownet and its uses.

UNIT – IV

FLUID DYNAMICS : Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line – Momentum equation and its application – Momentum and kinetic Energy correction factors – Forces on pipe bend.

UNIT – V

CLOSED CONDUIT FLOW : Laws of fluid friction – Darcy-Weisbach equation - Minor losses – Pipes in series – Pipes in parallel – Total energy line and hydraulic gradient line - Pipe network problems - Variation of friction factor with Reynold's number – Moody's chart.

UNIT – VI

MEASUREMENT OF FLOW : Pitot tube - Venturimeter and orifice meter – Orifices and mouthpieces - Rectangular, triangular and trapezoidal notches – Broad crested weirs.

UNIT – VII

LAMINAR AND TURBULENT FLOW : Reynold's experiment - Characteristics of laminar and turbulent flows – Laminar flow through circular pipes - Flow between parallel plates - Hydrodynamically smooth and rough boundaries.

UNIT – VIII

HYDRAULIC SIMILITUDE : Dimensional analysis - Rayleigh's method and Buckingham's pi theorem - Model studies – Geometric, kinematic and dynamic similarities - Dimensionless numbers – Model laws – Scale effects.

TEXT BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics and Fluid Mechanics*, 18th Edition, Standard Book House, Delhi, 2011.
2. R.K. Bansal, *Fluid Mechanics and Hydraulic Machines*, 9th Edition, Laxmi Publishers, New Delhi, 2011.

REFERENCES

1. R.K. Rajput, *Fluid Mechanics and Hydraulic Machinery*, 4th Edition, S. Chand Publishers, New Delhi, 2010.
2. J.F. Douglas, J.M. Gaserek and J.A. Swaffird, *Fluid Mechanics*, 5th Edition, Longman, 2010.
3. A.K. Mohanty, *Fluid Mechanics*, 2nd Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
4. S.K. Som and G. Biswas, *Introduction to Fluid Machines*, 2nd Edition, Tata McGraw-Hill Publishers Pvt. Ltd, 2010.

II B.Tech. I Semester

10BT30111 : SURVEYING LAB – I

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Mathematics, Physics

Course Description: Exercises on chain survey; compass survey; plane table survey; leveling.

Course Outcomes:

- Apply the procedure for accurate and through note taking in the field work to serve as a legal note.
- Identify the differences in elevation, draw and utilize contour plots and calculate volume for earth work
- Perform typical land surveying activities

DETAILED SYLLABUS:

LIST OF EXERCISES

A) CHAIN SURVEY

1. Study of chains and its accessories - Aligning, Ranging and Chaining
2. Cross staff survey and plotting
3. Chaining across obstacles and plotting
4. Chain traversing and plotting

B) COMPASS SURVEY

5. Study of prismatic compass – Measurement of bearings of lines
6. Determination of area by radiation method and plotting
7. Determination of distance between two inaccessible points with compass
8. Compass traversing and plotting

C) PLANE TABLE SURVEY

9. Study of plane table and its accessories
10. Radiation and Intersection methods by plane table survey
11. Plane table traversing
12. Resection - Two point and three point problems

D) LEVELLING

13. Study of Dumpy level/Auto level and levelling staff
14. Fly levelling (differential levelling)
15. Longitudinal and cross-sectioning of a road profile and plotting.
16. Contouring exercise

II B.Tech. I Semester

10BT30112 : STRENGTH OF MATERIALS LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Engineering Mechanics

Course Description: Tension test on mild steel; compression test on wood and spring; bending test on beams; torsion test on mild steel

Course Outcomes:

- Determine the behavior of structural elements.
- Test and identify the strength of construction materials.
- Interpret the testing data for possible solution
- Write reports on the structural properties of the materials

LIST OF EXPERIMENTS

1. Tension test on mild steel / HYSD bar
2. Compression test on wood
3. Compression test on coiled spring
4. Tension test on coiled spring
5. Bending test on carriage spring
6. Brinell and Rockwell hardness tests
7. Charpy and Izod impact tests
8. Shear test on mild steel
9. Bending test on simply supported beam
10. Bending test on cantilever beam
11. Bending test on fixed beam
12. Bending test on continuous beam
13. Verification of Maxwell's reciprocal theorem
14. Torsion test on mild steel

II B.Tech. II Semester

10BT3BS01 : PROBABILITY AND STATISTICS

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisite: Intermediate/Senior Secondary mathematics
Course Description: Probability and random variables ; Discrete and continuous distributions ; measures of correlation ; linear regression ; sampling distributions ; hypothesis testing ; tests of significance ; statistical quality control and queuing theory.

Course Outcomes:

- Acquire knowledge in probability, continuous and discrete random variables, Binomial, Poisson, Normal, Uniform, Exponential distributions.
 - a) Sampling distribution of statistic.
 - b) Null and alternative Hypothesis, type I and type II errors, critical region, level of significance and degrees of freedom.
 - c) Advantages and limitations of Statistical Quality Control, specification limits control charts.
 - d) Pure and Death process, Queuing systems.

Develop analytical skills in

- a) Binomial, Poisson, Normal, Uniform, Exponential distributions
- b) Small and large sample tests of significance
- c) Chi-square test as a test of goodness of fit
- d) Statistical Quality Control charts
- e) Correlation and regression.
- f) Queuing model(M/M/1)

Design mathematical model which involve

- a) Test of significance for single mean, difference of mean, single proportion, difference of proportion and difference of standard deviation for large samples.
- b) Student's t test, F-test, Chi-square test for small samples
- c) Statistical quality control charts Mean, R, np and c

DETAILED SYLLABUS:

UNIT - I

PROBABILITY MATHEMATICAL EXPECTATIONS :

Introduction to Probability : Definition of random experiment, events and sample space – Definition of probability – Addition and multiplication theorems - Conditional probability – Baye's theorem – Simple problems on Baye's theorem.

Random Variable : Discrete and continuous random variables - Distribution function of random variable – Properties – Probability mass function - Probability density function – Mathematical expectation – Properties of mathematical expectations – Mean and variance.

UNIT - II

PROBABILITY DISTRIBUTIONS :

Discrete Distributions : Binomial distribution – Mean and standard deviations of Binomial distribution – Poisson distribution – Mean and standard deviations of Poisson distribution – Applications.

Continuous Probability Distributions : Uniform distribution – Exponential distribution – Normal distribution – Properties of normal distribution – Importance of normal distribution – Area properties of normal curve.

UNIT-III

CORRELATION AND REGRESSION :

Correlation : Definition - Measures of correlation – Correlation for bivariate distribution – Rank correlation coefficients.

Regression : Simple linear regression – Regression lines and properties.

UNIT-IV

SAMPLING DISTRIBUTIONS : Population and sample – Parameter and statistic – Sampling distribution of statistic – Standard error of statistic – Null and alternative hypotheses – Type I and II errors – Level of significance – Critical region –Degrees of freedom.

UNIT-V

LARGE SAMPLES TEST OF SIGNIFICANCE : Test of significance for single proportion – Test of significance for difference of proportions - Test of significance for a single mean - Test of significance for difference of means – Test of significance for difference of standard deviations.

UNIT – VI

SMALL SAMPLES TEST OF SIGNIFICANCE : Student's t-test – F-test for equality of population variance – Chi-square test of goodness of fit – Contingency table – Chi-square test for independence of attributes.

UNIT – VII

STATISTICAL QUALITY CONTROL : Introduction – Advantages and limitations of statistical quality control – Control charts – Specification limits – \bar{x} , R, np and c charts.

UNIT – VIII

QUEUING THEORY : Queuing theory – Pure birth and death process – M/M/1 Model – Problems.

TEXT BOOKS

1. T.K.V. Iyengar, B. Krishna Gandhi and Others, *Probability and Statistics*, 3rd Edition, S. Chand Group, New Delhi, 2011.
2. Shahnaz Bathul, *A Text Book of Probability and Statistics*, 2nd Edition, Ridge Publications, Hyderabad.
3. Kandaswamy and Tilagavathy, *Probability Statistics and Queuing Theory*, 1st Edition, S. Chand Group, New Delhi, 2004.

REFERENCES

1. Miller and John E. Freund, *Probability and Statistics for Engineers*, 7th Edition, Pearson Higher Education, 2010.
2. Ronald E. Walpole, *Probability and Statistics for Engineers and Scientists*, 8th Edition, Pearson Education India, New Delhi, 2007.
3. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th Edition, Sultan and Chand, New Delhi, 2007.
4. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, 3rd Edition, Sultan and Chand, New Delhi, 2009.

II B.Tech. II Semester

10BT40101 : STRUCTURAL ANALYSIS - I

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Mechanics of solids

Course Description: Principal stresses and strains; deflection of beams; columns and struts; theories of failure; unsymmetrical bending and shear centre; fixed beams and propped cantilevers; continuous beams.

Course Outcomes:

- Calculate beam deflections using different methods of structural analysis.
- Calculate the shear stress and bending moments
- Understand the behavior of springs, shafts, thin and thick cylinders in various loading conditions.

DETAILED SYLLABUS:

UNIT-I

PRINCIPAL STRESSES AND STRAINS : Stresses on an inclined plane under axial loading – Compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains.

UNIT-II

DEFLECTION OF BEAMS - I : Bending into a circular arc – Slope, deflection and radius of curvature – Differential equation for the elastic curve of a beam – Double integration and Macaulay's methods - Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L. and uniformly varying load.

UNIT-III

DEFLECTION OF BEAMS - II : Mohr's theorems – Moment area method – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L., Uniformly varying load - Application to simple cases including overhanging beams.

UNIT-IV

COLUMNS AND STRUTS : Types of columns – Short, medium and long columns – Axially loaded compression members – Euler's theorem for long columns – Euler's critical load – Equivalent length of a column – Slenderness ratio – Limitations of Euler's theory – Rankine-Gordon formula – Long columns subjected to eccentric loading – Secant formula.

UNIT-V

THEORIES OF FAILURE : Maximum principal stress theory - Maximum principal strain theory - Maximum shear stress theory - Maximum strain energy theory - Maximum shear strain energy theory.

UNIT-VI

UNSYMMETRICAL BENDING AND SHEAR CENTRE : Centroidal principal axes of section - Moment of inertia referred to any set of rectangular axes - Stress in beams due to unsymmetrical bending - Principal axes - Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis – Shear centre of channel section and unequal section.

UNIT-VII

FIXED BEAMS AND PROPPED CANTILEVERS : Introduction to statically indeterminate beams – Fixed end moment due to uniformly distributed load, point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams – Deflection of fixed beams - Effect of sinking of support - Effect of rotation of a support - Shear force and Bending moment diagrams of propped cantilever.

UNIT-VIII

CONTINUOUS BEAMS : Clapeyron's theorem of three moments – Analysis of continuous beams with one or both ends fixed - Continuous beams with overhang.

TEXT BOOKS

1. R.S.Khurmi, *Theory of Structures*, 11th Edition, S.Chand Publications, New Delhi, 2010.
2. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures- Vol.I* (17th Edition) and *Vol.II* (16th Edition), Khanna Publications, New Delhi, 2011.

REFERENCES

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, Anand, Gujrat, 2010.
2. Pandit, G., Gupta, S. and Gupta, R., *Theory of Structures – Vol. I*, 2nd Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 1999.
3. B.C.Punmia, *Strength of Materials and Mechanics of Structures*, 7th Edition, Standar Publishers Distributors, New Delhi, 1986.
4. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., New Delhi, 2010.

II B.Tech. II Semester

10BT40102 : FLUID MECHANICS - II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Fluid Mechanics - I

Course Description: Boundary layer theory; open channel flow; impact of jets; hydraulic turbines; centrifugal pumps; hydropower engineering.

Course Outcomes:

- Apply the fundamentals of mathematics in solving boundary layer problems.
- Analyze the type of jump and slopes formed in a channel.
- Design a turbine for a specified site.
- Conduct investigations on the failure of a turbine and pump.
- Propose suitable pump for a building.
- Describe factors involved in the design of a turbine and carryout model study and carryout good engineering practices while recommending for the construction of a hydroelectric power plant.

DETAILED SYLLABUS:

UNIT – I

BOUNDARY LAYER THEORY : Boundary layer concepts - Thickness of boundary layer - Characteristics of boundary layer along a thin flat plate - Vonkarmen momentum integral equation - Laminar and turbulent boundary layers (no derivation) - Laminar sub-layer separation of boundary layer - Control of boundary layer- Flow around submerged objects – Drag and lift - Magnus effect.

UNIT – II

OPEN CHANNEL FLOW - I : Types of flows – Types of channels – Velocity distribution – Chezy's, Manning's and Bazin's formulae for uniform flow – Most Economical sections - Critical flow - Specific Energy - Critical depth – Computation of critical depth – Critical, sub-critical and super critical flows – Velocity measuring instruments.

UNIT – III

OPEN CHANNEL FLOW - II : Non uniform flow - Dynamic equation for gradually varied flow - Mild, critical, steep, horizontal and adverse slopes - Surface profiles - Direct step method – Rapidly varied flow - Hydraulic jump and its applications - Energy dissipation.

UNIT – IV

IMPACT OF JETS : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Series of vanes - Jet striking centrally and at tip - Velocity triangles at inlet and outlet - Expressions for work done and efficiency - Applications to radial flow turbines.

UNIT – V

HYDRAULIC TURBINES – I : Layout of a typical hydropower installation – Heads and efficiencies -classification of turbines - Pelton wheel - Francis turbine - Kaplan turbine - Working, working proportions - Velocity diagrams - Work done and efficiency - Hydraulic design – Runaway speed - Draft tube theory, function and efficiency.

UNIT – VI

HYDRAULIC TURBINES – II : Governing of turbines - Surge tanks - Unit quantities and specific speed – Performance characteristics - Geometric similarity - Cavitation, causes, effects.

UNIT – VII

CENTRIFUGAL PUMPS : Pump installation details – Classification - Heads – Losses and efficiencies - Limitation of suction lift - Work done - Minimum starting speed - Specific speed - Multistage pumps - Pumps in parallel - Performance of pumps - Characteristic curves - Net positive suction head – Priming devices - Cavitation.

UNIT – VIII

HYDROPOWER ENGINEERING : Classification of hydropower plants – Load factor - Utilization factor - Capacity factor - Estimation of hydropower potential.

TEXT BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics and Fluid Mechanics*, 18th Edition, Standard Book House, Delhi, 2011.
2. K, Subramanya, *Flow in Open Channels*, 3rd Edition, Tata McGraw-Hill Publishers, New Delhi, 2010.
3. D.S. Kumar, *Fluid Mechanics and Fluid Power Engineering*, 7th Edition, Kataria and Sons, Delhi, 2009.
4. R.K. Bansal, *Fluid Mechanics and Hydraulic Machines*, 9th Edition, Laxmi Publishers, New Delhi, 2011.

REFERENCES

1. Ranga Raju, *Flow Through Open Channels*, 7th Edition, Tata McGraw-Hill Publications, New Delhi, 2009.
2. R.K. Rajput, *Fluid Mechanics and Hydraulic Machinery*, 4th Edition, S. Chand Publishers, New Delhi, 2010.
3. V.T .Chow, *Open Channel Flow*, McGraw-Hill Publishers, New Delhi, 1996.
4. Banga and Sharma, *Hydraulic Machines*, 7th Edition, Khanna Publishers, New Delhi, 2007.
5. M.M. Dandekar and K.N. Sharma, *Water Power Engineering*, 1st Edition, Vikas Publishing House, New Delhi, 2009.

II B.Tech. II Semester

10BT40103 : REINFORCED CEMENT CONCRETE STRUCTURES - I

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Concrete Technology, Structural Analysis

Course Description: Concrete; limit state design; beams; shear, torsion and bond; columns; footings; slabs; serviceability.

Course Outcomes:

- Apply the knowledge of different methods of design for the serviceability of structures.
- Analyze beams and columns under various loading conditions.
- Design beams, columns and footings using IS Code and limit state theory.

DETAILED SYLLABUS:

UNIT –I

CONCRETE : Constituents of concrete - IS 456 Recommendations - Grades of concrete - Working stress method - Design constants – Design for flexure - Singly reinforced beams.

UNIT –II

LIMIT STATE DESIGN : Concepts of limit state design – Comparison with working stress method - Basic statistical principles – Characteristic loads – Characteristic strength – Partial safety factors – Stress-strain curves for cold worked deformed bars and mild steel bars - Assumptions in limit state design – Stress-block parameters – Limiting moment of resistance.

UNIT –III

BEAMS : Limit state design of singly reinforced, doubly reinforced, T and L beams for flexure.

UNIT – IV

SHEAR, TORSION AND BOND : Limit state design of section for shear and torsion – Concept of bond, anchorage and development lengths - I.S. Code provisions - Design of simply supported and continuous beams, including detailing.

UNIT – V

COLUMNS : Short and long columns under axial loads, uniaxial bending and biaxial bending – Slender columns – I.S. Code provisions.

UNIT –VI

FOOTINGS : Different types of footings – Design of isolated square, rectangular and circular footings.

UNIT – VII

SLABS : Design of one way slab - Two-way slab - Continuous slab using I.S. Coefficients.

UNIT –VIII

SERVICEABILITY : Limit state design of serviceability for deflection and cracking – I.S. Code provisions.

TEXT BOOKS

1. S. Unnikrishna Pillai and Devdas Menon, *Reinforced Concrete Design*, 3rd Edition, Tata Mc.Graw Hill, New Delhi, 2010.
2. S.K. Ray and N.C. Sinha, *Fundamentals of Reinforced Concrete*, 5th Edition, S. Chand Publishers, 2010.

REFERENCES

1. P.C. Varghese, *Limit State Design of Reinforced Concrete*, 2nd Edition, Prentice Hall of India, New Delhi, 2010.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Reinforced Concrete Structures - Vol. I*, 19th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2010.
3. N. Krishna Raju and R.N. Pranesh, *Reinforced Concrete Design*, 3rd Edition, CBS Publishers Distributors, New Delhi, 2010.
4. M.L. Gambhir, *Fundamentals of Reinforced Concrete Design*, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.

Codes: IS 456-2000 code book is to be permitted into the examination hall.

II B.Tech. II Semester

10BT40104 : CONSTRUCTION, PLANNING AND PROJECT MANAGEMENT

Internal Marks	External Mark	Total	L	T	P	C
30	70	100	4	-	-	4

Pre-requisite: Building Materials and Concrete Technology

Course Description: Masonry and foundations; building components; finishings; organization; resource management (manpower, materials, machinery); project management, bar charts and milestone charts; network; PERT and CPM.

Course Outcomes:

- Apply knowledge of mathematics, science, and engineering principles in construction projects
- Describe the basic concepts and skills required for construction project management.
- Explain the key issues for building contract procedures, management and administration.
- Apply the techniques of project planning and management in construction projects.

DETAILED SYLLABUS:

UNIT – I

MASONRY AND FOUNDATIONS :

Masonry : Types of masonry – English and Flemish bonds – Rubble and Ashlar masonry – Cavity walls – Partition walls.

Foundations : Foundations: Shallow foundations – Spread, combined, strap and mat footings.

UNIT – II

BUILDING COMPONENTS : Lintels, arches, vaults, stair cases – Different types of floors - Concrete, mosaic, terrazzo floors – Pitched, flat and curved roofs – Lean-to-Roof, coupled roofs, trussed roofs - King and Queen post trusses - RCC Roofs - Madras Terrace/Shell Roofs.

UNIT – III

FINISHINGS : Damp Proofing , water proofing, Termite proofing, Fire proof- materials used – Plastering – Pointing – White washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

UNIT – IV

ORGANIZATION : Types of organization – Merits and demerits of different types of organization – Authority – Policy – Recruitment process and training – Development of personnel department – Labour Problems – Labour legislation in India – Workmen's Compensation Act of 1923 and Minimum Wages Act of 1948, and subsequent amendments– Safety in construction.

UNIT – V

RESOURCE MANAGEMENT :

Manpower: Resource smoothing – Resource leveling – Establishing workers productivity.

Materials : Objectives of material management – Costs – Functions of material management departments – ABC classification of materials – Inventory of materials – Material procurement – Stores management.

Machinery : Classification of construction equipment – Earth moving equipment - Excavation equipment - Hauling equipment - Earth compaction equipment - Hoisting equipment - Concreting plant and equipment – Time and motion study – Selection of equipment –

Task consideration – Cost consideration – Factors affecting the selection - Factors affecting cost owning and operating the equipment – Equipment maintenance.

UNIT – VI

PROJECT MANAGEMENT, BAR CHARTS AND MILESTONE CHARTS:

Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives - Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

UNIT – VII

ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK :

Introduction – Event – Activity – Dummy – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies – Illustrative examples.

UNIT – VIII

PERT AND CPM : Network analyses - PERT – Slack – Critical path – Illustrative examples – Probability of meeting scheduled date Problems – CPM Process – CPM Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L - Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples.

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Building Construction*, 10th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.
2. B.C.Punmia, K.K. Khandelwal, *Project Planning and Control with PERT and CPM*, 4th Edition, Lakshmi Publications(P). Ltd., New Delhi, 2010.
3. Jha, *Construction Project Management*, 1st Edition, Pearson Publications, New Delhi, 2011.

REFERENCES

1. S. Seetharaman, *Construction Engineering and Management*, 3rd Edition, Umesh Publications, Delhi, 2010.
2. R. Chudly, *Construction Technology – Vol. I and Vol. II*, 4th Edition, Longman, UK, 1987.
3. P.K. Joy, *Total Project Management: The Indian Context*, 1st Edition, Mac Millan Publishers India Limited, 1993.

II B.Tech. II Semester

10BT3BS02: ENVIRONMENTAL SCIENCES

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisite: Basic Sciences.

Course Description: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

Course Outcomes:

On successful completion of this course the students will be able to:

- Demonstrate knowledge in
 - a) Different components of environment and natural resources.
 - b) Green technology
 - c) Ecology and Ecosystems
 - d) Biodiversity and its conservation
 - e) Population and Human health
- Identify sources of pollution and provide suggestions for protection of natural resources.
- Follow environmental ethics to protect the diversified ecosystems and make environment sustainable.

DETAILED SYLLABUS:

UNIT-I

INTRODUCTION TO ENVIRONMENTAL SCIENCES : Definition and concept of the term Environment – Various components of Environment – Abiotic and biotic – Atmosphere – Hydrosphere – Lithosphere – Biosphere – Inter relationships – Need for public awareness – Role of important National and International individuals and organizations in promoting Environmentalism.

UNIT-II

NATURAL RESOURCES, CONSERVATION AND MANAGEMENT : Renewable and Non renewable resources and associated problems – Forests: Deforestation, Causes, effects and remedies – Effects of mining, dams and river valley projects – case studies; Water resources: Water use and over exploitation – Conflicts over water – Large dams – benefits and problems; Food resources : World food problems – Adverse effects of modern agriculture – Fertilizer and pesticide problems; Land resources: Land degradation – Land slides- Soil erosion – desertification- water logging – salinity – Causes, effects and remedies; Mineral resources: Mining – Adverse effects; Energy resources: Growing needs – Renewable and Non renewable resources – Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear Energy, Hydrogen fuel, Solar - Impact on environment - Sustainable life styles.

UNIT-III

ECOLOGY AND ECOSYSTEMS : Definitions and concepts – Characteristics of ecosystem – Structural and functional features – Producers, consumers and decomposers and food webs – Types of ecosystems – Forests grassland, desert, crop land, pond, lake, river and marine ecosystems – Energy flow in the ecosystem – Ecological pyramids – Ecological successions.

UNIT-IV

BIODIVERSITY, CONSERVATION AND MANAGEMENT :

Introduction – Definition and concept of biodiversity – Value of biodiversity – Role of biodiversity in addressing new millennium challenges – Global, national biodiversity – Hot spots of biodiversity– Threats to biodiversity – Man and wild life conflicts – Remedial measures – Endemic, endangered and extinct species – In-situ and Ex-situ conservation of biodiversity.

UNIT-V

ENVIRONMENTAL POLLUTION AND CONTROL : Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution – Solid waste management – Causes, effects, control and disposal methods – Role of individuals in the prevention of pollution – Hazards and disaster management – Floods – Earthquakes – Tsunamis – Cyclones – Land slides – Case studies.

UNIT-VI

SOCIAL ISSUES AND THE ENVIRONMENT : Concept of sustainable development – Methods of rainwater harvesting – Watershed management – waste land reclamation – Green cover – Green power – Green technology – Resettlement and rehabilitation of people and related problems – Case studies – Issues and possible solutions - Greenhouse effect and global warming – Carbon credits – Acid rains – Ozone layer depletion – Causes, effects and remedies – Consumerism and waste production – Environment protection acts – Air (Prevention and Control of Pollution) Act – Water Act – Forest Conservation Act – Wild Life Protection Act – Issues involved in the enforcement.

UNIT-VII

HUMAN POPULATION AND ENVIRONMENT : Population growth and its impact on environment – Environmental ethics – Family welfare programmes – Human health: T.B., Cancer, HIV/AIDS – Causes, effects and remedies – Occupational health hazards – Human rights – Important international protocols and conventions on Environment.

UNIT-VIII

FIELD WORK/ ENVIRONMENTALIST'S DIARY / ASSIGNMENTS/ SEMINARS

TEXT BOOKS

1. Erach Barucha, *Environmental Studies*, 1st Edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies*, 3rd Edition, New Age International Publishers, 2011

REFERENCES

1. Deshwal, *Environmental Studies*, 2nd Edition, Khanna Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies*, 1st Edition, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies*, 2nd Edition, Tata McGraw-Hill, New Delhi, 2010.

II B.Tech. II Semester

10BT40111 : SURVEYING LAB – II

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Mathematics, Physics

Course Description: Exercises on chain survey; compass survey; plane table survey; leveling.

Course Outcomes:

- Implement the procedure for accurate and through note taking in the field work to serve as a legal note and Identify the differences in elevation, draw and utilize contour plots and calculate volume for earth work
- Perform typical land surveying activities
- Identify careers in surveying and mapping and be committed to the profession and lifelong learning, ethical and safe practices, and respect diversity and societal issues in practice.
- Effectively communicate information in these formats: written, oral, mathematical, and graphical.

LIST OF EXERCISES

A) THEODOLITE SURVEY

1. Study of theodolite - Measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and method of reiteration.
3. Finding out distance between two inaccessible points.
4. Trigonometric levelling - Measurement of heights and distances (Two Exercises)
5. Tacheometric surveying - Measurement of heights and distances (Two Exercises)
6. Setting out a circular curve by Rankine's method of tangential angles.
7. Setting out a circular curve by Double Theodolite method.
8. Setting out works for buildings and pipe lines.

B) TOTAL STATION SURVEY

9. Study of total station - Measurement of horizontal angles, vertical angles and distances
10. Determination of area using total station.
11. Determination of remote height using total station
12. Distance, gradient, and differential height between two inaccessible points using total station
13. Stake-out using total station
14. Traversing using total station
15. Contouring using total station

II B.Tech. II Semester

10BT40112 : FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Fluid Mechanics – I

Course Description: Calibration of flow meters; Bernoulli's apparatus; performance of turbines and pumps; loss through pipes.

Course Outcomes:

- Gain skills in the usage of flow measurement instrument and notches.
- Apply Bernoulli's equation to find the losses in pipe and discharge.
- Perform the test on pumps and turbines to find their efficiency.
- Prepare reports on the data collected and use graphical techniques to interpret the data for environmental sustainability.
- Perform exercises in multidisciplinary groups.
- Demonstrate appropriate work habits and regularity.

LIST OF EXPERIMENTS

Any **TWELVE** experiments are to be conducted .

1. Calibration of venturimeter
2. Calibration of orificemeter
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Determination of coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of rectangular notch
6. Calibration of triangular notch
7. Determination of loss of head due to sudden contraction
8. Determination of loss of head due to sudden expansion
9. Determination of friction factor for pipes
10. Verification of Bernoulli's equation.
11. Impact of jet on vanes
12. Study of hydraulic jump.
13. Performance test on Pelton wheel turbine
14. Performance test on Francis turbine
15. Performance test on Kaplan turbine.
16. Performance test on single stage centrifugal pump
17. Performance test on multi stage centrifugal pump
18. Performance test on reciprocating pump

III B.Tech. I Semester
10BT4HS01 : MANAGERIAL ECONOMICS AND PRINCIPLES OF
ACCOUNTANCY

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: --

Course Description: Managerial Economics; Demand and Elasticity of Demand; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Principles of Accounting; Final Accounts; Capital Budgeting and its Techniques; and Computerized Accounting with Tally software.

Course Outcomes:

After completion of the course, a successful student will be able to

- **Acquire Knowledge in**
 - a) Tools and concepts of Micro Economics.
 - b) Basic Principles and concepts of Accountancy.
 - c) Provides life skills for effective utilization of scarce resources.
 - d) Financial Accounting.
 - e) Using advanced tools like tally and SAP.
 - f) Significance of Economics and Accountancy
- Develop skills in providing solutions for
 - a) Managerial decisions of an organization.
 - b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.
 - c) Financial data in decision making.
- Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND

ANALYSIS : Definition, Nature and scope of managerial economics.

Demand Analysis: Determinants of demand – Demand function - Law of demand and its exceptions - Elasticity of demand – Types - Measurement and significance of elasticity of demand - Demand forecasting and methods of demand forecasting.

UNIT – II

THEORY OF PRODUCTION AND COST ANALYSIS :

Production Function: Isoquants and isocosts – Input-output relationship - Law of returns - Internal and external economies of scale.

Cost Concepts : Opportunity vs. out lay costs, Fixed vs. variable costs - Explicit vs. implicit costs - Out of pocket vs. inputted costs – Break even analysis (BEA) - Determination of break even point (Simple problems).

UNIT – III

INTRODUCTION TO MARKETS AND PRICING :

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing – Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Limit pricing - Market penetration - Market skimming - Block pricing – Bundling - Peak load pricing - Cross subsidization - Dual pricing - Administrated pricing.

UNIT – IV

BUSINESS AND NEW ECONOMIC ENVIRONMENT : Characteristic features of business - Features and evolution of sole proprietorship - Partnership - Joint stock company - New economic policy 1991.

UNIT – V

INTRODUCTION AND PRINCIPLES OF ACCOUNTING:

Accountancy : Introduction – Concepts – Conventions – Accounting principles - Double entry book keeping – Journal – Ledger - Trial balance (Simple problems).

UNIT – VI

FINAL ACCOUNTS : Introduction to final accounts - Trading account - Profit and loss account and balance sheet with simple adjustments (Simple problems).

UNIT – VII

CAPITAL AND CAPITAL BUDGETING :

Capital : Significance - Types of capital.

Capital Budgeting : Nature and scope of capital budgeting - Features and methods of capital budgeting – Pay back period method - Accounting rate of return method - Internal rate of return method - Net present value method and profitability index (Simple problems).

UNIT – VIII

COMPUTERIZATION OF ACCOUNTANCY SYSTEM : Manual accounting vs. computerized accounting – Advantages and disadvantages of computerized account – Using accounting software **Tally :** Tally features – Company creation – Account groups – Group creation – Ledger creation.

TEXT BOOKS

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, 3rd Edition, Tata Mc-Graw Hill, New Delhi, 2007.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics*, 1st Edition, S. Chand and Company, New Delhi, 1997.

REFERENCES

1. Samba Lalita, *Computer Accounting Lab work*, 1st Edition, Kalyani Publishers, Ludhiana, 2009.
2. Vershaney and Maheswari, *Managerial Economics*, 19th Edition, Sultan Chand and Sons, New Delhi, 2005.
3. H. Craig Petersen and W. Cris Levis, *Managerial Economics*, 4th Edition, Pearson Education, 2009.
4. Lipy and Chrystel, *Economics*, 4th Edition, Oxford University Press, New Delhi, 2008.
5. S.N. Maheswari and S.K. Maheswari, *Financial Accounting*, 4th Edition, Vikas Publishing House, 2005.
6. S.P. Jain and K.L. Narang, *Financial Accounting*, 5th Edition, Kalyani Publishers, Ludhiana, 2000.

III B.Tech. I Semester

10BT50101 : STRUCTURAL ANALYSIS – II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Structural analysis – I

Course Description: Analysis of moving loads; influence lines; moment distribution method; slope-deflection method; Kani's method; energy method; redundant pin-jointed frames; multi storey frames (approximate methods).

Course Outcomes:

- Able to calculate beam deflections using different methods.
- Understand the concepts of Moving loads , influence lines, slope deflection, moment distribution method, KANI's method and energy methods.

DETAILED SYLLABUS:

UNIT-I

MOVING LOADS : Maximum SF and BM at a given section and absolute maximum SF and BM due to single concentrated load, UDL longer than the span, UDL shorter than the span, two point loads and several point loads – Equivalent uniformly distributed load – Focal length.

UNIT-II

INFLUENCE LINES : Influence line for support reaction, shear force and bending moment – Load position for maximum SF and for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses.

UNIT-III

MOMENT DISTRIBUTION METHOD : Basic concepts - Stiffness factor – Carry over factor - Application to continuous beams with and without settlement of supports.

UNIT IV

SLOPE–DEFLECTION METHOD : Basic concepts - Slope deflection equation - Application to continuous beams with and without settlement of supports.

UNIT–V

KANI'S METHOD : Analysis of continuous beams including settlement of supports - Single bay, single storey portal frames without side sway.

UNIT-VI

ENERGY METHOD : Strain in linear elastic system - Expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – Deflections of simple beams and pin jointed plane trusses.

UNIT-VII

REDUNDANT PIN-JOINTED FRAMES : Introduction to indeterminate frames – Static and kinematic indeterminacies – Castigliano's theorem – Analysis of pin-jointed frames with upto two degrees of internal and external indeterminacies.

UNIT – VIII

MULTI STOREY FRAMES (Approximate Methods) : Substitute frame method (Two cycle method) for gravity loads – Portal method and cantilever method for lateral loads.

TEXT BOOKS

1. R.S.Khurmi, *Theory of Structures*, 11th Edition, S.Chand Publications, New Delhi, 1987.
2. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures - Vol.II*, 16th Edition, Khanna Publications, New Delhi, 2011.

REFERENCES

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, Anand, Gujrat, 2010.
2. Pandit, G., Gupta, S. and Gupta.R., *Theory of Structures – Vol. II*, 1st Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 1999.
3. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *SMTS-II - Theory of Structures*, 12th Edition, Laxmi Publications (P) Ltd, New Delhi, 2004.
4. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., New Delhi, 2010.

III B.Tech. I Semester

10BT50102 : REINFORCED CEMENT CONCRETE STRUCTURES - II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: RCCS I

Course Description: Design of stair cases; shallow foundations; pile foundations; retaining walls; domes; underground and overhead water tanks; prestressed concrete.

Course Outcomes:

- To apply the design codes relevant to the design of reinforced concrete members.
- Familiar with professional and ethical issues and understand the importance of structural engineering.

DETAILED SYLLABUS:

UNIT-I

STAIRCASES : Types of staircases - Stairs spanning longitudinally and transversally.

UNIT-II

FOUNDATIONS : Combined footings - Strap footing - Raft foundations.

UNIT-III

PILE FOUNDATIONS : Design of piles and pile caps – Underreamed piles – Grade beams

UNIT-IV

RETAINING WALLS : Lateral earth pressure - Design of cantilever and counter fort retaining walls.

UNIT-V

DOMES : Circular domes – Stresses - Membrane theory - Design.

UNIT-VI

WATER TANKS-I : Design of members in tension - Minimum steel areas and covers - Design of circular water tanks resting on ground.

UNIT VII

WATER TANKS-II : Design of underground water tanks – Overhead water tanks – Circular beams.

UNIT-VIII

PRESTRESSED CONCRETE : Introduction to prestressing - Materials - Types of prestressing – Loss of prestress – Pretensioning and posttensioning - Design of simple beams.

TEXT BOOKS

1. S. Unnikrishna Pillai and Devdas Menon, *Reinforced Concrete Design*, 3rd Edition, Tata Mc.Graw Hill, New Delhi, 2010.
2. N.C. Sinha and S.K. Roy, *Fundamentals of Reinforced Concrete*, 5th Edition, S. Chand Publishers, 2010.

REFERENCES

1. Limit State Designe of Reinforced Concrete, P.C. Varghese, Prentice Hall of India, New Delhi, 2nd Edition, 2010.
2. Reinforced Concrete Structures - Vol. I and Vol.II, B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi, 19th Edition, 2010.
3. Reinforced Concrete Design, N. Krishna Raju and R.N. Pranesh, CBS Publishers Distributors, New Delhi, 3rd Edition, 2010.
4. Prestressed Concrete, N. Rajagopalan, Narosa Publishing House, New Delhi, 2nd Edition, 2008.

Codes: IS 456-2000 and IS 1343-1980 code books are to be permitted into the examination hall.

III B.Tech. I Semester

10BT50103 : ENGINEERING HYDROLOGY

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Fluid Mechanics I and II

Course Description: Hydrologic cycle; applications and history; weather and seasons in India; precipitation; evaporation and evapotranspiration; runoff; hydrographic analysis; design flood; groundwater hydrology; well hydraulics.

Course Outcomes:

- Use principles of science for studying the hydrological cycle.
- Analyze and interpret the rainfall data and measure precipitation.
- Develop solutions in estimating the flood for the safety of public and apply different methods in estimating the flood and conduct investigations.
- Find the life of a reservoir and inform society for their safety.
- Follow professional ethics in forecasting flood and reservoir sedimentation and prepare quality reports.

DETAILED SYLLABUS :

UNIT – I

INTRODUCTION TO HYDROLOGY : Definition and scope of hydrology – Hydrologic cycle – Practical applications and historical development – Precipitation – Types and forms of precipitation – Weather and seasons in India.

UNIT – II

PRECIPITATION : Measurement of rainfall – Recording and non-recording type of rain gauges – Errors in measurement – Analysis and interpretation of rain fall data – Mass curve of rainfall – Hyetograph – Double mass curve - Methods of calculation of mean precipitation over an area – Depth-Area-Duration relationships.

UNIT – III

EVAPORATION AND EVAPOTRANSPIRATION : Process – Factors affecting evaporation – Estimation – Methods of reduction.

Infiltration : Definition – Factors affecting infiltration – Infiltration equation and indices – Measurement.

Streamflow : Measurement of discharge – Area velocity method – Moving boat method.

UNIT – IV

RUNOFF : Components – Factors affecting runoff – Rainfall-Runoff relationships – Flow mass curve, Flow duration curves.

UNIT – V

HYDROGRAPHIC ANALYSIS : Components of Hydrograph – Unit Hydrograph – Derivation – Use and limitation of unit hydrograph.

UNIT – VI

DESIGN FLOOD : Methods – envelope curves – Empirical formulae – Rational method – Unit hydrograph method – Frequency analysis – Flood routing.

UNIT – VII

GROUNDWATER HYDROLOGY : Introduction – Forms of subsurface water – Classification of formations – Aquifer characteristics – Porosity – Specific yield.

UNIT – VIII

WELLS : Types of wells – Draw down – Discharge of flow operating in unconfined aquifer – Discharge of flow operating in a confined aquifer – Pumping test – Recuperation test for open wells.

TEXT BOOKS

1. K. Subramanya, *Engineering Hydrology*, 3rd Edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2011.
2. P. Jaya Rami Reddy, *A Text book of Hydrology*, 3rd Edition, University Press, Laxmi Publications, New Delhi, 2011.

REFERENCES

1. H.M. Raghunath, *Ground Water*, 3rd Edition, Wiley Eastern Ltd., New Delhi, 2009.
2. David Keith Todd, *Ground Water Hydrology*, 2nd Edition, Wiley India Pvt. Ltd., New Delhi, 2010.
3. V.T. Chow., *Hand Book of Applied Hydrology*, 2nd Edition, Mc Graw-Hill Education Pvt.Ltd., New Delhi, 2000.

III B.Tech. I Semester

10BT50104 : SOIL MECHANICS

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Engineering Mechanics

Course Description: Soil formation; types; structure and clay mineralogy; phase diagram; volume-weight relationships; index properties; permeability; seepage; stress distribution; compaction; consolidation; shear strength.

Course Outcomes:

The course introduces the basic principles of engineering behavior of soils, and by the end of this course students should be able to:

- Apply Knowledge of index properties and engineering properties of soil.
- Analyse soils for index properties and engineering properties.
- Determine various soil parameters through laboratory tests.
- Specify the requirements of soil properties for engineering application and investigate the same.

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION : Soil formation - Types of soils – Soil structure and clay mineralogy – Adsorbed water – Volume-weight relationships - Three-phase diagram.

UNIT – II

INDEX PROPERTIES OF SOILS : Moisture content - Specific gravity – In-situ density - Relative density- Grain size analysis – Sieve and hydrometer methods – Plasticity of soils - Consistency limits and indices – I.S. Classification of soils – Sensitivity – Thixotropy - Activity of soils.

UNIT –III

PERMEABILITY : Soil water – Capillary rise – Flow of water through soils – Darcy's law - Permeability – Factors affecting permeability – Laboratory determination of coefficient of permeability – Permeability of layered systems.

UNIT –IV

SEEPAGE THROUGH SOILS : Effective stress principle - Effective stress under different loading conditions - Seepage pressure - Quicksand condition – Seepage through soils – Flownets: Characteristics and Uses - Seepage through earth dams with horizontal filter - Critical hydraulic gradient.

UNIT – V

STRESS DISTRIBUTION IN SOILS : Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart – Approximate methods – Contact pressure distribution.

UNIT – VI

COMPACTION : Mechanism of compaction - Optimum moisture content and maximum dry density - Factors affecting compaction - Effects of compaction on soil properties - Laboratory determination of OMC and MDD - Field compaction methods - Compaction control.

UNIT – VII

CONSOLIDATION OF SOILS : Initial, primary and secondary consolidation - Spring analogy for primary consolidation - Consolidation test - e-p and e-log p curves - Terzaghi's theory of one dimensional consolidation - Coefficient of consolidation – Preconsolidation pressure – Secondary consolidation.

UNIT – VIII

SHEAR STRENGTH OF SOILS : Mohr-Coulomb failure theories – Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability – Shear strength of cohesionless soils – Critical void ratio – Liquefaction - Shear strength of cohesive soils.

TEXT BOOKS

1. Gopal Ranjan and ASR Rao, *Basic and Applied Soil Mechanics*, 2nd Revised Edition, New age International Pvt . Ltd, New Delhi, 2010.
2. K.R. Arora, *Soil Mechanics and Foundation Engineering*, 7th Edition, Standard Publishers and Distributors, New Delhi, 2010.

REFERENCES

1. Braja.M.Das, *Text Book of Geotechnical Engineering*, 1st Edition, Cengage Learning India, New Delhi, 2009.
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation*, 16th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2005.
3. C. Venkatramaiah, *Geotechnical Engineering*, 3rd Edition, New Age International Publishers, New Delhi, 2010.
4. V. N. S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering*, 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

III B.Tech. I Semester

10BT50105 : ENGINEERING GEOLOGY

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites:

Course Description: Importance of geology in the civil engineering; weathering; mineralogy; petrology; structural geology; groundwater; earthquakes; landslides; geophysical studies; geological consideration for dams, reservoirs and tunnels.

Course Outcomes:

After the completion of this course, a successful student is able to:

- Apply the knowledge of geological features, the properties of rocks and their suitability as building stones for various civil engineering constructions
- Analyze the failures of structures using geological studies.
- Give recommendations for effective use of rocks, minerals for construction
- Conduct investigations on geological formations and structures.

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION : Importance of geology from civil engineering point of view – Brief study of case histories of failure of some civil engineering constructions due to geological drawbacks – Importance of physical geology, petrology and structural geology; Weathering: Effects of weathering of rocks – Importance of weathering with reference to dams, reservoirs and tunnels.

UNIT – II

MINERALOGY : Definition of mineral – Importance of study of minerals – Different methods of study of minerals– Advantages of study of minerals by physical properties - Identification of minerals – Physical properties of common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite – Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Galena, Pyrolusite, Graphite, Magnesite and Bauxite.

UNIT – III

PETROLOGY : Definition of rock – Geological classification of rocks into igneous, sedimentary and metamorphic rocks –Dykes and sills - Common structures, textures – Features of igneous, sedimentary and metamorphic rocks – Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT – IV

STRUCTURAL GEOLOGY : Out crop - Strike and dip – Classification and recognition of folds, faults, unconformities, and joints – Their importance in-situ – Foliation and lineation – Concept of stress and strain, analysis of stress and response of rock to stress – Analysis of deformation and strain ellipsoid – Common types of soils, their origin and occurrence in India.

UNIT – V

GROUNDWATER, EARTHQUAKE AND LANDSLIDES : Groundwater – Water table – Common types of groundwater – Springs – Cone of depression – Geological controls of groundwater movement – Groundwater exploration – Hydrological properties of rocks: porosity, permeability, storativity, specific yield and specific retention

Earthquakes, their causes and effects - shield areas and seismic zones – Seismic waves - Richter scale - Precautions to be taken for building construction in seismic areas – Landslides, their causes and effect - Measures to be taken to prevent their occurrence.

UNIT – VI

GEOPHYSICAL STUDIES : Importance of geophysical studies - Principles of geophysical study by gravity methods –Magnetic methods – Electrical resistivity methods – well logging and interpretation – Seismic refraction methods – Radiometric methods and geothermal method – Special importance of electrical resistivity methods and seismic refraction methods.

UNIT – VII

GEOLOGY OF DAMS AND RESERVOIRS : Types of dams – Geological considerations in the selection of a dam site – Analysis of dam failures of the past – Factors contributing to the success of a reservoir.

UNIT – VIII

TUNNELS : Purposes of tunneling – Effects of tunneling on the ground – Geological considerations (i.e., Tithological, structural and groundwater) in tunneling, over break and lining in tunnels.

TEXT BOOKS

1. N.Chennkesavulu, *Engineering Geology*, 2nd Edition, Mc-Millan India Ltd., New Delhi, 2011.
2. D. Venkata Reddy, *Engineering Geology*, 1st Edition, Vikas Publications, New Delhi, 2010.

REFERENCES

1. K.V.G.K. Gokhale, *Principles of Engineering Geology*, 1st Edition, B.S. Publications, Hyderabad, 2005.
2. Parbin Singh, *A Text Book of Engineering and General Geology*, 8th Edition, S.K. Kataria and Sons, New Delhi, 2010.
3. Krynine and Judd, *Principles of Engineering Geology and Geotechnics*, 1st Edition, CBS Publishers and Distributors, 2005.
4. Mukarjee, *Engineering Geology*, 11th Edition, World Press Pvt. Ltd., Calcutta, 2010.

III B.Tech. I Semester

10BT50111 : COMPUTER AIDED BUILDING DRAWING

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Building materials and Concrete Technology

Course Description: Loading bearing walls; RCC framed structures; Industrial buildings; views on one and two storey buildings.

Course Outcomes:

After the completion of this course, a successful student is able to :

- Draw plan, elevation and cross sectional views of a structure.
- Design the buildings using Auto Cad.
- Recommended various roof trusses for industrial building.

LIST OF EXERCISES

1. Buildings with load bearing walls (Flat and pitched roof) – Including details of doors and windows
2. RCC framed structures
3. Industrial buildings – North light roof trusses
4. Perspective view of one and two storey buildings

TEXT BOOKS

1. Varma B.P., *Civil Engineering Drawing and House Planning*, 10th Edition, Khanna Publishers, Delhi, 1992.
2. Balagopal and T.S. Prabhu, *Building Drawing and Detailing*, Spades Publishers, Calicut, 1987.

REFERENCES

1. Shah, M.G., *Building Drawing*, Tata McGraw-Hill, New Delhi, 1992.
2. Kumaraswamy N. and Kameswara Rao A., *Building Planning and Drawing*, 4th Edition, Charotar Publishing, 2010.
3. Kale and Patki, Shah, *Building Drawing with Integrated Approach To Built Environment*, Tata McGraw-Hill, New Delhi, 2002.

III B.Tech. I Semester
10BT50112 : ENGINEERING GEOLOGY LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Engineering geology

Course Description:

Study of rocks and minerals; geological maps; problems on structural geology

Course Outcomes:

After the completion of this course, a successful student is able to :

- Apply the knowledge of physical properties of minerals and rocks to the suitability of the construction materials.
- Analyze the geological maps of the construction area.
- Conduct geological investigations with resistivity meter

LIST OF EXERCISES

1. Study of physical properties and identification of rock forming minerals.
2. Study of physical properties and identification of ore forming minerals.
3. Megascopic identification of common igneous rocks.
4. Megascopic identification of common sedimentary rocks.
5. Megascopic identification of common metamorphic rocks.
6. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
7. Simple structural geology problems.

III B.Tech. I Semester

10BT4HS02 : **ADVANCED ENGLISH COMMUNICATION SKILLS** (Audit Course)

Internal Marks	External Marks	Total	L	T	P	C
-	-	-	-	3	-	-

Prerequisite: Basic Grammar and Fundamentals of Writing Skills

Course Description: Vocabulary Building; Reading Comprehension; Academic Essay; Technical Report; Career Skills; Resume Writing; Group Discussion; Interview Skills.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

- Acquire knowledge in.
 - Vocabulary
 - Etymology
 - Idioms and Phrases
- Analyse the functional knowledge of writing, styles and techniques for academic and professional requirements.
- Interpret and synthesize the language functions through:
 - Role Plays
 - Group Discussions
 - Mock Interviews

DETAILED SYLLABUS:

UNIT - I

VOCABULARY BUILDING : Synonyms and antonyms - Word roots - One-word substitutes - Prefixes and suffixes - Study of word origin - Analogy, idioms and phrases.

FUNCTIONAL ENGLISH : Starting conversation - Responding appropriately and relevantly - Using the right body language - Role play in different situations.

UNIT - II

READING COMPREHENSION : Reading for facts - Guessing meanings from context - Scanning, skimming, inferring meaning and critical reading.

UNIT - III

ACADEMIC ESSAY WRITING : Accuracy, brevity, clarity, brainstorm - List your ideas - Sub-headings - Revising content and organisation.

UNIT - IV

TECHNICAL REPORT WRITING : Types of formats and styles - Subject-matter - Subject-organization - Clarity, coherence and style - Planning - Data-collection - Tools - Analysis.

UNIT - V

CAREER SKILLS : Career direction - Exploring your talents - Personality inventories - Write a "Who I Am" statement - Thinking further - Perform career research - How do I get hired - Creating job satisfaction - Identify your satisfaction triggers - Positive attitude - Maintain a balanced lifestyle - Analyze your job in terms of your interests - Set goals to bring your interests and responsibilities in line - Personal SWOT analysis - Making the most of your talents and opportunities - Shaping your job to fit you better - Future proof your career - Managing your emotions

UNIT - VI

RESUME WRITING: Structure and presentation - Planning - Defining the career objective - Projecting ones strengths and skill-sets - Summary - Formats and styles - Cover letter.at work - Get the recognition you deserve.

UNIT - VII

GROUP DISCUSSION: Dynamics of group discussion - Intervention-Summarizing - Modulation of voice - Fluency and coherence - Participation, relevance, assertiveness, eye contact and body language.

UNIT - VIII

INTERVIEW SKILLS: Concept and process - Pre-interview planning- Opening strategies - Answering strategies - Interview through tele and video-conferencing.

REFERENCES

1. M. Ashraf Rizvi, *Effective Technical Communication Skills*, Tata McGraw-Hill, New Delhi, 2005.
2. Meenakshi Raman and Sangetha Sharma, *Technical Communication - Principles and Practice*, Oxford University Press, New Delhi, 2010.
3. Santha Kumar R, *Secrets of Success in Interviews*, Crucial Books, Secunderabad, 2007.
4. M. Ashraf Rizvi, *Resumes and Interviews - The Art of Wining*, Tata McGraw-Hill, New Delhi, 2008.
5. Gopala Swamy Ramesh and Mahadevan Ramesh, *The Ace of Soft Skills: Attitude, Communication and Etiquette for Success*, Pearson Education, New Delhi, 2009.

SUGGESTED SOFTWARE

1. TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
2. Softwares from 'train2success.com'
3. Resume Preparation, K-Van Solutions.
4. Facing Interviews, K-Van Solutions.
5. Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
6. Vocabulary Builder, Young India Films.
7. E-correspondence, Young India Films.

III B.Tech. II Semester

10BT60101 : ESTIMATION AND QUANTITY SURVEYING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying and Building materials

Course Description: Standard units; detailed and abstract estimates of buildings, roads and canals; rate analysis; reinforcement bar bending schedule; contracts and tenders; building valuation; specifications.

Course Outcomes:

- Learn standard units for different items of work in building.
- Calculate various building materials required for a structure.
- Estimate the cost materials and labour required for a construction.
- Prepare agreements ,tenders for building construction and valuation and rent fixation of different building structures.

DETAILED SYLLABUS:

UNIT – I

GENERAL ITEMS OF WORK IN BUILDING : Standard Units Principles of working out quantities for detailed and abstract estimates – Calculation of quantities of brick work, RCC, PCC, Plastering, whitewashing, colourwashing and painting/varnishing for shops, rooms, residential building with flat and pitched roof – Approximate method of estimating.

UNIT – II

DETAILED ESTIMATES OF BUILDINGS : Different items of works in building – Principles of taking out quantities – Detailed measurement form – Estimate of RCC building - Long walls - Short wall method and Centre line method – Various types of arches – Calculation of brick work and RCC works in arches.

UNIT – III

ROADS AND CANALS :

Roads: Estimate of bituminous and cement concrete - Estimate of earthwork - Estimate of pitching of slopes - Estimate of earthwork of road from longitudinal sections - Estimate of earthwork in hill roads.

Canals: Earthwork in canals – Different cases – Estimate of earthwork in irrigation channels.

UNIT – IV

RATE ANALYSIS : Working out data for various items of work overhead and contingent charges - Task or out – Turn work - Labour and materials required for different works - Rates of materials and labour - Schedule of Rates - Preparing analysis of rates for the following items of work: Concrete, RCC Works, Brick work in foundation and super structure, plastering, CC flooring, whitewashing.

UNIT-V

REINFORCEMENT BAR SCHEDULE : Reinforcement bar bending and bar requirement schedules.

UNIT – VI

CONTRACTS AND TENDERS : Contracts: Elements of contract- offer acceptance and consideration - Valid contract - Types of contracts – Lumpsum contract, schedule contract, item rate contract, sub-contracts, joint ventures - Departmental execution of works - Muster Roll Form 21 - Piece work agreement form - Work order.

Tenders: Contract contractor – Quotation - Earnest money - Security money – Tender - Tender notice, tender form - Bidding procedure, irregularities in bidding – Bidding award - Arbitration disputes and claim settlement.

UNIT – VII

VALUATION OF BUILDINGS: Necessity - Different terms used in valuation and their meaning - Different methods of building valuation and rent fixation - Outgoings – Depreciation - Methods for estimating cost depreciation – Escalation.

UNIT – VIII

SPECIFICATIONS: Purpose and method of writing specifications - General specifications - Detailed specifications for different items of building construction.

TEXT BOOKS

1. B.N. Dutta, *Estimating and Costing*, UBS publishers, New Delhi, 2000.
2. G.S. Birdie, *Estimating and Costing*, Danpatrai Publications, New Delhi, 2009.

REFERENCES

1. M. Chakraborti, *Estimating Costing Specification and Valuation in Civil Engineering*, 23rd Edition, Laxmi Publications, New Delhi, 2010.
2. Standard Schedule of Rates and Standard Data Book, Public Works Department.
3. IS 1200 (Parts I to XXV–1974/ Method of Measurement of Building and Civil Engineering Works – B.I.S.)
4. National Building Code of India – 2010, BIS, Govt. of India, New Delhi.

III B.Tech. II Semester

10BT60102 : STEEL STRUCTURES - I

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: SA & RCCS

Course Description: Design concepts; limit state method; rivetted and bolted connections; welded connections; tension members; compression members; built-up compression members; design of column foundations.

Course Outcomes:

- Use fundamentals of mathematics to find CG & various sections.
- Analyze various sections, joints, connections of steel members.
- Design tension and compression members
- Demonstrate the knowledge of steel code for designing members under pure bending.

DETAILED SYLLABUS:

UNIT-I

DESIGN CONCEPTS : Types of rolled steel sections – Stress-strain relationship for mild steel – Loads – Design concepts of steel structures – Working stress design – Limit state design – Design requirements – Design strength – Serviceability limit state.

By Limit State Method: [IS 800-2007]

UNIT-II

RIVETED AND BOLTED CONNECTIONS : Failure of a joint - Strength and efficiency of a joint - Lap Joint - Butt joint - Eccentric connections.

UNIT - III

WELDED CONNECTIONS : Strength of welds - Butt and fillet welds - Design of fillet welds subjected to axial load - Design of fillet welds subjected to moment acting in the plane and at right angles to the plane of the joints - Beam to beam and beam to column connections.

UNIT-IV

TENSION MEMBERS : Net effective sectional area for angle and tee sections - Design of tension members - Lug angles.

UNIT-V

BEAMS : Bending, shear and bearing strength – Design of simple beams - Design of plated beams - Design of connection of cover plates with the flanges of beams.

UNIT-VI

COMPRESSION MEMBERS : Effective length, radius of gyration and slenderness of compression members - Design strength - Design of axially loaded compression members.

UNIT -VII

BUILT-UP COMPRESSION MEMBERS : Design of built-up compression members - Design of lacings and battens - Design principles of eccentrically loaded columns - Splicing of columns.

UNIT – VIII

DESIGN OF COLUMN FOUNDATIONS : Design of slab base and gusseted bases - Column bases subjected moment.

TEXT BOOKS

1. S.K. Duggal, *Design of steel structures*, 1st Edition, Tata McGraw Hill, New Delhi, 2010
2. N. Subramanian, *Design of steel structures*, 1st Edition, Oxford University Press, 2010

REFERENCES

1. S.S. Bhavikatti, *Design of Steel Structures*, 2nd Edition, I.K. International Publishing House Pvt. Ltd, 2010.
2. N. Krishna Raju, *Structural Design and Drawing*, 3rd Edition, Universities Press, Hyderabad, 2009.
3. Ramachandra and Virendra Gehlot, *Design of Steel Structures*, 11th Edition, Scientific Publishers, Jodhpur, 2005.
4. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures*, 2nd Edition, Laxmi Publications, New Delhi, 1998.

IS Codes: IS -800 – 2007, IS – 875 – Part III and Steel Tables are to be permitted into the examination hall.

III B.Tech. II Semester

10BT60103 : WATER RESOURCES ENGINEERING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Fluid Mechanics – I and II, Engineering Hydrology

Course Description: Irrigation; soil moisture; diversion head works; reservoirs; gravity and earth dams; canal structures; cross drainage works

Course Outcomes:

- Find the duty and delta required for a crop from the mathematical principles.
- Analyze the forces acting on a multipurpose dam
- Design a dam and canal structures.
- Carryout research on the stability of dam and provide suitable solutions
- Estimate the reservoir capacity using modern tools.
- Give reasons for the failure of a dam and reservoir.

DETAILED SYLLABUS:

UNIT – I

IRRIGATION : Necessity and importance– Advantages and Disadvantages – Types of Irrigation – Application of irrigation water – Indian agricultural soils – Methods of increasing soil fertility – Standards for irrigation water.

UNIT – II

SOIL MOISTURE : Soil-Water-Plant relationship – Vertical distribution of soil moisture – Soil moisture constants – Consumptive use – Duty-Delta relationship - Factors affecting duty – Irrigation efficiency.

UNIT – III

DIVERSION HEAD WORKS : Types of diversion head works – Weirs – Barrages – Layout of diversion works – Causes and failure of hydraulic structures on permeable foundations – Bligh’s creep theory – Khosla’s theory – Determination of uplift pressure – Impervious floors – Exit gradient – Functions of upstream and downstream sheet piles.

UNIT – IV

DAMS : Types of dams – Merits and demerits – Factors affecting selection of site – Zones of storage of reservoir – Estimation of reservoir capacity – Mass curve.

UNIT – V

GRAVITY DAMS : Forces acting on gravity dam - Causes of failure of gravity dams – Elementary profile and practical profile of gravity dam – Limiting height of a low gravity dam – Stability analysis – Drainage galleries.

UNIT – VI

EARTH DAMS : Types – Causes of failure – Criteria for safe design - Seepage through earth dam – Measures of seepage control.

UNIT – VII

CANAL STRUCTURES : Types of falls – Canal regulation works – Canal outlets.

UNIT – VIII

CROSS DRAINAGE WORKS : Types – Selection of site aqueducts -
Super passages – Level crossing.

TEXT BOOKS

1. S.K. Garg, *Irrigation Engineering and Hydraulic Structures*, 23rd Edition, Khanna Publishers, New Delhi, 2010.
2. B.C. Punmia and P.B.B. Lal, *Irrigation and Water Power Engineering*, 16th Edition, Laxmi Publications, New Delhi, 2011.
3. R.K. Sharma and T.K. Sharma, *Irrigation Engineering*, 3rd Edition, S. Chand Publishers, New Delhi, 2007.

REFERENCES

1. K.R. Arora, *Irrigation, Water Power and Water Resources Engineering*, 4th Edition, Standard Publishers Distributors, Delhi, 2011.
2. G.L. Asawa, *Irrigation and Water Resources Engineering*.

III B.Tech. II Semester

10BT60104 : ENVIRONMENTAL ENGINEERING - I

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Fluid mechanics –I & II

Course Outcomes:

- Analyze the water samples for finding different impurities present in water.
- Identify the problems due to impure water.
- Design a pipe network for supplying water from a main source.
- Carryout research on water treatment and distribution system.
- Use advanced techniques for water sampling analysis.
- Assess the reasons for ill health due to disinfected water consumption and provide necessary solutions to treatment for the benefit of the society.

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION : Importance of water supply Engineering - Need for protected water supply – Objective of water supply systems – Flow diagram of water supply systems.

UNIT – II

SOURCES AND DEMAND OF WATER : Different sources of water – Quantity and quality of different sources – Types and variation in water demand – Factors affecting water demand – Design period – Forecasting of population, different methods and their suitability.

UNIT – III

WATER COLLECTION, CONVEYANCE AND DISTRIBUTION : Intake works for collection of surface water – Conveyance of water – Gravity and pumping methods – Different materials used for conveying conduits and their suitability – Systems of distribution – Distribution reservoirs – Distribution networks – Design of simple networks – Pipe accessories – Valves and their location and suitability.

UNIT – IV

QUALITY REQUIREMENTS OF WATER : Sources of water pollution – Water borne diseases – Physical, chemical and biological impurities – Tests conducted for determining impurities – Water standards for different uses - Water quality standards WHO.

UNIT – V

WATER TREATMENT – I : Conventional water treatment processes units and their functions - Theory and design of aeration, coagulation, flocculation, and clarification - Determination of optimum dose of alum for coagulation of water.

UNIT – VI

WATER TREATMENT – II : Theory of filtration – Different types of filters and their design - Disinfection – Disinfectants – Mechanism of disinfection – Different methods of disinfection – Break point chlorination – Types chlorination – Dose of disinfectant.

UNIT – VII

ADVANCED TREATMENT METHODS : Removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemical and biological residues, Removal of Persistent Organic Pollutants – Adsorption with activated carbon, ion-exchange resins, membrane processes, chemical oxidation and softening.

UNIT – VIII

WATER SUPPLY ARRANGEMENTS IN BUILDINGS : Definition of technical terms used in water supply arrangements – Identification of different water supply of pipes – General layout of water supply in single storey and multi storeyed buildings - Principles and precautions in laying pipe lines in the premises of buildings - Connection from water main to building – Water supply fittings – Detection and prevention of leakage.

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010.
2. S.K. Garg, *Environmental Engineering (Vol.I): Water Supply Engineering*, 20th Revised Edition, Khanna Publishers, New Delhi, 2011.

REFERENCES

1. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition, S.Chand Publishers, New Delhi, 2010.
2. Nazih K. Shamma and Lawrence K. Wang, *Fair, Geyer and Okun's Water and Waste Water Engineering: Water Supply and Wastewater Removal*, 3rd Edition, John Wiley and Sons, New Delhi, 2011.
3. H.S. Peavy and D.R.Rowe, *Environmental Engineering*, 1st Edition, McGraw-Hill Publishing Company, New York, 1984.

III B.Tech. II Semester

10BT60105 : TRANSPORTATION ENGINEERING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying, Soil Mechanics

Course Description: Planning and geometric design of highways ,Railways ,Airports ; Highway engineering; Traffic characteristics and measurement; Material and construction; analysis and design of flexible and rigid pavements.

Course Outcomes:

- Apply knowledge of science and maths and engineering fundamentals for transportation solution. Collecting and analysis of transportation data.
- Arrives at transportation solutions compatibility with social economical.
- Design transportation system using latest theories.
- Construct the transportation projects in such as highways.
- Develop skills of project management in project initiation,.

DETAILED SYLLABUS

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING : Highway development in India – Necessity for highway planning - Different road development plans - Classification of roads - Road network patterns – Highway alignment - Factors affecting alignment - Engineering surveys – Drawings and reports.

UNIT – II

HIGHWAY GEOMETRIC DESIGN : Importance of geometric design - Design controls and criteria- Highway crosssection elements- sight distance elements - Stopping sight distance, overtaking sight distance and intermediate sight distance - Design of horizontal alignment - Design of super elevation and extra widening - Design of transition curves - Design of vertical alignment – Gradients - Vertical curves.

UNIT – III

HIGHWAY MATERIALS : Aggregates and bitumen – Desirable properties – Laboratory tests on aggregate and bitumen, CBR test – Specifications – Aggregate bitumen mixes – Desirable properties – Mix design by Marshal method – Cement and cement concrete.

UNIT – IV

PAVEMENT DESIGN : Types of pavements – Difference between flexible and rigid pavements – Pavement components – Sub grade, sub base, base and wearing course – Functions of pavement components – Design factors – Flexible pavement design methods – G.I method, CBR method, Triaxial method – Numerical examples – Design of rigid pavements – Critical load positions – Westergaard's stress equations – Computing radius of relative stiffness and equivalent radius of resisting section – Stresses in rigid pavements – Design of expansion and contraction joints in CC pavements. Design of dowel bars and tie bars.

UNIT – V

HIGHWAY DRAINAGE : Importance of highway drainage – Requirements – Surface drainage – Subsurface drainage – Drainage of slopes and erosion control – Road construction in water logged areas and black cotton soils.

UNIT – VI

RAILWAY ENGINEERING : Permanent way components – Cross section of permanent way - Functions of various components like rails, sleepers and ballast –Rail fastenings – Creep of rails - Theories related to creep – Adzing of sleepers - Sleeper density.

UNIT – VII

GEOMETRIC DESIGN OF RAILWAY TRACK : Gradients - Grade compensation - Cant and negative super elevation - Cant deficiency – Degree of curve – Crossings and turn out .

UNIT – VIII

AIRPORT ENGINEERING : Factors affecting selection of site for airport – Aircraft characteristics - Geometric design of runway - Computation of runway length – Correction for runway length – Orientation of runway – Wind rose diagram – Runway lighting system.

TEXT BOOKS

1. S.K. Khanna and C.E.G.Justo, *Highway Engineering*, 8th Edition, Nemchand and Brothers, Roorkee, 2009.
2. S.P. Saxena, S.P. Arora, *Railway Engineering - A Text Book of Transportation Engineering*, 7th Edition, S.Chand and Co. Ltd., 2010.
3. L.R. Kadiyali and Lal, *Highway Engineering Design*, 5th Edition, Khanna Publications, New Delhi, 2009.
4. S.K. Khanna and Arora, *Airport Planning and Design*, 6^h Edition, Nemchand and Brothers, Roorkee, 2009.

REFERENCES

1. S.P.Bindra, *Highway Engineering*, 4th Edition, Dhanpat Rai and Sons, New Delhi, 2011.
2. L.R.Kadyali, *Traffic Engineering and Transportation Planning*, 7th Edition, Khanna Publications, 2010.
3. M. M. Agarwal, *Railway Engineering*, 15th Edition, Prabha and Co., New Delhi, 1994.
4. Virendhra Kumar and Statish Chandhra, *Air Transportation Planning and Design*, 1st Edition, Galgotia Publishers, New Delhi, 1999.

III B.Tech. II Semester

10BT60106 : FOUNDATION ENGINEERING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Soil Mechanics

Course Description: soil exploration; lateral earth pressure; earth retaining structures; stability of earth slopes; bearing capacity of shallow foundations; allowable bearing pressure; pile foundations; caissons and well foundations.

Course Outcomes:

- Apply knowledge of soil exploration, earth pressure, slope stability, bearing capacity of soils and foundations for selection of suitable sites and foundations for different structures.
- Analyse soils for bearing capacity for different types of foundations and stability of slopes.
- Design earth retaining structures and foundations depending upon the site characteristics.
- Conduct field investigations for engineering characterization of soils.

DETAILED SYLLABUS:

UNIT – I

SOIL EXPLORATION : Need – Planning - Methods of soil exploration – Geophysical methods – Open excavation methods - Boring and sampling methods – Types of soil samples - Field tests: penetration tests, plate load test, in-situ vane shear test, pressure meter test – Observation of groundwater table - Borehole logging – Soil investigation report - Selection of foundation based on soil condition.

UNIT – II

LATERAL EARTH PRESSURE : Types of Earth Pressures – Plastic equilibrium in soils – Rankine's theory – Earth pressures in cohesionless and cohesive soils - Coloumb's wedge theory – Earth pressure on retaining walls of simple configurations - Graphical methods (Rebhann and Culmann) - Pressure on the wall due to single line load alone.

UNIT – III

EARTH RETAINING STRUCTURES : Types of retaining structures - Stability considerations of gravity and cantilever retaining walls - Proportioning of retaining walls - Cantilever sheet pile walls - Anchored bulk heads (free earth support method only).

UNIT – IV

STABILITY OF EARTH SLOPES : Infinite and finite earth slopes – Types of failures – Factor of safety of infinite slopes – Stability analysis of finite slopes: Swedish arc method, standard method of slices, Bishop's simplified method, Taylor's stability number - Stability of slopes of earth dams under different conditions - Improving stability of slopes.

UNIT – V

BEARING CAPACITY OF SHALLOW FOUNDATIONS : Types and choice of foundation - Depth of foundation - Types of shear failure – Safe bearing capacity – Terzaghi's, Meyerhof's, Skempton's and IS methods - Effect of groundwater table on bearing capacity.

UNIT – VI

ALLOWABLE BEARING PRESSURE : Bearing capacity from penetration tests - Allowable bearing pressure - Safe bearing capacity and settlement from plate load test – Presumptive bearing capacity – Allowable settlements of structures – Settlement analysis.

UNIT – VII

PILE FOUNDATIONS : Types of piles – Factors influencing the selection of pile - Load carrying capacity of piles in granular and cohesive soils - Static and dynamic pile formulae – In-situ penetration tests - Pile load tests – Negative skin friction - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT – VIII

CAISSONS AND WELL FOUNDATIONS : Types of caissons - Bearing capacity - Construction of caissons - Advantages and disadvantages of caisson foundations – Comparison of caisson types - Well foundations - Shape – Lateral stability - Terzaghi's analysis - Components of wells - Functions and design - Design criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS

1. K.R. Arora, *Soil Mechanics and Foundation Engineering*, 7th Edition, Standard Publishers and Distributors, New Delhi, 2010.
2. C. Venkatramaiah, *Geotechnical Engineering*, 3rd Edition, New Age International Publishers, New Delhi, 2010.

REFERENCES

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation*, 16th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2005.
2. Gopal Ranjan and A.S.R. Rao, *Basic and Applied Soil Mechanics*, 2nd Revised Edition, New Age International Pvt. Ltd, New Delhi, 2010.
3. Braja M. Das, *Principles of Foundation Engineering*, 6th Edition, Cengage Learning India, New Delhi, 2007.
4. J.E. Bowles, *Foundation Analysis and Design*, 5th Edition, McGraw-Hill Publishing Company, New York, 2001.
5. W.C. Teng, *Foundation Design*, 1st Edition, Prentice Hall Inc., New Jersey, 1962.
6. V.N.S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering*, 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

III B.Tech. II Semester

10BT60111 : GEOTECHNICAL ENGINEERING LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Soil Mechanics

Course Description: Tests for Atterberg's limits; determination of field density; grain size analysis, permeability tests, compaction test, relative density, CBR test, consolidation test, unconfined compression test, triaxial test, direct shear test, vane shear test.

Course Outcomes:

- Classify the given soil and determine its properties
- Analyze and interpret engineering behavior of soils.
- Find the suitability of soil for a civil engineering construction.
- Prepare a report on the properties of soil for the given site.

DETAILED SYLLABUS:

LIST OF EXPERIMENTS

1. Tests for Atterberg's limits
2. Determination of field density - core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil - constant head test and variable head test
5. Compaction test
6. Relative density test
7. CBR test
8. Consolidation test
9. Unconfined compression test
10. Tri-axial compression test
11. Direct shear test.
12. Vane shear test

III B.Tech. II Semester

10BT60112 : ENVIRONMENTAL ENGINEERING LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Environmental Engineering-I

Course Outcomes:

- Acquire knowledge on the quality standards
- Test water quality and assess waste water characteristics using the principles of treatment method.
- Estimate the quantity of chemicals required to treat the water and waste water.

DETAILED SYLLABUS:

LIST OF EXPERIMENTS

1. Determination of pH and turbidity
2. Determination of conductivity and total dissolved solids.
3. Determination of alkalinity/acidity.
4. Determination of chlorides.
5. Determination and estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of dissolved oxygen.
8. Determination of nitrogen.
9. Determination of total phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of optimum coagulant dose.
13. Determination of chlorine demand.
14. Presumptive E - Coli test.

III B. Tech.– II Semester

10BT60113: SEMINAR

Internal Marks	External Marks	Total	L	T	P	C
75	-	75	-	-	-	2

Prerequisites: All the courses of the program up to III B. Tech. – I Semester.

Course Description: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of thesis and presentation.

Course Outcomes:

On completion of seminar work the student will be able to

- Acquire in-depth knowledge in the areas of interest of the seminar topic.
- Analyze critically chosen seminar topic for substantiated conclusions.
- Design solutions for the seminar topic chosen.
- Undertake investigation of seminar output providing valid conclusions.
- Use the appropriate techniques, resources and modern engineering tools necessary for conducting seminar work.
- Understand the impact of seminar output in the context of environmental sustainability.
- Understand professional and ethical responsibilities for sustainable development of society in the chosen field of seminar.
- Function effectively as individual on the chosen seminar topic.
- Develop communication skills, both oral and written for preparing and presenting seminar reports.
- Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

III B.Tech. II Semester

10BT60114 : **SPREADSHEET APPLICATIONS IN CIVIL
ENGINEERING
(AUDIT COURSE)**

L	T	P	C
-	3	-	-

Prerequisites: MS Excel; design of beams and hydraulic structures; analyses of frames

Course Description: MS Excel as a Spreadsheet tool; spreadsheet creation; design of slabs, footings; analysis of frames; design of notches, weirs; design of pipes

Course Outcomes:

- Apply the principles of spread sheet for the formation of the cells, formatting and creation of tables
- Analyze the frames
- Use spread sheet for the design of beams, slabs, flow meters and pipes

DETAILED SYLLABUS:

LIST OF EXERCISES

1. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources. Creating a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
2. Creating a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.
3. Design of singly reinforced beam
4. Design of doubly reinforced beam
5. Design of one-way slab
6. Design of two-way slab
7. Design of isolated footings
8. Analysis of frames
9. Design of surplus weir
10. Design of trapezoidal notch
11. Design of canal regulator
12. Design of sewer pipe

TEXT BOOKS

1. Sylvan Charles Bloch, *Excel for Engineers and Scientists in Geotechnical Engineering*, Wiley, 2002.
2. Craig T. Christy, *Engineering with the spreadsheet: structural engineering templates using Excel*, ASCE Publications, 2006.

REFERENCES

1. Thomas F. Wolff, *Spreadsheet Applications in Geotechnical Engineering*, 1st Edition, PWS Publishing Company, 1995.

IV B.Tech. I Semester

10BT70101 : REMOTE SENSING AND GIS

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying and CABD Lab

Course Description: Aerial photogrammetry; remote sensing: electromagnetic spectrum, sensors; geographic information system: data representation, spatial analysis; water resources applications

Course Outcomes:

After completion of this course, a student is able to :

- Apply the knowledge of aerial photographs, satellite imagery to civil engineering applications
- Analyze the Remote sensing data to generate the geographical information for natural resources.
- Develop solutions for water management and traffic regulations and conduct the survey with GPS and satellite imagery.
- Use modern tools for interpretation of the data of a location

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION TO PHOTOGRAMMETRY : Principle and types of aerial photographs – stereoscopy – Map vs. Mosaic – Ground control – Parallax measurements for height – Determinations - Techniques of photo interpretation – Aerial and satellite photogrammetry.

UNIT – II

REMOTE SENSING – I : Basic concepts and foundation of remote sensing – Elements involved in remote sensing, electromagnetic spectrum – Spectral reflectance and spectral regions remote sensing terminology and units.

UNIT – III

REMOTE SENSING – II : Energy resources – Energy interactions with earth surface features and atmosphere – Resolution, sensors and satellite visual interpretation techniques – Basic elements – Converging evidence – Interpretation for terrain evaluation – Spectral properties of water bodies – Introduction to digital data analysis – Structure of digital image.

UNIT – IV

GEOGRAPHIC INFORMATION SYSTEM : Introduction to GIS – GIS definition and terminology – GIS categories – Components of GIS, fundamental operations of GIS – Land surveying – Global positioning system.

UNIT – V

TYPES OF DATA REPRESENTATION : Data collection and input overview – Data input and output – Keyboard entry and coordinate geometry procedure – Manual digitizing and scanning – Raster GIS – Vector GIS – File management, spatial data – Layer based GIS – Feature based GIS mapping, map projections.

UNIT – VI

GIS SPATIAL ANALYSIS : Computational analysis methods (CAM) – Visual analysis methods (VAM) – Data storage – Vector data storage – Attribute data storage – Overview of the data manipulation and analysis – Integrated analysis of the spatial and attribute data.

UNIT – VII

WATER RESOURCES APPLICATIONS - I : Land use/Land cover in water resources – Surface water mapping and inventory – Rainfall – Runoff relations and runoff potential indices of watersheds – Flood and drought impact assessment and monitoring – Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII

WATER RESOURCES APPLICATIONS – II : Reservoir sedimentation – Fluvial Geomorphology – Water resources management and monitoring – Ground water targeting – Identification of sites for artificial recharge structures – Drainage Morphometry – Inland water quality survey and management – Water depth estimation and bathymetry.

TEXT BOOKS

1. B. Bhatta, *Remote Sensing and GIS*, 1st Edition, Oxford University Press, New Delhi, 2009.
2. M. Anji Reddi, *A Text Book of Remote Sensing and Geographical Information Systems*, 2nd Edition, B.S. Publications, Hyderabad, 2010.

REFERENCES

1. C.P. Lo Albert and K.W. Yong, *Concepts and Techniques of GIS*, 2nd Edition, Prentice Hall (India) Publications, 2010.
2. Narayana Panigrahi, *Geographical Information Science*, 1st Edition, University Press, New Delhi, 2008.
3. Peter A. Burragh and Rachael Mc Donnell, *Principles of Geographical Information Systems*, 2nd Edition, Oxford University Press, USA, 2005.

IV B.Tech. I Semester

10BT70102 : ENVIRONMENTAL ENGINEERING - II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Environmental Engineering-I

Course Description: Objectives and systems of sewage collection and disposal; quantity of sewage; characteristics of sewage; sewage treatment; sludge management; effluent disposal; Municipal solid waste.

Course Outcomes:

- Gain knowledge on the characteristics of wastewater treatment processes
- Analyze the various types of waste water samples
- Design waste water treatment plant
- Interpret the data of waste water samples and suggest suitable treatment process.
- Use modern techniques for treating waste water and assess the impurities in waste water composition of sludge.
- Understand the impact on the environment due to onsite disposal of waste and responsible for the sludge conditioning, utilization and disposal

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION : Definition of terms – Sewage, sullage, refuse, garbage – Objectives of sewerage works systems of sewage collection and disposal – Conservancy systems – Water carriage systems – Merits and demerits - Sewerage systems – Combined, separate, partially separate and combined systems - Merits and demerits.

UNIT – II

QUANTITY OF SEWAGE : Estimation of quantity of municipal waste water – Estimation of quantity of storm water – Different types of sewers, design flows through sanitary sewers, storm sewers and combined sewers - Hydraulic design of sewers – Sewer appurtenances – House drainage and plumbing systems.

UNIT – III

CHARACTERISTICS OF SEWAGE : Sampling of sewage – Characteristics and composition of sewage – Physical, chemical and biological – Total solids – C.O.D – B.O.D – Equation and factors affecting the BOD rate of reaction – Population equivalent.

UNIT – IV

PRELIMINARY AND PRIMARY SEWAGE TREATMENT : Concept of waste water treatment, primary, secondary and tertiary treatment – Conventional treatment process flow diagrams of municipal wastewater treatment plants – Functions of each unit principles and design of screens, grit chamber, and primary setting tanks.

UNIT – V

SECONDARY TREATMENT OF SEWAGE : Principles of biological treatment, nutritional requirement of biological treatment systems, factors affecting biological treatment systems – Design, construction, operation and maintenance of trickling filter, activated sludge process - Oxidation ditch - Stabilization ponds.

UNIT – VI

SLUDGE MANAGEMENT : Quantity and characteristics and types of sludge - Sludge conditioning and dewatering - Handling, treatment, sludge utilization and disposal - Tertiary treatment – Removal of nitrogen, phosphorus, refractory organic, heavy metals, suspended solids and pathogenic bacteria.

UNIT – VII

EFFLUENT DISPOSAL : Standards for disposal – Disposal into surface water bodies – Self purification, zones of pollution – Dissolved oxygen sag curve – Streeter – Phelps equation, marine disposal – On land disposal and treatment systems – Overflow, flooding and irrigation. Onsite disposal systems – Septic tank and effluent disposal system.

UNIT – VIII

MUNICIPAL SOLID WASTE : Characteristics, generation, collection and transportation of solid wastes - Engineered systems for solid waste management – Reuse – Recycling – Energy recovery – Treatment and disposal.

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010.
2. P.N. Modi, *Sewage Treatment Disposal and Wastewater Engineering*, 3rd Edition, Standard Publishers Distributors, Delhi, 2011.

REFERENCES

1. S.K. Garg., *Environmental Engineering (Vol. II): Sewage Disposal and Air Pollution Engineering*, 22nd Edition, Khanna Publishers, New Delhi, 2010.
2. Met Calf and Eddy, *Wastewater Engineering*, 4th Edition, TMH Education Pvt. Ltd., New Delhi, 2010.
3. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition, S.Chand Publishers, New Delhi, 2010.
4. Nazih K. Shammass and Lawrence K. Wang, *Fair, Geyer and Okun's Water and Waste Water Engineering: Water Supply and Wastewater Removal*, 3rd Edition, John Wiley and Sons, New Delhi, 2011.

IV B.Tech. I Semester

10BT70103 : STEEL STRUCTURES - II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: SA & Rccs

Course Description: Design concepts of steel structures; loads; working stress and limit state design; limit state design of riveted and bolted connections; welded connections; tension members; beams; compression members; built up sections; column foundations.

Course Outcomes:

- Use fundamentals of mathematics to find CG & various sections.
- Analyze various sections, joints, connections of steel members.
- Design of riveted plate girders, welded plate girders, purlins, tubular trusses, ganty girder and composite beam.
- Demonstrate the knowledge of steel code for designing members under pure bending.

DETAILED SYLLABUS:

UNIT - I

RIVETED PLATE GIRDERS : Design of cross section - Curtailment of flange plates - Connection of flange angles to web and flange angles to flange plates - Design of vertical, horizontal and bearing stiffeners.

UNIT-II

WELDED PLATE GIRDERS : Design of cross section of plate girders - Design of vertical, horizontal and bearing stiffeners.

UNIT - III

ROOF TRUSSES : Different types of trusses – Design loads – Load combinations - IS Code recommendations - Structural details – Design of simple roof trusses involving the design of purlins, members and joints.

UNIT - IV

TUBULAR TRUSSES : Design of tension members, compression members and flexural members – Tubular trusses – Connections.

UNIT – V

GANTRY GIRDER : Gantry girder impact factors - Longitudinal forces - Design of gantry girders.

UNIT – VI

STEEL WATER TANKS : Specifications – Design of rectangular pressed steel tank – Design of staging.

UNIT –VII

STEEL - CONCRETE COMPOSITE CONSTRUCTION : Design principles – Shear connections – Composite beam design.

UNIT – VIII

PLASTIC ANALYSIS : Introduction to plastic analysis –Shape factor, plastic hinge, collapse loads for simply supported beams, propped cantilevers, and two span continuous beams - Design simple beams.

TEXT BOOKS

1. S.K. Duggal, *Design of Steel Structures*, 1st Edition, Tata McGraw Hill, New Delhi, 2010
2. N. Subramanian, *Design of Steel Structures*, 1st Edition, Oxford University Press, 2010

REFERENCES

1. S.S. Bhavikatti, *Design of Steel Structures*, 2nd Edition, I.K. International Publishing House Pvt. Ltd, 2010.
2. N. Krishna Raju, *Structural Design and Drawing*, 3rd Edition, Universities Press, Hyderabad, 2009.
- 3.. Ramachandra and Virendra Gehlot, *Design of Steel Structures*, 11th Edition, Scientific Publishers, Jodhpur, 2005.
4. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures*, 2nd Edition, Laxmi Publications, New Delhi, 1998.

IS Codes: IS -800 – 2007, IS – 875 – Part III and Steel Tables are to be permitted into the examination hall.

IV B.Tech. I Semester

10BT70104 : TRAFFIC ENGINEERING AND MANAGEMENT

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Transportation engineering

Course Description: Significance and scope; traffic characteristics; highway capacity; parking studies; traffic control and regulation; traffic and environment; traffic signs and road markings; highway safety; traffic management.

Course Outcomes:

- Apply the knowledge of maths, science, and engineering fundamentals for traffic solutions, collecting and analyzing traffic data, accidents data ;traffic volume, speed , density studies, accident studies
- Arrive at highway capacity, design of traffic control and regulation systems.
- Establish the traffic control and regulation systems.
- Carryout Road safety audit, accident studies and 3-Es methodology initiation and implementation.
- Give Environmental impact assessment, air pollution, noise pollution and other detrimental impacts of traffic engineering mitigation techniques.

DETAILED SYLLABUS:

UNIT - I

INTRODUCTION TO TRAFFIC ENGINEERING : Significance and scope - Characteristics of vehicles and road users - Skid resistance and braking efficiency (Problems) - Components of traffic engineering - Road, traffic and land use characteristics

TRAFFIC CHARACTERISTICS : Basic characteristics of traffic - Volume, speed and density - Relationship among traffic parameters.

UNIT-II

TRAFFIC MEASUREMENT : Traffic volume studies - Objectives - Types of volume studies – Concept of PCU- Data collection and presentation – Speed studies – Types of speeds - Objectives of speed studies - Methods of conducting speed studies - Data collection and presentation - Statistical methods for analysis of speed data - Origin and destination studies - Pedestrian studies - Basic principles of traffic flow.

UNIT-III

HIGHWAY CAPACITY : Definition of capacity – Importance of capacity – Factors affecting capacity - Concept of level of service - Different levels of service - Concept of service volume - Peak hour factor.

PARKING STUDIES : Types of parking facilities – On street and off street parking facilities - Parking studies - Parking inventory study – Parking survey by patrolling method - Analysis of parking data and parking characteristics - Multi storey car parking facility - Design standards.

UNIT-IV

TRAFFIC CONTROL AND REGULATION : Traffic problems in urban areas - Importance of traffic control and regulation - Traffic regulatory measures - Channelisation – Principle and design of intersections, grade separations and interchanges - Traffic signals – Saturation flow - Design of traffic signals and signal co-ordination (Problems) - Signal phasing and timing diagrams - Traffic control aids and street furniture, street lighting, computer applications in signal design.

UNIT-V

TRAFFIC AND ENVIRONMENT : Detrimental effect of traffic on environment – Air pollution – Pollutants due to traffic – Measures to reduce air pollution due to traffic - Noise pollution – Measures to reduce noise pollution.

UNIT-VI

TRAFFIC SIGNS AND ROAD MARKINGS : Types of traffic signs - Cautionary, regulatory and informative signs - Specifications - Pavement markings - Types of markings – Lane markings and object markings - Standards and specifications for road markings.

UNIT-VII

HIGHWAY SAFETY : Problem of highway safety – Types of road accidents - Causes – Engineering measures to reduce accidents- Enforcement measures – Educational measures - Road safety audit - Principles of road safety audit.

UNIT-VIII

TRAFFIC MANAGEMENT : Traffic management - Transportation system management (TSM) - Travel demand management (TDM) - Traffic forecasting techniques, restrictions on turning movements - Oneway Streets - Traffic segregation - Traffic calming - Tidal flow operations - Exclusive bus lanes - Introduction to intelligent transportation system (ITS).

TEXT BOOKS

1. Kadiyali L R, *Traffic Engineering and Transport Planning*, 7th Edition, Khanna Technical Publications, Delhi, 2010.
2. Khanna K and Justo C E G, *Highway Engineering*, 8th Edition, Nem Chand & Bros, Roorkee, 2009.

REFERENCES

1. *Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management*.
2. *Guidelines of Ministry of Road Transport and Highways*, Government of India.
3. Subhash C. Saxena, *A Course in Traffic Planning and Design*, Dhanpat Rai Publications, New Delhi, 1989.
4. C. Jotin Khisty and B.Kent Lall, *Transportation Engineering – An Introduction*, Prentice Hall of India Pvt. Ltd., 2006.
5. Partha Chakroborthy and Animesh Das, *Principles of Transportation Engineering*, Prentice Hall of India Pvt. Ltd, New Delhi.
6. C.S. Papacostas and P.D. Prevedouros, *Transportation Engineering and Planning*, Prentice Hall of India Pvt. Ltd., 2006.
7. Mannering and Kilareski, *Highway Engineering and Traffic Analysis*, John Wiley Publications.

UNIT-IV

SLOPE DEFLECTION METHOD : Analysis of single bay, single storey, portal frame including side sway - Shear force and bending moment diagrams.

UNIT-V

MOMENT DISTRIBUTION METHOD : Analysis of single bay, single storey portal frames including side sway – Shear force and bending moment diagrams.

UNIT-VI

FLEXIBILITY METHODS : Flexibility coefficients - Flexibility matrices - Sign convention - Application to continuous beams - Temperature stresses - Lack of fit – Support settlements.

UNIT-VII

STIFFNESS METHOD : Stiffness coefficients - Stiffness matrices – Application to continuous beams - Effect of support displacements– Temperature stresses.

UNIT-VIII

BEAMS CURVED IN PLAN : Circular beams loaded uniformly and supported on symmetrically placed columns – Semi-circular beams simply supported on three equally spaced supports.

UNIT-IV

SLOPE DEFLECTION METHOD : Analysis of single bay, single storey, portal frame including side sway - Shear force and bending moment diagrams.

UNIT-V

MOMENT DISTRIBUTION METHOD : Analysis of single bay, single storey portal frames including side sway – Shear force and bending moment diagrams.

UNIT-VI

FLEXIBILITY METHODS : Flexibility coefficients - Flexibility matrices - Sign convention - Application to continuous beams - Temperature stresses - Lack of fit – Support settlements.

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STIFFNESS METHOD : Stiffness coefficients - Stiffness matrices – Application to continuous beams - Effect of support displacements– Temperature stresses.

UNIT-VIII

BEAMS CURVED IN PLAN : Circular beams loaded uniformly and supported on symmetrically placed columns – Semi-circular beams simply supported on three equally spaced supports.

TEXT BOOKS

1. R.S.Khurmi, *Theory of Structures*, 11th Edition, S.Chand Publications, New Delhi, 2010.
2. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures-Vol.I* (17th Edition) *and Vol.II*(16th Edition), Khanna Publications, New Delhi, 2011.

REFERENCES

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, Anand, Gujrat, 2010.
2. Pandit, G., Gupta, S. and Gupta, R., *Theory of Structures – Vol. II*, 1st Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2013.
3. B.C.Punmia, *Strength of Materials and Mechanics of Structures*, 7th Edition, Standar Publishers Distributors, New Delhi, 2011.
4. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., New Delhi, 2010.

IV B.Tech. I Semester

**10BT70106 : SOIL DYNAMICS AND MACHINE FOUNDATIONS
(Elective - I)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Engineering Physics, Soil Mechanics, Foundation Engineering

Course Description: Fundamentals of vibration; frequency of soil systems; wave propagation; dynamic soil properties; vibration analyses; design of machine foundations; machine foundations on piles. vibration isolation.

Course Outcomes:

- Understand causes and characteristics of vibrations.
- Determine dynamic soil properties.
- Analyze and design machine foundations.
- Use vibration principles and suggest suitable pile foundations.

DETAILED SYLLABUS:

UNIT - I

FUNDAMENTALS OF VIBRATION : Definitions - Simple harmonic motion - Free and forced vibrations with and without viscous damping - Frequency dependent excitation - Systems under transient loads - Rayleigh's method of fundamental frequency - Logarithmic decrement.

UNIT-II

FREQUENCY OF SOIL SYSTEMS: Determination of viscous damping – Transmissibility - Systems with two and multiple degrees of freedom - Vibration measuring instruments.

UNIT-III

WAVE PROPAGATION: Propagation of seismic waves in soil deposits - Attenuation of stress waves - Stress-strain behavior of cyclically loaded soils - Strength of cyclically loaded soils.

UNIT-IV

DYNAMIC SOIL PROPERTIES : Dynamic soil properties - Laboratory and field testing techniques - Elastic constants of soils - Correlations for shear modulus and damping ratio in sands, gravels, clays and lightly cemented sand - Liquefaction of soils.

UNIT-V

VIBRATION ANALYSES : Types - General requirements - Permissible amplitude - Allowable soil pressure - Modes of vibration of a rigid foundation block - Methods of analysis - Lumped mass models - Elastic half space method - Elastodynamics - Effect of footing shape on vibratory response

UNIT-VI

DESIGN OF MACHINE FOUNDATIONS: Analysis and design of block foundations for reciprocating engines - Dynamic analysis and design procedure for a hammer foundation - IS code of practice - Design procedure for foundations of reciprocating and impact type machines.

UNIT-VII

MACHINE FOUNDATIONS ON PILES: Introduction - Analysis of piles under vertical vibrations - Analysis of piles under translation and rocking- Analysis of piles under torsion - Design procedure for a pile supported machine foundation.

UNIT-VIII

VIBRATION ISOLATION: Types and methods of isolation - Active isolation and passive isolation - Dynamic properties of isolation materials.

TEXT BOOKS

1. Braja M. Das and G. V. Ramana, *Principles of Soil Dynamics*, 2nd Edition, Cengage Learning Inc., Stanford, USA, 2011.
2. P. Srinivasulu, and C. Vaidyanathan, *Hand book of Machine Foundations*, 1st Edition, Tata McGraw-Hill, New Delhi, 1996.

REFERENCES

1. Arya, S. D, O'Neil, M. and Pincus, *Design of Structures and Foundations for Vibrating Machines*, G.Gulf Publishing Co., 1979.
2. Prakash S., *Soil Dynamics*, McGraw Hill, 1981.
3. Richart, F. E., Hall J. R and Woods R. D., *Vibrations of Soils and Foundations*, Prentice Hall Inc., 1970.
4. Swami Saran, *Soil Dynamics and Machine Foundations*, 1st Edition, Galgotia Publications Pvt. Ltd, 2010.
5. Kramar S.L, PHI Series, *Geotechnical Earthquake Engineering*, 1st Edition, Pearson Education (Singapore) Pvt. Ltd., 2008.
6. Kameswara Rao, *Vibration Analysis and Foundation Dynamics*, Wheeler Publishing, New Delhi, 1998.

IV B.Tech. I Semester

**10BT70107 : DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(Elective - I)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Water Resources Engineering

Course Description: Design and drawing of surplus weir, tank sluice with tower head, trapezoidal notch fall, canal regulator, type III siphon aqueduct and sloping glacis weir.

Course Outcomes:

- Apply the principles of science and mathematics in the design of irrigation structures.
- Identify the assumptions involved in the design of irrigation structures

DETAILED SYLLABUS:

Design and drawing of the following irrigation structures.

1. Surplus weir
2. Tank sluice with tower head
3. Trapezoidal notch fall
4. Canal regulator
5. Type III Siphon aqueduct.
6. Sloping glacis weir

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS

1. C. Satyanarayana Murthy, *Design of Minor Irrigation and Canal Structures*, Wiley Eastern Ltd, New Delhi.
2. S.K. Garg, *Irrigation Engineering and Hydraulic Structures*, 23rd Edition, Standard Book House, Delhi, 2010.
3. B.C. Punmia, Pande B.B. Lal, Ashok Kumar Jain and Arun Kumar Jain, *Irrigation and Water Power Engineering*, 16th Edition, Laxmi Publications, New Delhi, 2011.

IV B.Tech. I Semester

**10BT70108 : ENVIRONMENTAL IMPACT ASSESSMENT AND
MANAGEMENT
(Elective - I)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Environmental Sciences, EE-I and II

Course Description: Concept of EIA; elements and factors affecting EIA; EIA methodologies; environmental impact assessment on soil, ground water, surface water, air, vegetation and wildlife; environmental audit; environmental acts; case studies.

Course Outcomes:

- After completion of the course, a successful student is able to gain knowledge in
 - a . Identifying environmental impact parameters for conducting EIA
 - b . Steps involved in EIA
 - c . Methods adopted in EIA
 - d . Implementation of mitigation measures
- Analyze and interpret the parameters that affect the study area
- Give reasons to protect the society based on EI
- Demonstrate the knowledge sources that effect the environment
- Exercise ethics while discharging duties as an EIA Engineer
- Work in multidisciplinary teams to discharge his duties as an EIA engineer
- Write EIA report and give recommendations
- Engage in lifelong learning through environmental audit

DETAILED SYLLABUS:

UNIT - I

INTRODUCTION : Basic concept of EIA - Initial environmental examination - Elements of EIA - Factors affecting EIA - Impact evaluation and analysis - Preparation of environmental base map - Classification of environmental parameters.

UNIT-II

EIA METHODOLOGIES: Criteria for the selection of EIA Methodology - EIA methods - Adhoc methods, matrix methods, network method - Environmental medium quality index method, overlay methods and cost/benefit analysis.

UNIT-III

ENVIRONMENTAL IMPACT ON SOIL AND GROUND WATER: Prediction and assessment - Soil quality - Methodology for the assessment of soil and groundwater - Delineation of study area - Identification of activities.

UNIT-IV

ENVIRONMENTAL IMPACT ASSESSMENT OF SURFACE WATER AND AIR : Impact prediction - Assessment of impact significance - Identification and incorporation of mitigation measures - EIA in surface water, air and biological environment: Methodology for the assessment of impacts on surface water environment - Air pollution sources - Generalized approach for assessment of air pollution Impact.

UNIT-V

ASSESSMENT OF IMPACT ON VEGETATION AND WILDLIFE: Assessment of impact of developmental activities on vegetation and wildlife - Environmental impact of deforestation – Causes and effects of deforestation.

UNIT-VI

ENVIRONMENTAL AUDIT: Environmental audit and environmental legislation - Objectives of environmental audit - Types of environmental audit - Audit protocol - Stages of environmental audit - Onsite activities - Evaluation of audit data and preparation of audit report.

UNIT - VII

ENVIRONMENTAL ACTS: Post audit activities - The Environmental protection act - The water act - The air act - Wild life act.

UNIT-VIII

CASE STUDIES: Case studies and preparation of environmental impact assessment statement for various industries.

TEXT BOOKS

1. Y. Anjaneyulu, *Environmental Impact Assessment Methodologies*, 2nd Edition, B.S. Publications, Hyderabad, 2010.
2. J. Glynn and Gary W. Heinke, *Environmental Science and Engineering*, 2nd Edition, Prentice Hall Inc., 1996.

REFERENCES

1. Suresh K. Dhameja, *Environmental Engineering and Management*, S.K. Kataria and Sons, New Delhi, 2010.
2. H.S. Bhatia, *A Text Book of Environmental Pollution and Control*, Galgotia Publication (P) Ltd., Delhi, 2003.

IV B.Tech. I Semester

10BT70109 : DESIGN OF BRIDGES (Elective - I)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: RCC I & II , Structural Analysis I & II

Course Description: Different loading standards; design of box culvert, deck slab bridge, T- beam bridge, plate girder bridge and composite bridge; bridge bearings; bridge piers and abutments.

Course Outcomes:

- Apply science and engineering to find the loading pattern over the bridges.
- Analyze various types of loading pattern over the bridges.
- Design deck slabs and piers.
- Carryout investigations on the foundation of piers, abutments and deck slabs.
- Use modern materials and technologies in the construction of bridges.
- Analyze the stability of a bridge.

DETAILED SYLLABUS:

UNIT - I

BRIDGE LOADING STANDARDS: Highway bridge loading standards - Impact factor - Railway bridge loading standards (BG ML Bridge) - Various loads in bridges - Importance of site investigation in bridge design.

UNIT-II

BOX CULVERT : General aspects - Design loads - Design of box culvert subjected to class AA tracked vehicle only.

UNIT-III

DECK SLAB BRIDGE : Effective width method of analysis and design of deck slab bridge (simply supported) subjected to class AA tracked vehicle only.

UNIT-IV

BEAM AND SLAB BRIDGE (T-BEAM BRIDGE) : General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT-V

PLATE GIRDER BRIDGE : Elements of a plate girder and their design - Design of a deck type welded plate girder – Bridge of single line B.G.

UNIT-VI

COMPOSITE BRIDGES : Advantages – Design of composite bridges consisting of RCC slabs over steel girders including shear connectors.

UNIT - VII

BRIDGE BEARINGS : General features – Types of bearings – Design principles of steel rocker and roller bearings – Design of a steel rocker bearing – Design of elastomeric pad bearing.

UNIT-VIII

PIERS AND ABUTMENTS : General features – Bed block – Materials piers and abutments - Types of piers – Forces acting on piers – Stability analysis of piers – General features of abutments – Forces acting on abutments – Stability analysis of abutments – Types of wing walls – Approaches – Types of bridge foundations (excluding design).

TEXT BOOKS

1. N. Krishnam Raju, *Design of Bridges*, 4th Edition, Oxford and IBH, Publishing Company Pvt. Ltd., New Delhi, 2010
2. T.R. Jagadish and M.A. Jayaram, *Design of Bridges Structure*, 2nd Edition Prentice Hall of India Pvt. Ltd., New Delhi, 2009
3. *Relevant IRC & Railway Bridge Codes.*

REFERENCES

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures*, 2nd Edition, Laxmi Publications, New Delhi, 2009.
2. Ramachandra, *Design of Steel Structures*, 11th Edition, Scientific Publishers (India), 2009.
3. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of R.C.C. Structures*, Laxmi Publications, New Delhi, 1992.
4. Ponnu Swamy S., *Bridge Engineering*, 2nd Edition, Tata Mcgraw-Hill Company, New Delhi, 2010.
5. Swami Saran, *Analysis and Design of Substructures – Limit State Design*, 2nd Edition, Oxford and IBH Publishing Company Pvt. Ltd., New Delhi, 2010.

IV B.Tech. I Semester

**10BT70110 : INDUSTRIAL STRUCTURES
(Elective - II)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Structural Analysis

Course Description: Classification of industries and industrial structures; general and functional requirements; planning and layout; design of steel roof and RC structures; prefabrication; design of bunkers, silos, grid floor and chimneys

Course Objectives:

- Apply the principles of physics in the design of Industrial structures.
- Analyze the loading pattern in the design of Industrial structure.
- Design RC structure for Industrial structure.
- Use modern design methods in the design of slabs, bunkers and chimneys.
- Understand the importance of precast / pre fabricate structures in the industrial structures.

DETAILED SYLLABUS:

UNIT - I

PLANNING : Classification of industries and industrial structures – General requirements for industries like cement, chemical and steel plants – Planning and layout of buildings and components.

UNIT-II

FUNCTIONAL REQUIREMENTS : Lighting – Ventilation – Acoustics – Fire safety – Guidelines from factories act.

UNIT-III

STEEL ROOF STRUCTURES : Industrial roofs – Crane girders – Mill buildings.

UNIT-IV

DESIGN OF R.C. STRUCTURES : Design of folded plates and cylindrical shell roofs.

UNIT-V

PREFABRICATION : Principles of prefabrication – Prestressed precast roof trusses - Functional requirements for precast concrete units.

UNIT-VI

BUNKERS AND SILOS : Design of bunkers and silos – RCC and steel.

UNIT - VII

GRID FLOORS : Analysis and design of grid floors.

UNIT-VIII

CHIMNEYS : Design of chimneys - RCC and Steel.

TEXT BOOKS

1. P. Purushothaman, *Reinforced Concrete Structural Elements*, Tata McGraw-Hill, New Delhi, 1984.
2. Subramanian. N, *Design of Steel Structures*, Oxford University Press, New Delhi, 2008.

REFERENCES

1. Henn. W, *Buildings for Industry - Vol. I and Vol. II*, London Hill Books, 1995.
2. Pasala Dayaratnam, *Design of Steel Structures*, S. Chand Group, New Delhi, 2008.
3. *Handbook on Functional Requirements of Industrial Buildings*, SP 32 – 1986, Bureau of Indian Standards, New Delhi, 1990.
4. Koncz, J. Bauverlay, *Manual of Precast Construction - Vol. I and Vol. II*, GMBH, 1971.

IV B.Tech. I Semester

10BT70111 : GROUND IMPROVEMENT TECHNIQUES (Elective - II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Soil Mechanics and Foundation Engineering

Course Description: Need and objectives; identification of problematic soils; ground improvement techniques; densification in granular soils; densification in cohesive soils; soil stabilisation; confinement; reinforced earth; geosynthetics; improvement of expansive soils

Course Outcomes:

Student will be able to

- Identify basic deficiencies of various soil deposits
- Decide various methods of improving the soil stability
- Implement techniques of ground improvement.
- Use admixtures in stabilizing the soil.

DETAILED SYLLABUS:

UNIT – I

GROUND IMPROVEMENT : Need and objectives - Identification of problematic soils - Mechanical, hydraulic, physico-chemical, electrical, thermal and strengthening methods - Selection of suitable ground improvement technique based on soil condition.

UNIT – II

DENSIFICATION IN GRANULAR SOILS : Principles of soil densification – Properties of compacted soil - Compaction control tests - Specification of compaction requirements – In-situ densification methods in granular soils – Blasting, vibro-compaction, vibro-replacement, dynamic tamping, stone columns/granular piles and sand/gravel compaction piles - Vibration at the ground surface, impact at the ground surface - Vibration at depth, impact at depth.

UNIT - III

DENSIFICATION IN COHESIVE SOILS : In-situ densification methods in cohesive soils – Preloading or dewatering - Methods of de-watering - Sumps and interceptor ditches - Single, multi-stage well points - Vacuum well points - Horizontal wells - Foundation drains - Blanket drains - Criteria for selection of fill material around drains – Electroosmosis - Vertical drains – Sand drains, sand wick geodrains – Stone and lime columns – Thermal methods.

UNIT – IV

STABILISATION : Modification by admixtures - Shotcreting and guniting technology - Modification at depth by grouting - Methods of stabilization: mechanical, cement, lime, bituminous, chemical stabilization with calcium chloride, sodium silicate and gypsum - Objectives of grouting - Grouts and their properties - Grouting methods: ascending, descending and stage grouting - Hydraulic fracturing in soils and rocks - Post grout test.

UNIT –V

CONFINEMENT : In-situ ground reinforcement - Ground anchors – Rock bolting and soil nailing.

UNIT – VI

REINFORCED EARTH : Principles – Components of reinforced earth – Factors governing design of reinforced earth walls – Design principles of reinforced earth walls.

UNIT – VII

GEOSYNTHETICS : Properties – physical, mechanical, hydraulic, endurance, degradation, tests – Types: Geotextiles, geogrids, geomembranes etc. - Functions and applications - Design for drainage, separation, filtration, reinforcement, multiple functions.

UNIT - VIII

EXPANSIVE SOILS : Problems of expansive soils – Tests for identification – Methods of determination of swell pressure - Improvement of expansive soils – Foundation techniques in expansive soils – Underreamed piles.

TEXT BOOKS

1. Hausmann M.R., *Engineering Principles of Ground Modification*, International Edition, McGraw-Hill, 1989.
2. Purushotham Raj, P., *Ground Improvement Techniques*, 1st Edition, Laxmi Publications (P) Ltd., New Delhi, 1999.

REFERENCES

1. Moseley, M.P. and Kirsch. K., *Ground Improvement*, 2nd Revised Edition, Taylor Francis Ltd, United Kingdom, 2004.
2. Xanthakos P.P, Abramson, L.W and Bruce, D.A, *Ground Control and Improvement*, 1st Edition, John Wiley and Sons, New York, USA, 1994.
3. Koerner, R. M., *Designing with Geosynthetics*, 4th Edition, Prentice Hall Inc., New Jersey, USA, 1997.
4. Koerner, R.M., *Construction and Geotechnical Methods in Foundation Engineering*, International Edition, McGraw-Hill, 1984.
5. Jewell, R.A., *Soil Reinforcement with Geotextiles (Report)*, CIRIA Special Publication, London, 1996.
6. Das, B. M., *Principles of Foundation Engineering*, 6th Edition, Cengage Learning India, New Delhi, 2007.

IV B.Tech. I Semester
10BT70112: WATER RESOURCES SYSTEM
PLANNING AND MANAGEMENT
(Elective - II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Surveying, Hydrology, Water Resources Engineering

Course Description: Concepts of water resources system planning and management; linear programming; dynamic programming; non-linear optimization techniques; simulation; water resources economics; water resources management

Course Outcomes:

- Apply mathematics and optimization techniques for effective water resources planning
- Analyze availability of water resources for sustainable development
- Design and develop simulation techniques for water resources, planning and management
- Investigate the availability of surface and subsurface water resources
- Provide solutions for water resources system management
- Communicate the importance of water resources planning and management.
- Carryout cost benefit analysis and give insights for the benefit of society
- Engage in water resources system planning for sustainable society.

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION : Concepts of systems analysis - Systems approach to water resources planning and management - Role of optimization models - Objective function and constraints - Types of optimization techniques.

UNIT – II

LINEAR PROGRAMMING – I : Formulation of linear programming models - Graphical method - Simplex method - Application of linear programming in water resources.

UNIT - III

LINEAR PROGRAMMING – II: Revised simplex method - Duality in linear programming - Sensitivity and post optimality analysis.

UNIT – IV

DYNAMIC PROGRAMMING: Belman's principles of optimality forward and backward recursive dynamic programming - Case of dimensionality - Application of dynamic programming for resource allocation.

UNIT –V

NON-LINEAR OPTIMIZATION TECHNIQUES: Classical method of optimization - Kun-Tecker - Gradient based research techniques for simple unconstrained optimization.

UNIT – VI

SIMULATION: Application of simulation techniques in water resources.

UNIT –VII

WATER – RESOURCES ECONOMICS: Principles of economics analysis – Benefit cost analysis - Socio-economic intuitional and pricing of water resources.

UNIT – VIII

WATER RESOURCES MANAGEMENT: Planning of reservoir system – Optimal operation of single reservoir system – Allocation of water resources – Optimal cropping pattern – Conjunctive use of surface and sub-surface water resources.

TEXT BOOKS

1. S. Vedula and P.P. Mujumdar, *Water Resources Systems*, 5th Edition, Tata McGraw-Hill, 2010.
2. James and Lee, *Water Resources Economics*, Oxford Publishers, 2005.
3. S.S. Rao, *Engineering Optimization*, 4th Edition, John Wiley and Sons Inc., 2009.

REFERENCES

1. P.R. Bhawe, *Optimal Design of Water Distribution Networks*, Narosa Publishing House, 2003.
2. P. Sankar Iyer, *Operations Research*, TMH Publications, 2008.
3. N. Ramanathan, *Operations research*, TMH Publications, 2005.

IV B.Tech. I Semester

10BT70113: AIR POLLUTION AND CONTROL (Elective - II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Environmental Sciences

Course Description: Effects of air pollution; thermodynamics of air pollution; plume behavior; pollutant dispersion models; control of particulates and gaseous pollutants; air quality management.

Course Outcomes:

- Gain knowledge of air pollutants.
- Identify the major sources and sampling of air pollutants.
- Understand the effects of air pollutants on human beings and vegetation.
- Select and design various equipment in controlling the air pollutants
- Provide information about pollutants and removal process.
- Communicate the methods of management of air quality and inform emission standards

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION TO AIR POLLUTION: Scope, significance and episodes - Air pollutants – Classifications – Natural and artificial – Primary and secondary, point and non- point, line and areal sources of air pollution - Stationary and mobile sources.

UNIT – II

EFFECTS OF AIR POLLUTION: Effects of air pollutants on man, material and vegetation - Global effects of air pollution – Green house effect, heat islands, acid rains, ozone holes etc.

UNIT - III

THERMODYNAMICS OF AIR POLLUTION : Thermodynamics and kinetics of air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc. - Air-fuel ratio - Computation and control of products of combustion.

UNIT – IV

PLUME BEHAVIOUR: Meteorology and plume dispersion - Properties of atmosphere - Heat, pressure, wind forces, moisture and relative humidity - Influence of meteorological phenomena on air quality - Wind rose diagrams.

UNIT –V

POLLUTANT DISPERSION MODELS: Lapse rates - Pressure systems - Winds and moisture plume behaviour - Plume rise models - Gaussian model for plume dispersion.

UNIT – VI

CONTROL OF PARTICULATES: Control of particulates – Control at sources - Process changes - Equipment modifications - Design and operation of control equipments – Settling chambers - Centrifugal separators - Filters dry and wet scrubbers - Electrostatic precipitators.

UNIT –VII

CONTROL OF GASEOUS POLLUTANTS: General methods of control of Nox and Sox emissions – In-plant control measures - Process changes - Dry and wet methods of removal and recycling.

UNIT – VIII

AIR QUALITY MANAGEMENT: Air quality management – Monitoring of SPM, SO₂; NO and CO Emission standards.

TEXT BOOKS

1. Thod Godish, *Air Quality*, 4th Edition, Levis Publishers, Taylor and Francis Group, New Delhi, 2003.
2. M.N. Rao and H.V.N. Rao, *Air Pollution*, 19th Edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2010.
3. K. Wark and C.F. Warner, Harper and Row, *Air Pollution: Its Origin and Control*, 3rd Edition, Addison–Wesley, New York, 1998.

REFERENCES

1. R.K. Trivedy and P.K. Goel, *An introduction to Air Pollution*, 2nd Edition, B.S.P. Books Pvt.Ltd, Hyderabad, 2005.
2. K.V.S.G. Murali Krishna, *Air Pollution and Control*, 3rd Edition, Kousal and Co. Publications, New Delhi, 2008.
3. B. Padmanabha Murthy, *Enivronmental Meteorology*, 1st Edition, I.K. Internationals Pvt.Ltd, New Delhi, 2009.

IV B.Tech. I Semester

**10BT70114 : TRANSPORTATION PLANNING AND
PAVEMENT DESIGN (Elective - II)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: NIL

Course Description: Transportation planning; transport demand analysis; pavement analysis; analysis and design of flexible and rigid pavements; highway materials and mix design; highway construction and maintenance.

Course Outcomes:

- Analyse the City's urban design initiatives that are conducive in enhancing the attractiveness of walking, cycling, use of transit and winter-related recreational activities.
- Understand the short, medium and long-term transportation policies and programs that are complementary to each other and to other City plans, and are flexible to accommodate changes in future directions
- Find the Factors governing trip generation and attraction multiple linear regression analysis.
- Provide the material characterization affected by Tyre characteristics, Tyre pressure and wheel load.
- Provide the material characterization affected by Tyre characteristics, Tyre pressure and wheel load.
- Identify the process of collecting information necessary for successful design of flexible and rigid pavements and there analysis.
- Construct the earth roads ,Gravel road, WBM roads, Bituminous pavements ,Cement concrete roads , Reinforced concrete pavements for the benefit of society
- Understand the Need for highway maintenance and
- Failures and their causes in flexible pavements and rigid pavements evaluation of Pavement.

DETAILED SYLLABUS:

UNIT – I

TRANSPORTATION PLANNING:Transportation planning process - System approach to transportation planning - Stages in transportation planning and difficulties in transportation planning process - Transportation survey - Study area - Zoning - Types of surveys - Inventory of transportation facilities - Land use and economic activities.

UNIT – II

TRANSPORT DEMAND ANALYSIS :Trip purpose - Factors governing trip generation and attraction - Multiple linear regression analysis - Trip distribution models - Gravity model - Modal split models - Probit analysis - Traffic assignment models - All-or-nothing assignment model.

UNIT - III

PAVEMENT ANALYSIS :Types of pavement – Factors affecting design of pavements – Elastic modulus, Poisson's ratio, wheel load, wheel configuration and tyre pressure – ESWL Concept - Tyre pressure – Contact pressure - Material characteristics – Environmental and other factors.

UNIT – IV

ANALYSIS AND DESIGN OF FLEXIBLE PAVEMENTS:

Analysis:Stresses in flexible pavement – Layered systems concept – One layer system – Boussinesq Two layer system – Burmister theory for pavement design.

Design: Theoretical, empirical and semi-empirical methods - Burmister, CBR Method, AASHO Method, IRC method.

UNIT –V

ANALYSIS AND DESIGN OF RIGID PAVEMENTS :

Analysis: Stresses in rigid pavements – Relative stiffness of slab, modulus of sub-grade reaction – Stresses due to warping, stresses due to loads, stresses due to friction.

Design: PCA method, AASHTO, IRC method – Joints – Use of tie bars and dowell bars.

UNIT – VI

HIGHWAY MATERIALS AND MIX DESIGN :Soil, aggregate and bitumen - Aggregate properties and their Importance - Bituminous concrete - Mix design - Marshall's method of bituminous mix design.

UNIT –VII

HIGHWAY CONSTRUCTION :Construction of earth roads - Gravel roads – WBM roads - Bituminous pavements - Cement concrete roads – Reinforcedconcrete pavements – Soil stabilization – Methods and objectives - Soil-cement stabilization and Soil-lime stabilization.

UNIT – VIII

HIGHWAY MAINTENANCE :Need for highway maintenance – Failures and their causes in flexible pavements and rigid pavements - Pavement evaluation - Benkleman beam method - Strengthening of existing pavements - Overlays.

TEXT BOOKS

1. S.K. Khanna and C.J. Justo, *Highway Engineering*, 7th Edition, Nemchand& Bros., Roorkee, 2000.
2. L.R. Kadiyali and N.B. Lal, *Principles and Practices of Highway Engineering*, Khanna Publishers, New Delhi, 2003.

REFERENCES

1. E. J. Yoder and Witczak, *Principles of Pavement Design*, 2nd Edition, John Willey and Sons, 1975.
2. ParthaChakraborty and Animesh Das, *Principles of Transportation Engineering*, Prentice Hall of India, New Delhi.
3. L.R. Kadiyali, *Traffic Engineering and Transportation Planning*, 7th Edition, Khanna Publishers, New Delhi, 2007.
4. C. JotinKhinsty and B. Kent Lall, *Transportation Engineering*, 3rd Edition, PHI, New Delhi, 2002.

CODES

1. IRC Code for Flexible Pavement – IRC – 37 -2001.
2. IRC Code for Rigid pavement – IRC – 58 – 2002.

IV B.Tech. I Semester

10BT70115 : GIS AND COMPUTER AIDED DESIGN AND DETAILING LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Remote Sensing and GIS, RCCS, AutoCAD and Staad Pro

Course Description: Study of thematic maps; GIS application on water resources and transportation engineering

Course Outcomes:

After completion of this course, a student is able to :

- Apply the knowledge of structural analysis and design; and aerial photographs, satellite imagery to civil engineering applications
- Analyze civil engineering structures using STAAD Pro; Remote sensing data using GIS to generate the geographical information for natural resources.
- Design civil engineering structures using STAAD Pro; Generate maps using ARCGIS
- Interpret the data pertaining to structural design and RS and GIS
- Use STAAD Pro for solving structural design and Arc GIS for civil engineering applications.
- Write report on Structural design and RS and GIS data

DETAILED SYLLABUS:

GIS SOFTWARE

1. Arc GIS 9.0
2. ERDAS 8.7
3. MapInfo 6.5
4. Any one or Equivalent

LIST OF EXERCISES

1. Digitization of map/toposheet
2. Creation of thematic maps
3. Study of features estimation
4. Developing digital elevation model
5. Simple applications of GIS in water resources engineering and transportation engineering

CAD SOFTWARE

STAAD PRO or Equivalent

LIST OF EXERCISES

1. 2-D Frame analysis and design
2. Steel tabular truss analysis and design
3. 3-D Frame analysis and design
4. Retaining wall analysis and design
5. Simple tower analysis and design
6. Analysis and design of solid slab and RCC Tee beam bridges for IRC loading
7. Analysis and design of intz type water tank, circular and rectangular water tanks
8. Analysis and design of plate girder bridge, twin girder deck type railway bridge, truss girder bridges

TEXT BOOKS

1. Chor Pang Lo. Albert, K.W. Yeung, *Concept and Techniques of GIS*, PHI, 2007.
2. Krishnamoorthy, C.S and Rajeev. S., *Computer Aided Design*, Narosa Publishing House, New Delhi, 1991.

REFERENCES

1. Krishnamurthy. D., *Structural Design and Drawing – Vol. II and Vol. III*, CBS Publishers and Distributors, Delhi, 1992.
2. Groover, M.P. and Zimmers, E.W. Jr., *CAD/CAM: Computer Aided Design and Manufacturing*, Prentice Hall of India Ltd, New Delhi, 1993.
3. Burrough. P. A, *Principles of GIS for Land Resources Assessment*, Oxford University Publication, 2000.
4. Clarke. K.C., *Getting Started with Geographic Information Systems*, 3rd Edition, Prentice Hall of India Ltd, New Delhi, 2001.
5. *SP-16 – 1980: Design Aids for Reinforced Concrete*, Bureau of Indian Standards, New Delhi.
6. *SP-34 – 1987: Hand Book on Concrete Reinforcement and Detailing*, Bureau of Indian Standards, New Delhi.

IV B.Tech. I Semester

10BT70116 : CONCRETE AND HIGHWAY ENGINEERING LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Transportation engineering, building material

Course description: The course will provide knowledge and skills of road/highway material testing to those in the field of road construction or who intend to join this field of specialization.

Course Outcomes:

After completion of this course, a student is able to:

- Understand the strength of the Road/concrete materials.
- Perform aggregate testing related to road and highway construction
- Evaluate the quality and performance of unbound and bound road materials.
- Select the appropriate materials for use in different road layers.
- Write testing report on concrete and highway material testing.

DETAILED SYLLABUS:

LIST OF EXPERIMENTS

I. ROAD AGGREGATES

1. Aggregate crushing value
2. Aggregate impact test
3. Specific gravity and water absorption
4. Attrition test
5. Abrasion test
6. Shape tests

II. BITUMINOUS MATERIALS

7. Penetration test
8. Ductility test
9. Softening point test
10. Flash and fire point tests

III. CEMENT AND CONCRETE

11. Normal consistency and fineness of cement
12. Initial setting time and final setting time of cement.
13. Specific gravity and soundness of cement
14. Compressive strength of cement
15. Workability test on concrete by Compaction factor, Slump and Vee-bee
16. Young's modulus and compressive strength of concrete
17. Bulking of sand
18. Non-Destructive testing on concrete (for demonstration)

IV B. Tech.– I Semester

10BT70117: MINI-PROJECT

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	-	2

Prerequisites: All courses of the program up to III B. Tech. – II Semester.

Course Description: Identification of topic for the mini-project; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

Course Outcomes:

On completion of project work the student will be able to

- Demonstrate in-depth knowledge on the mini-project topic.
- Identify, analyze and formulate problem chosen for mini-project work to attain substantiated conclusions.
- Design solutions to the chosen mini-project problem.
- Undertake investigation of mini-project results providing valid conclusions.
- Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.
- Apply mini-project results for sustainable development of the society.
- Understand the impact of mini-project results in the context of environmental sustainability.
- Understand professional and ethical responsibilities for sustainable development of society in the chosen field of mini-project work.
- Function effectively as individual and a member in the mini-project team.
- Develop communication skills, both oral and written for preparing and presenting mini-project reports.
- Demonstrate knowledge and understanding of cost and time analysis required for carrying out the mini-project.
- Engage in lifelong learning to improve knowledge and competence in the chosen field of mini-project.

IV B.Tech. II Semester

10BT6HS01 : MANAGEMENT SCIENCE

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Pre-Requisites: —

Course Description: Management science approaches in organizations, including modeling and rational approaches to decision-making process; Historic development of management thought: decision making; the management functions of planning, organizing, leading and controlling. Case analysis; materials management; business simulations and real-time projects; analysis and communication, using real world applications and cases; decision analysis as applied to tactical and strategic business decisions.

Course Outcomes:

On completion of this course, a successful student will be able to:

- Understand fundamental needs of a small business enterprise and identify the avenues for improvement.
- Analyze lacunae in management practices in an organization and provide qualitative assessment of the possible remedies to address the lacunae.
- Design administrative system and process flow for small enterprises for maximizing efficiency.
- Apply problem-structuring methods used within Management Science.

DETAILED SYLLABUS:

UNIT - I

INTRODUCTION TO MANAGEMENT : Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management.

UNIT - II

DESIGNING ORGANIZATIONAL STRUCTURES : Basic concepts related to organization – Departmentation and decentralization - Types of organizations – Merits, demerits and adoptability to modern firms.

UNIT - III

OPERATIONS MANAGEMENT : Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling.

UNIT - IV

MATERIALS MANAGEMENT : Materials management objectives – Inventory - Types of inventory – Safety stock - Classical EOQ model - Need for inventory control – EOQ simple problems - ABC analysis - Purchase procedure - Stores management.

MARKETING : Functions of marketing - Marketing mix - Channels of distribution.

UNIT - V

HUMAN RESOURCES MANAGEMENT (HRM) : Nature and scope of HRM - HRD and personnel management and industrial relations - Functions of HRM - Role of HR Manager in an organization - Performance appraisal - Job evaluation and merit rating - Motivation - Importance of motivation - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT - VI

PROJECT MANAGEMENT (PERT/CPM) : Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Identifying critical path - Probability of completing the project within given time - Project cost analysis - Project crashing (simple problems).

UNIT - VII

ENTREPRENEURSHIP : Introduction to entrepreneurship - Definition of an entrepreneur - Entrepreneurial traits - Entrepreneur vs. manager - Entrepreneurial decision process - Role of entrepreneurship in economic development - Social responsibilities of entrepreneurs - Opportunities for entrepreneurs in India and abroad - Women as an entrepreneur.

UNIT - VIII

CONTEMPORARY MANAGEMENT PRACTICES : Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) – Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

TEXT BOOKS

1. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management*, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCES

1. Kotler Philip and Keller Kevin Lane, *Marketing Mangement*, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Wehrich, *Essentials of Management*, 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management*, 2nd Edition, TMH, New Delhi.
4. Heinz Wehrich and Harold Koontz, *Management- A Global Perspective*, 10th Edition, McGraw-Hill International.

IV B.Tech. II Semester

**10BT80101 : EARTHQUAKE RESISTANT DESIGN
(Elective - III)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Pre-Requisites: — Engineering Geology, Engineering Mechanics, RCCS

Course Description: Theory of vibrations; damping; concept of response spectrum; multi-degree of freedom systems, earthquake analysis of single and multi storeyed buildings; design and detailing provisions; seismic planning; design of shear walls.

Course Outcomes:

- Gain skills of seismic and engineering to seismic resistance design.
- Analyze structure subjected to natural vibration and estimate frequencies.
- Design building using IS 1893 – 2002
- Conduct investigations for the failure of a structure.
- Use modern tools for the analysis and design of buildings.
- Assess the safety of the building and suggest requirements.
- Prepare a report in the latest developments in the earthquake resistant design.

DETAILED SYLLABUS:

UNIT - I

INTRODUCTION TO STRUCTURAL DYNAMICS : Theory of vibrations – Lumped mass and continuous mass systems – Single degree of freedom (SDOF) systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT - II

MULTI-DEGREE OF FREEDOM (MDOF) SYSTEMS: Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT - III

EARTHQUAKE ANALYSIS: Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storeyed buildings – Use of response spectra.

UNIT - IV

CODAL DESIGN PROVISIONS : Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT - V

EARTHQUAKE ENGINEERING : Engineering seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate tectonics – Elastic rebound theory – Earthquake terminology – Source, focus, epicenter etc. – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic zoning map of India – Seismograms and accelerograms.

UNIT - VI

CODAL DETAILING PROVISIONS: Review of the latest Indian seismic codes IS: 4326, IS: 13920 and SP – 34 provisions for ductile detailing of R.C buildings – Beam, column and joints.

UNIT - VII

SEISMIC PLANNING: Plan configurations – Torsion irregularities – Re-entrant corners – Non-parallel systems – Diaphragm discontinuity – Vertical discontinuities in load path – Irregularity in strength and stiffness – Mass irregularities – Vertical geometric irregularity – Proximity of adjacent buildings.

UNIT - VIII

SHEAR WALLS: Types – Design of shear walls as per IS: 13920 – Detailing of reinforcements.

TEXT BOOKS

1. Pankaj Agarwal and Manish Shrikhande, *Earthquake Resistant Design of Structures*, 1st Edition, Prentice Hall of India, New Delhi, 2010
2. S.K. Duggal, *Earthquake Resistant Design of Structures*, 1st Edition, Oxford University Press, New Delhi, 2010.

REFERENCES

1. Clough and Penzien, *Dynamics of Structures*, 3rd Edition, McGraw-Hill International Edition, 2008.
2. A.K. Chopra, *Dynamics of Structures*, 3rd Edition, Pearson Education, New Delhi, 2007.
3. C.V.R. Murty, *Earthquake Tips*, NICEE, I.I.T., Kanpur.
4. R. Ayothiraman and Hemanth Hazarika, *Earthquake Hazard Mitigation*, I.K. International Publishing House Pvt. Ltd., New Delhi.

Codes/Tables

IS Codes: IS: 1893, IS: 4326 and IS: 13920 to be permitted into the examinations hall.

IV B.Tech. II Semester

10BT80102 : **ADVANCED FOUNDATION ENGINEERING** (Elective - III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Foundation Engineering and RCCS

Course Description: Analysis and design of shallow foundations, piles, wells, sheet piles; foundations; foundations in problematic soils: CNS layer technique, lime column techniques, underreamed piles; marine substructures.

Course Outcomes:

After the completion of the course, student can be able to

- Select the best foundation solution for different types of civil engineering problems.
- Analyze and design different types of foundations based on different ground conditions.
- Determine allowable bearing pressures using several theorems and to apply these pressures wherever necessary.

DETAILED SYLLABUS:

UNIT-I

SHALLOW FOUNDATIONS : Bearing capacity – Theories of Prandtl, Terzaghi, Meyerhof, Hansen, Skempton and Vesic – General, local and punching shear failure - Effects of size, depth and shape of footings, tilt and eccentricity of applied loads, water table, compressibility, non-homogeneity and anisotropy of soil - Bearing capacity of isolated footing resting on stratified soils - Button's theory and Siva Reddy analysis - Settlement of foundation: one, two and three dimensional theories.

UNIT-II

ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS : Types of foundation – Analysis and structural design of R.C.C. isolated, strap footing, combined footing and mat foundation.

UNIT-III

PILE FOUNDATIONS : Bearing capacity of piles and pile groups – IS method – Settlement of piles – Negative skin friction – Lateral load resistance of individual piles and pile groups – Finite difference method - Non-dimensional method – Simple R.C.C. Design of pile.

UNIT – IV

WELL FOUNDATIONS : Shapes of Wells – Grip length and Bearing Capacity – Forces acting on well foundation – Banerjee's and Gangopadhyay's analysis – IRC method - Individual components of a Well – Sinking of Wells – Rectification of Tilts and Shifts.

UNIT – V

SHEET PILE WALLS : Sheet pile structures – cantilever sheet pile walls in granular soils and cohesive soils – Anchored Bulk head – Free earth supported method – Fixed earth support method – Lateral earth pressure on Braced sheet pile walls.

UNIT-VI

FOUNDATIONS IN PROBLEMATIC SOILS : Foundations in black cotton soils - basic foundation problems associated with black cotton soils - Lime column techniques – Principles and execution - Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

UNIT-VII

DESIGN OF UNDERREAMED PILE FOUNDATIONS : Underreamed piles - principle of functioning of underreamed pile - Analysis and structural design of underreamed pile.

UNIT-VIII

MARINE SUBSTRUCTURES : Introduction - Type of marine structures - Breakwaters, wharves, piers, seawalls, docks, quay walls - Design loads - Wave action - Wave pressure on vertical wall - Ship impact on piled wharf structure - Design of rubble mount break water and wall type break water.

TEXT BOOKS

1. Shamsheer Prakash, Gopal Ranjan and Swami Saran, *Analysis and Design of Foundations and Retaining Structures*, Sarita Publishers, Meerut, 1979.
2. P.C. Varghese, *Design of Reinforced Concrete Foundations*, 1st Edition, PHI Learning, New Delhi, 2009.

REFERENCES

1. Swami Saran, *Analysis and Design of Substructures – Limit State Design*, 2nd Edition, Oxford & IBH Publishing Company Pvt. Ltd., New Delhi, 2010.
2. Braja M. Das, *Principles of Foundation Engineering*, 6th Edition, Cengage Learning India, New Delhi, 2007.
3. Teng, W.C., *Foundation Engineering*, 1st Edition, Prentice Hall Inc., New Jersey, USA, 1962.
4. Peck, R.B., Hanson, W.E. and Thornburn, T. H., *Foundation Engineering*, 2nd Edition, Wiley Eastern Ltd., New York, 1980.
5. Bowles, J.E., *Foundation Analysis and Design*, 5th Edition, McGraw-Hill Publishing Company, New York, 2001.
6. C. Venkatramaiah, *Geotechnical Engineering*, 3rd Edition, New Age International Publishers, New Delhi, 2010.
7. V. N. S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering*, 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

IV B.Tech. II Semester

10BT80103 : WATERSHED MANAGEMENT

(Elective - III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Surveying and Hydrology

Course Description: Concept of watershed; need and objectives; characteristics of watershed; principles of erosion; measures to control erosion; water harvesting; land and ecosystem management; planning and administration

Course Outcomes:

- Improve the selected watersheds with associated natural resources base.
- Develop and strengthen community based watershed management for sustainable growth
- Use modern tools for water harvesting and land management
- Assess water availability and suggest different water harvesting techniques
- Demonstrate the importance of watershed management and support participatory water management
- Forecast ethical issues involved in the watershed development

DETAILED SYLLABUS:

UNIT-I

INTRODUCTION : Concept of watershed development t- Objectives of watershed development - Need for watershed development in India - Integrated and multidisciplinary approach for watershed management.

UNIT-II

CHARACTERISTICS OF WATERSHED : Size – Shape – Physiography– Slope – Climate – Drainage - Land use – Vegetation- Geology and soils - Hydrology and Hydrogeology - Socio-economic characteristics - Basic data on watersheds.

UNIT-III

PRINCIPLES OF EROSION : Types of erosion - Factors affecting erosion - Effects of erosion on land fertility and land capability - Estimation of soil loss due to erosion - Universal soil loss equation.

UNIT – IV

MEASURES TO CONTROL EROSION : Contour techniques – Ploughing – Furrowing – Trenching – Bunding – Terracing - Gully control - Rock fill dams - Brushwood dam - Gabion.

UNIT – V

WATER HARVESTING : Rainwater harvesting - Catchment harvesting - Harvesting structures - Soil moisture conservation - Check dams - Artificial recharge - Farm ponds - Percolation tanks.

UNIT-VI

LAND MANAGEMENT : Land use and land capability classification - Management of forest – Agricultural - Grassland and wild land - Reclamation of saline and alkaline soils.

UNIT-VII

ECOSYSTEM MANAGEMENT : Role of ecosystem - Crop husbandry- Soil enrichment - Inter, mixed and strip cropping - Cropping pattern- Sustainable agriculture - Bio-mass management - Dry land agriculture - Silvi pasture – Horticulture - Social forestry and afforestation.

UNIT-VIII

PLANNING AND ADMINISTRATION : Planning of watershed management activities - Peoples participation - Preparation of action plan - Administrative requirements.

TEXT BOOKS

1. JVS Murthy, *Watershed Management*, 2nd Edition, New Age International Publishers, 2009.
2. R. A. Wurbs and W.P. James, *Water Resource Engineering*, 1st Edition, PHI, 2001.

REFERENCES

1. V.V.N. Murthy, *Land and Water Management*, 4th Edition, Kalyani Publications, Punjab, 2008.
2. D.K. Majumdar, *Irrigation and Water Management*, 1st Edition, PHI, 2010.

IV B.Tech. II Semester

10BT80104 : ENVIRONMENTAL SANITATION (Elective - III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: EE-II

Course Description: Scope of sanitation; role of environmental engineer; communicable diseases; rural water supply; rural sanitation; food sanitation; institutional sanitation; refuse sanitation; occupational hazards.

Course Outcomes:

- Identify various types of communicable diseases
- Specify the controlling measures with respect to type of sanitation adopted
- Use advanced water treatment systems for treating water
- Recognize the importance of water, refuse and update the knowledge of water treatment process and disposal methods of refuse.

DETAILED SYLLABUS:

UNIT-I

INTRODUCTION: Environmental sanitation – Scope - Communicable diseases – Role of environmental engineers in the prevention of diseases – Present status of environmental sanitation in Indian villages, towns and cities – Total sanitation.

UNIT-II

COMMUNICABLE DISEASES : Origin and spread of communicable diseases – Typhoid - Cholera – Malaria – Filariasis – Plague – Tuberculosis – HIV/AIDS – Role of vectors – Prevention of the above diseases - Epidemiology.

UNIT-III

RURAL WATER SUPPLY: Sanitary protection of wells – Disinfection by Two pot system – Treatment for Fluorides, Arsenic, Iron and Manganese and Nitrates.

UNIT – IV

RURAL SANITATION: Rural latrines – Animal waste disposal – Biomass – Biogas production.

UNIT – V

FOOD SANITATION: Food poisoning – Food preservation – Sanitary maintenance of catering and eating establishments – Milk sanitation - Milk and milk products – Sanitation of market places – Slaughter houses.

UNIT-VI

INSTITUTIONAL SANITATION: Sanitary requirements and maintenance of public places – Schools – Hospitals – Jails and Offices – Swimming pools.

UNIT-VII

REFUSE SANITATION : Quality and quantity of refuse – Conveyance – Disposal methods – Sanitary land fill - Composting – Vermi composting – Mechanical composting – Incineration.

UNIT-VIII

OCCUPATIONAL HAZARDS : Hazards in industries – Mining operations – Hazards due to radiological pollution – Preventive measures – Natural and mechanical ventilation and exhaust systems.

TEXT BOOKS

1. Salvato, *Environmental Sanitation*, 3rd Edition, Tata McGraw-Hill, New Delhi, 2006.
2. Ehlers, V.M. and Steel, E.W., *Municipal Sanitation*, Tata McGraw-Hill, New Delhi, 1972.

REFERENCES

1. Chanlet, E.T., *Environmental Protection*, McGraw-Hill Inc., 1979.
2. Krishnan, N.V., *Safety Management in Industry*, Jaico Publishing House, Bombay, 1992.

IV B.Tech. II Semester

**10BT80105: ARCHITECTURE AND TOWN PLANNING
(Elective - III)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Surveying and Building Planning and Drawing

Course Description: Architectural design; site planning; building architecture and services; climate and environmental responsive design; town planning; planning process and structure land use planning; regional planning and standards

Course Outcomes:

- Apply the principles of light and sound for the best architectural design of a building.
- Formulate the basic requirements of a building Plan, design and develop town using various models of urban structure
- Synthesize the land use planning information for best town planning
- Assess the importance of land use pattern and design landscape
- Diagnose the code of ethics in land use planning and locate urban structure
- Make effective presentations on aesthetics, building rules and regulations, passive energy controls in the design of buildings
- Recall the importance of climatic factors, planning practices in India for town planning

DETAILED SYLLABUS:

UNIT-I

ARCHITECTURAL DESIGN : Architectural design – Analysis – Integration of function and aesthetics – Introduction to basic elements and principles of design.

UNIT-II

SITE PLANNING : Surveys – Site analysis – Development control – Layout regulations - Layout design concepts – Integration of building services – Interior design.

UNIT-III

BUILDING ARCHITECTURE AND SERVICES : Residential, institutional, commercial and industrial – Application of anthropometry and space standards - Inter relationships of functions– Safety standards – Building rules and regulations – Integration of building services – Interior design.

UNIT – IV

CLIMATE AND ENVIRONMENTAL RESPONSIVE DESIGN : Man and environment interaction - Factors that determine climate – Characteristics of climate types – Design for various climate types – Passive and active energy controls – Green building concept.

UNIT – V

TOWN PLANNING : Planning – Definition, concepts and processes– Aims and objectives of planning – Levels of planning in India and their interrelationship – Planning administration.

UNIT-VI

PLANNING PROCESS AND STRUCTURE : Models of planning processes – Components of settlement structures – Models of urban structure – Demand and supply of land for urban use - Means and mechanism – Impact on urban structure - Goals of land policy.

UNIT-VII

LAND USE PLANNING : Concept of land use – Locational attributes of land use – Land use planning information system – Activity system and choice of space qualities – System approach and physical planning – Approach to land use planning– Introduction to spatial planning at regional level – Choice theory and advocacy planning and their application action plan and its relevance – Development plan types – Scope and objectives - Principles of landscape design

UNIT-VIII

REGIONAL PLANNING AND STANDARDS : Planning practices in India – Method of identifying urban and regional problem – Setting of goals objectives and priorities – Performance standards – Spatial standards and standard for utilities – Classification of regions – Regionalization and delineation techniques for various types of regions – Cluster and factor analysis method.

TEXT BOOKS

1. Francis D.K. Ching, *Architecture: Form, Space and Order*, VNR, N.Y., 1999.
2. Margaret Robert, *An Introduction to Town Planning Techniques*, Hutchinson London, 1990.

REFERENCES

1. Givoni B., *Man, Climate and Architecture*, Applied Science, Barking ESSEX, 1982
2. Edward D. Mills, *Planning and Architects Handbook*, Pearson Education, 1995.
3. Gallian B. Arthur and Simon Eisner, *The Urban Pattern – City Planning and Design*, Affiliated Press Pvt. Ltd., 1995.
4. J.N. Robinson, *Planning and Forecasting Technique: An Introduction to Macroeconomics Applications*, Paperback, 1972.
5. Faludi Andreas, *Planning Theory*, Pergamon Press, 1973.
6. Theodore William Patterson, Van Nostrand Reinhold, *Land use Planning: Techniques of Implementation*, Nature, 1979.

IV B.Tech. II Semester

10BT80106 : PRESTRESSED CONCRETE (Elective - IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Structural Analysis, Reinforced Cement Concrete Structures

Course Description: Historic development, principle, methods and losses of prestress; analysis and design of flexure, shear and end blocks; general design consideration of composite sections and deflections or prestressed concrete beams

Course Outcomes:

- Analyze prestressed members under flexure and stresses.
- Design the prestressed members using elastic design members.
- Give vital conclusions on the usage of prestressed members to control deflections.

DETAILED SYLLABUS:

UNIT – I

PRINCIPLES OF PRESTRESSING : Historic development – General principles of prestressing - Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel.

UNIT – II

METHODS OF PRESTRESSING : Methods and systems of prestressing - Pre-tensioning and post tensioning – Analysis of post tensioning - Different systems of prestressing - Hoyer system - Magnel system, Freyssinet system and Gifford-Udall system.

UNIT – III

LOSSES OF PRESTRESS : Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete - Shrinkage of concrete - Creep of concrete - Relaxation of steel - Slip in anchorage bending of member and frictional losses.

UNIT – IV

ANALYSIS OF SECTION FOR FLEXURE : Analysis of sections for flexure - Prestressed with straight, concentric, eccentric tendons, bent and parabolic tendons.

UNIT – V

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR : Allowable stresses - Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure and shear – Kern lines, cable profile.

UNIT – VI

ANALYSIS OF END BLOCKS : Guyon's method and Magnel method- Anchorage zone stresses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

UNIT – VII

COMPOSITE SECTION : Composite section - Analysis of stress – Differential shrinkage – General designs considerations.

UNIT – VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS : Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS

1. Krishna Raju, *Prestressed Concrete*, 4th Edition, Tata McGraw-Hill Publications, New Delhi, 2011.
2. N. Rajagopalan, *Prestressed Concrete*, 2nd Edition, Narosa Publications, New Delhi, 2010.

REFERENCES

1. Ramamrutham, *Prestressed Concrete*, 5th Edition, Dhanpat Rai Publications, New Delhi, , 2003.
2. T.Y. Lin and Ned H. Burns, *Design of Prestressed Concrete Structures*, 3rd Edition, John Wiley and Sons, 2010.

IS Codes

IS 1343 is to be permitted into the examination hall.

IV B.Tech. II Semester

10BT80107 : WATER POWER ENGINEERING

(Elective - IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites:

Course Description: Hydropower; water power estimate; hydropower plants; pumped storage power plants; hydraulic turbines; water conveyance; channel surges and intakes; power house and equipment

Course Outcomes:

- Design a turbine for a specified site.
- Conduct investigations on the failure of a turbine and pump
- Propose suitable pumped storage plant based on the availability of water.
- Describe factors involved in the design of a turbine and carryout model study.
- Carryout good engineering practices while recommending for the constructions of a hydroelectric power plant.
- Prepare a report based on the estimation of hydro power potential.
- Understand the importance of hydroelectric power and suggest new developments.
- Contribute for the development of hydroelectric projects and participate in life long learning.

DETAILED SYLLABUS:

UNIT – I

HYDROPOWER : Introduction to water power - Hydropower development - Sources of energy - Estimation of water power potential - Load curve - Load factor - Capacity factor - Utilization factor - Diversity factor - Load duration curve - Firm power - Secondary power - Prediction of load.

UNIT – II

WATER POWER ESTIMATE: Collection and analysis of stream flow data – Mass curve – Flow duration curves – Construction and utility of these curves – Effect of storage and pondage – Estimates of available water power.

UNIT – III

HYDROPOWER PLANTS: Low and high head plants: classification of hydel plants - Run-off- river plants - General arrangement of run-off-river plants - Valley dam plants - Diversion canal plants - High head diversion plants - Storage and pondage.

UNIT – IV

PUMPED STORAGE POWER PLANTS : Basic features - Advantages of pumped storage plants - Types of pumped storage plants - Relative merits of two-unit and three-unit arrangement.

UNIT – V

HYDRAULIC TURBINES : Classification of turbines – Francis, Kaplan and Pelton turbines – Component parts and their function – Draft tubes and their theory – Similarity laws and specific speed unit, quantities – Performance curves – Governing of turbines – Selection of turbines – Cavitation in turbines.

UNIT – VI

WATER CONVEYANCE: Classification of penstocks - Design criteria- Economical diameter - Anchor blocks - Conduit valves - Bends and manifolds.

UNIT – VII

CHANNEL SURGES AND INTAKES: Water Hammer - Resonance in Penstocks - Channel surges - Surge tanks - Intakes - Types - Losses- Air entrainment - Inlet aeration - Canals - Forebay – Tunnels – Selection of turbines.

UNIT – VIII

POWER HOUSE AND EQUIPMENT: Location of power house – General arrangement of hydroelectric unit – Number and size of units – Power house sub structure – Pumped storage plant.

TEXT BOOKS

1. M.M. Dandekar and K.N. Sharma, *Water Power Engineering*, Vikas Publishing House Pvt. Ltd., India, 2007
2. R.K. Sharma and T.K. Sharma, *A Text Book of Water Power Engineering*, S. Chand Company, New Delhi, 2008.

REFERENCES

1. B. C. Punmia, B. B. Pande Lal, Ashok Kumar Jain and Arun Kumar Jain, *Irrigation and Water Power Engineering*, Laxmi Publications, New Delhi, 2009.
2. P.N. Modi, *Irrigation Water Resources and Water Power Engineering*, 7th Edition, Standard Book House, 2008.
3. K.R. Arora, *Irrigation, Water Power and Water Resources Engineering*, 4th Edition, Standard Publishers Distributors, Delhi, 2011.
4. Deshmukh MM, *Water Power Engineering*, Dhanpat Rai and Sons, New Delhi, 1978.

IV B.Tech. II Semester

**10BT80108 : GROUND WATER DEVELOPMENT AND
MANAGEMENT (Elective - IV)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Hydrology, Engineering Geology, Water Resources Engineering

Course Description: Groundwater occurrence and water movement; analysis of pumping test data; surface and subsurface investigation; artificial recharge of ground water; saline water intrusion in aquifer; groundwater basin management.

Course Outcomes:

- Apply the continuity equation in estimating the groundwater flow and direction of movement.
- Analyze the capacity of a well using Theis, Jacob and Chow's solution.
- Develop methods for recharging groundwater
- Conduct investigation of groundwater exploration
- Use different techniques in recharging groundwater and control of groundwater pollution
- Identify the importance of groundwater for the society and sustainability.

DETAILED SYLLABUS:

UNIT – I

GROUNDWATER OCCURRENCE : Groundwater hydrologic cycle - Origin of groundwater - Rock properties effecting groundwater - Vertical distribution of groundwater - Zone of aeration and zone of saturation - Geologic formation as aquifers - Types of aquifers - Porosity, specific yield and specific retention.

UNIT – II

GROUNDWATER MOVEMENT: Permeability - Darcy's law - Storage coefficient – Transmissivity - Differential equation governing groundwater flow - Groundwater flow equation - Groundwater flow contours and their applications.

UNIT – III

ANALYSIS OF PUMPING TEST DATA – I : Steady groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Thiem's equations – Assumptions - Formation constants - Yield of an open well.

UNIT – IV

ANALYSIS OF PUMPING TEST DATA – II : Unsteady flow towards a well – Non equilibrium equations – Thies solution – Jacob and Chow's simplifications - Leaky aquifers.

UNIT – V

SURFACE AND SUBSURFACE INVESTIGATION : Surface methods of exploration – Electrical resistivity and seismic refraction methods - Subsurface methods – Geophysical logging and resistivity logging - Aerial photogrammetry applications along with case studies in subsurface investigation.

UNIT – VI ARTIFICIAL RECHARGE OF GROUND WATER : Concept of artificial recharge – Recharge methods - Relative merits - Applications of GIS and Remote Sensing in artificial recharge of groundwater along with case studies.

UNIT – VII

SALINE WATER INTRUSION IN AQUIFER : Occurrence of saline water intrusions - Ghyben- Herzberg relation - Shape of interface - Control of seawater intrusion.

UNIT – VIII

GROUNDWATER BASIN MANAGEMENT : Concepts of conjunction use - Case studies.

TEXT BOOKS

1. H.M. Raghunath, *Ground Water*, 3rd Edition, Wiley Eastern Ltd., New Delhi, 2009.
2. David Keith Todd, *Ground Water Hydrology*, 2nd Edition, Wiley India Pvt. Ltd., New Delhi, 2010.

REFERENCES

1. Beaver JA, *Ground Water*, John Wiley and Sons, 1969.
2. R.Willis and W.W.G. Yeh, *Ground Water System Planning and Management*, PHI, 1987.
3. C.W. Fetter, *Applied Hydrogeology*, 4th Edition, PHI, New Delhi, 2010.
4. Manning JC, *Applied Principles of Hydrology*, CBS Publishers Distributers, 2007.
5. K. R. Karanth, *Ground Water Assessment, Development and Management*, 1st Edition, TMH, 2003.

IV B.Tech. II Semester

10BT80109 : INDUSTRIAL WASTE WATER TREATMENT

(Elective - IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: EE-I

Course Description: Water quality requirements; treatment of water; principles of treatment; liquid wastes and treatment; recirculation and effluent treatment; joint treatment of wastes; waste land remediation and reclamation.

Course Outcomes:

- Apply the principles of science in the treatment of water.
- Analyse various pollutants present in industrial waste water.
- Develop solutions for the treatment of industrial waste water safe disposal of industrial waste.
- Propose proper effluent disposal method and use techniques such as GIS etc.
- Address problems due to on site waste disposal and recommendation techniques.
- Responsible for the best practices to be applied to waste disposal.
- Work individually and in groups effectively.
- Recognize the importance of industrial waste treatment and disposal.

DETAILED SYLLABUS:

UNIT – I

WATER QUALITY REQUIREMENTS: Quality requirements of boiler and cooling waters – Quality requirements of process water for Textiles – Food processing and brewery industries – Boiler and cooling water treatment methods.

UNIT – II

TREATMENT OF WATER: Water for boiler – Cooling - Softening - Ion exchange – MSP.

UNIT – III

PRINCIPLES OF TREATMENT: Basic theories of industrial waste water treatment – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning.

UNIT – IV

LIQUID WASTES AND TREATMENT - I : Origin of liquid waste from textiles, paper and pulp industries - Thermal power plants and tanneries - Special characteristics - Effects and treatment methods - Manufacturing process and design origin of liquid waste from fertilizers, distillers and dairy - Special characteristics - Effects and treatments methods.

UNIT – V

LIQUID WASTES AND TREATMENT - II : Origin of liquid waste from sugar mills, steel plants, oil refineries, and pharmaceuticals plants - Special characteristics - Effects and treatment methods.

UNIT – VI

RECIRCULATION AND EFFLUENT TREATMENT: Recirculation of industrial wastes – Use of municipal waste water in industries - Manufacturing processes – Common effluent treatment plants – Advantages and suitability – Limitations - Effluent disposal methods.

UNIT – VII

JOINT TREATMENT OF WASTES: Joint treatment of industrial wastes and domestic wastes – Consequent problems – Industrial waste water discharges into streams, lakes and oceans and problems – Land disposal – Aquifer treatment system.

UNIT – VIII

WASTE LAND REMEDIATION AND RECLAMATION : Definition of waste land - Characteristics of waste land - Physical chemical and biological pollution of soils - Ground water pollution – Dumping - Sand fills - Remediation methods – Physical, chemical and biological methods.

TEXT BOOKS

1. M.N. Rao and Dutta, *Waste Water Treatment*, 3rd Edition, Oxford and IBH Publishers, New Delhi, 2009.
2. Met Calf and Eddy, *Waste water Engineering, Treatment and Re Use*, 4th Edition, Tata Mc Graw - Hill Education Private Limited, New Delhi, 2010.

REFERENCES

1. Newmerow, *Liquid Waste of Industry*, Pearson Education Publishing Co., 1971.
2. Mark J. Hammer and Mark J. Hammer Jr., *Water and Waste Water technology*, 6th Edition, 2008.

IV B.Tech. II Semester

**10B T 8 0110: NATURAL DISASTER MITIGATION AND
MANAGEMENT (Elective - IV)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Environmental Sciences

Course Description: Types of disasters; impact of disasters on environment; infrastructure and development; hazard assessment; earthquakes; tsunamis; floods; cyclones; landslides; droughts; disaster management.

Course Outcomes:

- Identify various elements involved in disaster mitigation
- Specify the methodology for assessment and analysis of impacts
- Analyze and interpret the guidelines for hazard assessment and vulnerability analysis
- Demonstrate various stages of disaster preparedness
- Discharge pre and post disaster mitigating activities
- Engage in identifying the mitigation programmes for continuous learning

DETAILED SYLLABUS:

UNIT – I

INTRODUCTION: Types of disasters - Natural disasters - Impact of disasters on environment - Infrastructure and development - Concepts of hazards and vulnerability analysis.

UNIT – II

HAZARD ASSESSMENT : Guidelines for hazard assessment and vulnerability analysis - Basic principles and elements of disaster mitigation.

UNIT – III

EARTHQUAKES : Introduction to earthquakes - Intensity scale (MSK-64) - Seismic activity in India - Seismic zones of India - Earthquakes in A.P. - Action plan for earthquake disaster preparedness - Elements at risk, recovery and rehabilitation after earthquake - Earthquake resistant design and construction of buildings.

UNIT – IV

TSUNAMIS : Onset, types and causes – Warning - Element at risk - Typical effects - Specific preparedness and mitigation strategies.

UNIT – V

FLOODS AND CYCLONES : Onset, types, warnings - Elements at risk - Typical effects - Indian floods and cyclones - Hazard zones - Potential for reducing hazards - Mitigation strategies and community based mitigation.

UNIT –

LANDSLIDES : Onset, types and warning - Causes of landslides - Elements at risk - Indian land slides - Hazard zones - Typical effects - Mitigation strategies and community based mitigation.

UNIT – VII

DROUGHTS : Onset, types and warning - Kinds of droughts - Causes of droughts - Impact of droughts - Early warning and response mechanisms - Mitigation strategies - Droughts in India.

UNIT – VIII

DISASTER MANAGEMENT : Disaster management organization and methodology - Disaster management cycle - Disaster management in India - Typical cases - Cost-benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

TEXT BOOKS

1. V.K. Sharma, *Disaster Management*, National Centre for Disaster Management, IPE, Delhi. 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians*, GOI-UNDP Disaster Risk Management Programme, 2005.

REFERENCES

1. *Disaster Management in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. *Drought in India: Challenges and Initiatives*, Poorest Areas in Civil Society (PACS) Programme, 2001-2008, Website: www.empowerpoor.org.
3. *Disaster Preparedness Programme in India: A Cost Benefit Analysis*, Commissioned and published by the Humanitarian Practice Network at ODI HPN, website: www.odihpn.org.

IV B. Tech.– II Semester

10BT80111: COMPREHENSIVE VIVA-VOCE

Internal Marks	External Marks	Total	L	T	P	C
100	-	100	-	-	-	2

Prerequisites: All courses of the program.

Course Description: Assessment of student learning outcomes.

Course outcomes:

Comprehensive Viva-Voce enables a successful student to

- Demonstrate knowledge in the program domain.
- Present views cogently and precisely.
- Exhibit professional etiquette suitable for career progression.

IV B. Tech.– II Semester
10BT80112: PROJECT WORK

Internal Marks	External Marks	Total	L	T	P	C
75	150	225	-	-	12	12

Prerequisites: All the courses of the program up to IV B. Tech. – I Semester.

Course Description: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

Course Outcomes:

On completion of project work the student will be able to

- Demonstrate in-depth knowledge on the project topic.
- Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
- Design solutions to the chosen project problem.
- Undertake investigation of project results providing valid conclusions.
- Use the appropriate techniques, resources and modern engineering tools necessary for project work.
- Apply project results for sustainable development of the society.
- Understand the impact of project results in the context of environmental sustainability.
- Understand professional and ethical responsibilities while executing the project work.
- Function effectively as individual and a member in the project team.
- Develop communication skills, both oral and written for preparing and presenting project reports.
- Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
- Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

Rules of Disciplinary Action for Malpractice/Improper conduct in Examinations

S. No.	Nature of Malpractice / Improper Conduct	Rule No.	Punishment
1.	Possession of unauthorised material in printed or handwritten form or electronic devices	Rules 1(a), 1(b)	Expulsion from the examination hall and cancellation of examination in that subject. If any outside person involves and helps the candidate for malpractice, the outside person is handed over to the police and a case is registered.
2.	If the candidate copies evidently from various sources like, hand written material, typewritten or Photostat material, writing on body arms or clothes, writing with pen/pencil on calculators, scales, hall ticket, rubber etc.	Rule 2	Expulsion from the examination hall and cancellation of exam in that subject and all other subjects the candidate has appeared, including practical examinations and project work. He/she shall not be permitted to appear for the remaining examinations.
3.	If any person impersonates the other candidate in the examination.	Rule 3	If the person is a student of the College he shall be expelled from examination and debarred. He shall forfeit the seat. The performance of the original candidate is cancelled for that series of examination and debarred for two semesters. If the person is an outsider, he/she shall be handed over to the police and a case is registered.
4.	If the candidate attempts to steal/mutilate/damage (or) tries to send out the answer book (or) Takes out (or) arranges to send out the question paper during the examination.	Rule 4	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared, including practical examinations and project work. He/she shall not be permitted for the remaining examinations of the courses in that semester/year. The candidate is also debarred for two consecutive semesters. This matter shall be reported to police and a case is registered

5.	If the candidate uses objectionable, abusive or offensive language in the answer paper, or writes to the examiner requesting him to award pass marks.	Rule 5	Cancellation of the performance in that course.
6.	If the candidate refuses to obey the examination authorities (or) misbehaves (or) creates disturbance of any kind in and around the examination hall (or) organizes a walk out, (or) threatens (or) assaults the invigilator and indulges in the act of misconduct, destruction of property on the campus.	Rule 6	In case of students of the college, they shall be expelled from examination and their examination performance stands cancelled. In case of outsiders, they will be handed over to the police and a case is registered against them.
7.	If the candidate possesses any lethal weapon or firearm in the examination hall.	Rule 7	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared, including practical examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. This matter shall be reported to police and a case is registered
8.	If a student of the College, who is not a candidate for the particular exam or any person not connected with the College indulges in any malpractice or improper conduct mentioned in clauses 6 and 7.	Rule 8	For student of the College expulsion from the examination hall and cancellation of the performance in that series of examination. The candidate is also debarred and forfeits the seat. For persons who do not belong to the college will be handed over to the police and a case is registered.

9.	If the candidate comes in an intoxicated/inebriated condition to the examination hall.	Rule 9	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared, including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year
10.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Rule 10	Cancellation of the performance in that subject and all other subjects the candidate has appeared, including practical examinations and project work of that semester/year examinations.
11.	If any malpractice is detected which is not covered in the clauses 1 to 10 above, shall be brought to the notice of the Chief Controller of Examinations.		

**SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)**

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. A.P.

**Salient Features of Prohibition of Ragging
in Educational Institutions Act 26 of 1997**

- Ragging within or outside the College is prohibited.
- Ragging means doing an act which causes or is likely to cause insult or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student

Nature of Ragging	Punishment
Teasing, Embarrassing and humiliating	Imprisonment up to 6 months or fine up to Rs. 1,000/- or Both
Assaulting or using criminal force or criminal intimidation	Imprisonment up to 1 year or fine up to Rs. 2,000/- or Both
Wrongfully restraining or confining or causing hurt	Imprisonment up to 2 years or fine up to Rs. 5,000/- or Both
Causing grievous hurt, Kidnapping or rape or committing unnatural offence	Imprisonment up to 5 years or fine up to Rs. 10,000/-
Causing death or abetting suicide	Imprisonment up to 10 years or fine up to Rs. 50,000/-

Note:

1. A student convicted of any of the above offences, will be expelled from the College.
2. A student imprisoned for more than six months for any of the above offences will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the College immediately.
4. The full text of Act 26 of 1997 **and** UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009 (**Dated 17th June, 2009**) are placed in the College library for reference.