

# **GITAM UNIVERSITY**

(Declared as Deemed to be University U/S 3 of UGC Act, 1956)



**REGULATIONS & SYLLABUS**  
**OF**  
**B.Tech. (Civil Engineering)**  
(w.e.f 2009 -10 admitted batches)

Gandhi Nagar Campus, Rushikonda  
**VISAKHAPATNAM – 530 045**  
Website: [www.gitam.edu](http://www.gitam.edu)

# REGULATIONS

(w.e.f. 2009-10 admitted batch)

## 1.0 ADMISSIONS

- 1.1 Admissions into B.Tech (Civil Engineering) programme of GITAM University are governed by GITAM University admission regulations.

## 2.0 ELIGIBILITY CRITERIA

- 2.1 A pass in 10+2 or equivalent examination approved by GITAM University with Physics, Chemistry and Mathematics.
- 2.2 Admissions into B.Tech will be based on an All India Entrance Test (GAT) conducted by GITAM University and the rule of reservation, wherever applicable.

## 3.0 STRUCTURE OF THE B.Tech. PROGRAMME

- 3.1 The Programme of instruction consists of :
- (i) A general core programme comprising Basic Sciences, Basic Engineering, Humanities & Social Sciences and Mathematics.
  - (ii) An engineering core programme imparting to the student the fundamentals of engineering in the branch concerned.
  - (iii) An elective programme enabling the students to take up a group of departmental/ interdepartmental courses of interest to him/her.

In addition, a student has to

- (i) carry out a technical project approved by the department and submit a report
  - (ii) undergo summer training in an industry for a period prescribed by the department and submit a report
- 3.2 Each academic year consists of two semesters. Every branch of the B.Tech programme has a curriculum and course content (syllabi) for the courses recommended by the Board of Studies concerned and approved by Academic Council.

## 4.0 CREDIT BASED SYSTEM

- 4.1 Each course is assigned certain number of credits which will depend upon the number of contact hours (lectures & tutorials) per week.
- 4.2 In general, credits are assigned to the courses based on the following contact hours per week per semester.
- One credit for each Lecture / Tutorial hour.  
One credit for two hours of Practicals.  
Two credits for three (or more) hours of Practicals.
- 4.3 The curriculum of B.Tech programme is designed to have a total of 190 to 200 credits for the award of B.Tech degree.
- 4.4 Every course of the B Tech programme will be placed in one of the nine groups of courses with minimum credits as listed in the Table 1.

**Table 1: Group of Courses**

S.No,	Group of Courses	Code	Minimum credits
1	Humanities & Social Sciences	HS	12
2	Basic Sciences	BS	17
3	Mathematics	MT	10
4	Basic Engineering	BE	26
5	Core Engineering	CE	68
6	Departmental Elective	DE	9
7	Inter Departmental Elective	IE	8
8	Project Work	PW	8
9	Industrial Training	IT	2
Total			160

**5.0 MEDIUM OF INSTRUCTION**

The medium of instruction (including examinations and project reports) shall be English.

**6.0 REGISTRATION**

Every student has to register himself/herself for each semester individually at the time specified by the Institute / University.

**7.0 CONTINUOUS ASSESSMENT AND EXAMINATIONS**

7.1 The assessment of the student's performance in each course will be based on continuous internal evaluation and semester-end examination. The marks for each of the component of assessment are fixed as shown in the Table 2.

**Table 2: Assessment Procedure**

S.No.	Component of assessment	Marks allotted	Type of Assessment	Scheme of Examination
1	Theory	40	Continuous evaluation	(i) Two mid semester examinations shall be conducted for 10 marks each. (ii) Two quizzes shall be conducted for 5 marks each. (iii) 5 marks are allotted for assignments. (iv) 5 marks are allotted for attendance
		60	Semester-end examination	The semester-end examination in theory courses will be for a maximum of 60 marks.
	Total	100		

2	Practicals	100	Continuous evaluation	(i) 40 marks are allotted for record work and regular performance of the student in the lab. (ii) One examination for a maximum of 20 marks shall be conducted by the teacher handling the lab course at the middle of the semester (iii) One examination for a maximum of 40 marks shall be conducted at the end of the semester (as scheduled by the Head of the Department concerned).
3	Project work (VII & VIII semester)	100	Project evaluation	(i) 50 marks are allotted for continuous evaluation of the project work throughout the semester by the guide. (ii) 50 marks are allotted for the presentation of the project work & viva-voce at the end of the semester.*
4	Industrial Training (VII semester)	100	Industrial training evaluation	(i) 50 marks are allotted for report submission and seminar presentations after completion of the training. (ii) 50 marks are allotted for the viva-voce at the end of the semester.*

\* Head of the Department concerned shall appoint two examiners for conduct of the examination.

### 8.0 RETOTALLING, REVALUATION & REAPPEARANCE

- 8.1 Retotalling of the theory answer script of the end-semester examination is permitted on a request made by the student by paying the prescribed fee within ten days of the announcement of the result.
- 8.2 Revaluation of the theory answer script of the end-semester examination is also permitted on a request made by the student by paying the prescribed fee within fifteen days of the announcement of the result.
- 8.3 A Student who has secured 'F' Grade in any theory course / Practicals of any semester shall have to reappear for the semester end examination of that course / Practicals along with his / her juniors.
- 8.4 A student who has secured 'F' Grade in Project work / Industrial Training shall have to improve his report and reappear for viva – voce Examination of project work at the time of special examination to be conducted in the summer vacation after the last academic year.

### 9.0 SPECIAL EXAMINATION

- 9.1 A student who has completed the stipulated period of study for the degree programme concerned and still having failure grade ('F') in not more than 5 courses ( Theory / Practicals), may be permitted to appear for the special examination, which shall be conducted in the summer vacation at the end of the last academic year.
- 9.2 A student having 'F' Grade in more than 5 courses (Theory/practicals) shall not be permitted to appear for the special examination.

## 10.0 ATTENDANCE REQUIREMENTS

- 10.1 A student whose attendance is less than 75% in all the courses put together in any semester will not be permitted to attend the end - semester examination and he/she will not be allowed to register for subsequent semester of study. He /She has to repeat the semester along with his / her juniors.
- 10.2 However, the Vice Chancellor on the recommendation of the Principal / Director of the University College / Institute may condone the shortage of attendance to the students whose attendance is between 66% and 74% on genuine medical grounds and on payment of prescribed fee.

## 11.0 GRADING SYSTEM

- 11.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given in Table 3.

**Table 3: Grades & Grade Points**

Grade	Grade points	Absolute Marks
O	10	90 and above
A+	9	80 – 89
A	8	70 – 79
B+	7	60 – 69
B	6	50 – 59
C	5	40 – 49
F	Failed, 0	Less than 40

- 11.2 A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. However, a minimum of 24 marks is to be secured at the semester end examination of theory courses in order to pass in the theory course.

## 12.0 GRADE POINT AVERAGE

- 12.1 A Grade Point Average (GPA) for the semester will be calculated according to the formula:

$$\text{GPA} = \frac{\sum [C \times G]}{\sum C}$$

Where

C = number of credits for the course,

G = grade points obtained by the student in the course.

- 12.2 Semester Grade Point Average (SGPA) is awarded to those candidates who pass in all the courses of the semester.
- 12.3 To arrive at Cumulative Grade Point Average (CGPA), a similar formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.
- 12.4 The requirement of CGPA for a student to be declared to have passed on successful completion of the B.Tech programme and for the declaration of the class is as shown in Table 4.

**Table 4: CGPA required for award of Degree**

<b>Distinction</b>	<b>8.0*</b>
<b>First Class</b>	<b>7.0</b>
<b>Second Class</b>	<b>6.0</b>
<b>Pass</b>	<b>5.0</b>

\* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester in **first attempt**.

### **13.0 ELIGIBILITY FOR AWARD OF THE B.TechDEGREE**

#### **13.1 Duration of the programme:**

A student is ordinarily expected to complete the B Tech. programme in eight semesters of four years. However a student may complete the programme in not more than six years including study period.

13.2 However the above regulation may be relaxed by the Vice Chancellor in individual cases for cogent and sufficient reasons.

13.3 A student shall be eligible for award of the B.Tech degree if he / she fulfils all the following conditions.

- a) Registered and successfully completed all the courses and projects.
- b) Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.
- c) Has no dues to the Institute, hostels, Libraries, NCC / NSS etc, and
- d) No disciplinary action is pending against him / her.

13.4 The degree shall be awarded after approval by the Academic Council.

# RULES

1. With regard to the conduct of the end-semester examination in any of the practical courses of the programme, the Head of the Department concerned shall appoint one examiner from the department not connected with the conduct of regular laboratory work, in addition to the teacher who handled the laboratory work during the semester.
2. In respect of all theory examinations, the paper setting shall be done by an external paper setter having a minimum of three years of teaching experience. The panel of paper setters for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council. The paper setters are to be appointed by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations.
3. The theory papers of end-semester examination will be evaluated by internal/external examiner
4. Panel of examiners of evaluation for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council.
5. The examiner for evaluation should possess post graduate qualification and a minimum of three years teaching experience.
6. The appointment of examiners for evaluation of theory papers will be done by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations from a panel of examiners approved by the Academic Council.
7. The attendance marks (maximum 5) shall be allotted as follows :

Percentage of attendance	Marks
76% to 80%	1
81% to 85%	2
86% to 90%	3
91% to 95%	4
96% to 100%	5

# SYLLABUS

B.Tech. (CE)

Programme Code: EURCE200800

## I SEMESTER

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hour
							L	T	Lab	
EUREG 101	English Language skills	HS	3	60	40	100	3			3
EURMT 102	Engg. Mathematics - I	MT	4	60	40	100	4			4
EURPH 103	Engg. Physics - I	BS	4	60	40	100	4			4
EURCH 104	Engg. Chemistry – I	BS	4	60	40	100	4			4
EURCS 105	Programming with C	BE	3	60	40	100	3			3
EURME 106/205	Geometrical Drawing	BE	2	60	40	100	2			2
EURME 111/211	Workshop Technology Lab	BE	2	--	100	100			3	3
EURPH 112/212	Engg. Physics Lab	BS	2	--	100	100			4	4
EURCS 113	Programming with C Lab	BE	2	--	100	100			3	3
<b>TOTAL</b>			<b>26</b>	<b>360</b>	<b>540</b>	<b>900</b>	<b>20</b>	<b>-</b>	<b>10</b>	<b>30</b>

## II SEMESTER

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURHS 201	English Writing Skills	HS	3	60	40	100	3			3
EURMT 202	Engg Mathematics-II	MT	3	60	40	100	4			4
EURMT 203	Engg Mathematics-III	MT	3	60	40	100	4			4
EURBS 204	Engineering Physics – II	BS	3	60	40	100	4			4
EURCH 205	Engg. Chemistry – II	BS	3	60	40	100	4			4
EURCS 206	Object Oriented programming with C++	BE	3	60	40	100	3			3
EURME 215/115	Engineering Graphics Lab	BE	2	--	100	100			3	3
EURCH 214/114	Engg. Chemistry Lab	BS	2	--	100	100			3	3
EURCS 213	Objected oriented programming with C++ Lab	BE	2	--	100	100			3	3
<b>TOTAL</b>			<b>24</b>	<b>360</b>	<b>540</b>	<b>900</b>	<b>22</b>	<b>-</b>	<b>9</b>	<b>31</b>



**B.Tech. (CE)  
III SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 301	Engineering Mechanics- Statics and Dynamics	BE	4	60	40	100	4			4
EURCE 302	Mechanics of Solids	BE	4	60	40	100	3	1		4
EURCE 303	Building Materials and Building Construction	CE	4	60	40	100	3		2	5
EURCE 304	Concrete Technology	CE	2	60	40	100	2			2
EURCE 305	Surveying-I	CE	3	60	40	100	3			3
EURCE 306	Engineering Geology	BS	3	60	40	100	3			3
EURCE 311	Concrete Laboratory	CE	1		100	100			2	2
EURCE 312	Survey Field Work – I	CE	1		100	100			2	2
EURCE 313	Engg Geology Laboratory	BS	1		100	100			2	2
	<b>TOTAL</b>		<b>23</b>	<b>360</b>	<b>540</b>	<b>900</b>	<b>18</b>	<b>1</b>	<b>8</b>	<b>27</b>

**IV SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 401	Environmental Studies	HS	4	60	40	100	4			4
EURCE 402	Structural Analysis-I	CE	4	60	40	100	3	1		4
EURCE 403	Building Planning and Drawing	CE	4	60	40	100	2		3	5
EURCE 404	Fluid Mechanics – I	BE	4	60	40	100	3	1		4
EURCE 405	Environmental Engineering-I	CE	4	60	40	100	3	1		4
EURCE 406	Surveying – II	CE	3	60	40	100	3			3
EURCE 411	Fluid Mechanics Laboratory-I	BE	1		100	100			2	2
EURCE 412	Environmental Engineering Laboratory-I	CE	1		100	100			2	2
EURCE 413	Survey Field Work– II	CE	1		100	100			2	2
EURCE 414	* Industrial Tour	IT	0							
EURCE 415	English Communication Skills Laboratory	HS	2		100	100			3	3
	<b>TOTAL</b>		<b>28</b>	<b>360</b>	<b>640</b>	<b>1000</b>	<b>18</b>	<b>3</b>	<b>12</b>	<b>33</b>

\* Local tours to Project sites in and around Visakhapatnam

**B.Tech. (CE)  
V SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuo us Evaluati	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 501	Structural Analysis-II	CE	4	60	40	100	3	1		4
EURCE 502	Reinforced Concrete Structures-I	CE	4	60	40	100	3	1		4
EURCE 503	Steel Structures – I	CE	4	60	40	100	3	1		4
EURCE 504	Geo-technical Engineering- I	CE	4	60	40	100	3	1		4
EURCE 505	Fluid Mechanics – II	CE	4	60	40	100	3	1		4
EURCE 506	Environmental Engineering-II	CE	4	60	40	100	3	1		4
EURCE 511	Geo-technical Engineering Laboratory-I	CE	1		100	100			2	2
EURCE 512	Fluid Mechanics Laboratory-II	CE	1		100	100			2	2
EURCE 513	Environmental Engineering Laboratory-II	CE	1		100	100			2	2
EURCE 514	Survey Camp (to be conducted after previous Semester)	PW	2	100		100				
<b>TOTAL</b>			<b>29</b>	<b>460</b>	<b>540</b>	<b>1000</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>30</b>

**VI SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuo us Evaluatio	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 601	Reinforced Concrete Structures-II	CE	4	60	40	100	3	1		4
EURCE 602	Steel Structures – II	CE	4	60	40	100	3	1		4
EURCE 603	Geo-technical Engineering-II	CE	4	60	40	100	3	1		4
EURCE 604	Water Resource Engineering-I	CE	4	60	40	100	3	1		4
EURCE 605	Transportation Engineering-I	CE	4	60	40	100	3	1		4
EURCE 606	Project Estimation and Contracts	CE	4	60	40	100	3	1		4
EURCE 611	Strength of Materials Laboratory	CE	1		100	100			2	2
EURCE 612	Geo-technical Engineering Laboratory-II	CE	1		100	100			2	2
EURCE 613	Transportation Engineering Laboratory-I	CE	1		100	100			2	2
EURCE 614	Personality Development	HS	0		-	-			3	3
<b>TOTAL</b>			<b>27</b>	<b>360</b>	<b>540</b>	<b>900</b>	<b>18</b>	<b>6</b>	<b>9</b>	<b>33</b>

**B.Tech. (CE)  
VII SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 701	Water Resources Engineering-II	CE	4	60	40	100	3	1		4
EURCE 702	Transportation Engineering-II	CE	3	60	40	100	3			3
EURCE 703	Construction Management	HS	4	60	40	100	3	1		4
EURCE 711	Computer Applications in Civil Engineering	CE	3		100	100	-	-	5	5
EURCE 712	Non Destructive Testing Laboratory	CE	1		100	100			2	2
EURCE 713	Transportation Engineering Laboratory-II	CE	1		100	100			2	2
EURCE 714	Project Work	PW	2	50	50	100			4	4
EURCE 715	Industrial Training (to be conducted after the third year second Semester for 6weeks)	IT	2	-	100	100				
EURCE 721-727	Departmental Elective-I	DE	4	60	40	100	3	1		4
	<b>TOTAL</b>		<b>24</b>	<b>290</b>	<b>610</b>	<b>900</b>	<b>12</b>	<b>3</b>	<b>13</b>	<b>28</b>

**VIII SEMESTER**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 811	Project	PW	4	50	50	100			8	8
EURCE 831-836	Departmental Elective-II	DE	4	60	40	100	3	1		4
EURCE 841-846	Departmental Elective-III	DE	4	60	40	100	3	1		4
EURCE 851 to 8524	Inter-Departmental Elective-I	IE	4	60	40	100	3	1		4
EURCE 861 to 8619	Inter-Departmental Elective-II	IE	4	60	40	100	3	1		4
	<b>TOTAL</b>		<b>20</b>	<b>290</b>	<b>210</b>	<b>500</b>	<b>12</b>	<b>4</b>	<b>8</b>	<b>24</b>

- The distribution of 100 marks for Laboratory Examination is 40 for continuous assessment, 20 for Examination by the teacher at the middle of the semester, 40 for End Examination

**GRAND TOTAL = 26 + 24 + 23 + 28 + 29 + 27 + 24 + 20 = 201**

Interdepartmental Electives will be from other Departments. The list of courses that would be offered in any semester will be specified from which the students may select a course.

**B.Tech. (CE)**

**ELECTIVES: CIVIL ENGINEERING**

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 721-727	<b>Departmental Elective – I</b>	DE	4	40	60	100	3	1		4
721	Advanced Reinforced Concrete Structures-I									
722	Multistoreyed Structures									
723	Design of Bridges									
724	Design of Foundations for Dynamic Loading									
725	Hydraulic Structures									
726	Elements of Environmental Sanitation									
727	Environmental Impact Analysis									

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 831-836	<b>Departmental Elective – II</b>	DE	4	40	60	100	3	1		4
831	Industrial Structures									
832	Advanced Reinforced Concrete Structures-II									
833	Prestressed Concrete									
834	Ground Improvement Techniques									
835	Coastal Engineering									
836	Principles of Industrial Waste Treatment									

Course Code	Name of the Course	Category	Credits	Sem end Exam Marks	Continuous Evaluation Marks	Total Marks	Hours of Instruction per week			Total Hours
							L	T	Lab	
EURCE 841-846	<b>Departmental Elective – III</b>	DE	4	40	60	100	3	1		4
841	Finite Element Method									
842	Introduction to Earthquake Engineering									
843	Soil Dynamics and Machine Foundations									
844	Air Pollution and its Control									

845	Transportation Planning and Pavement Design	
846	Remote Sensing & Geographic Information Systems	

**B.Tech. (CE)**  
**INTER-DEPARTMENTAL ELECTIVE-I**

Course Code	Name of the Course
EURCE 852	Data Base management Systems
EURCE 853	Software Engineering
EURCE 854	Systems Modeling & Simulation
EURCE 855	Software Project Management
EURCE 856	Artificial Intelligence
EURCE 857	Transducers & Signal Conditioning
EURCE 858	Biomedical Instrumentation
EURCE 859	Power Electronics
EURCE 8510	Project Planning and Management
EURCE 8511	Neural Networks
EURCE 8512	Micro Electro Mechanical Systems Design (MEMSD)
EURCE 8513	Entrepreneurship
EURCE 8514	Public Administration
EURCE 8515	Fundamental of Communication Engineering
EURCE 8516	Equipment for Construction Industry
EURCE 8518	Data structures with C <sup>++</sup>
EURCE 8522	Basic Electronics
EURCE 8524	Computer Organisation

**INTER-DEPARTMENTAL ELECTIVE-II**

Course Code	Name of the Course
EURCE 862	Operating Systems
EURCE 863	Web Technology
EURCE 864	Industrial Electronics
EURCE 865	Computer Aided Design
EURCE 866	Robotics and Automation
EURCE 867	Mechatronics
EURCE 868	Education Research & Methodologies
EURCE 869	Professional Ethics
EURCE 8611	Thermodynamics
EURCE 8612	Digital Signal Processing
EURCE 8613	Electronic Measurement & Instrumentation
EURCE 8614	Very Large Scale Integrated System Design (VLSI)
EURCE 8616	Engineering Materials
EURCE 8617	Computer Network
EURCE 8618	Micro Processor & Micro Controllers
EURCE 8619	Managerial & Engineering Economics

## **B.Tech. (CE)**

Details of category wise credits allocated are as follows

<b>S.No.</b>	<b>Category</b>	<b>Code</b>	<b>Allocated Credits</b>
1	Humanities & Social Sciences	<b>HS</b>	<b>16</b>
2	Basic Sciences	<b>BS</b>	<b>22</b>
3	Mathematics	<b>MT</b>	<b>10</b>
4	Basic Engineering	<b>BE</b>	<b>29</b>
5	Core Engineering	<b>CE</b>	<b>94</b>
6	Departmental Electives	<b>DE</b>	<b>12</b>
7	Inter-Departmental Elective	<b>IE</b>	<b>8</b>
8	Project Work	<b>PW</b>	<b>8</b>
9	Industrial Training	<b>IT</b>	<b>2</b>
			<b>201</b>



**B.Tech. (CE) First Semester**  
**EUREG 101: English Language Skills**

Code: EUREG 101  
Credits: 3  
Department: BSH

Category: HS  
Hours: 3 per week

The fundamental aim of this course is to help the student become a confident and competent communicator in written and spoken English. The methodology in teaching and evaluation shall be oriented towards this end, rather than rote memorization.

Prerequisite: Acquaintance with basic High School Grammar and Composition.

**I. A TEXT WITH COMMUNICATIVE APPROACH**

The aim of the text is to provide interesting new approach to learning English by providing stimulating and motivating material and a wide range of activities that are meaningful, natural, authentic and useful in day-to-day life. :

**“Creative English for Communication” by N. Krishnaswamy & T. Sriraman – Macmillan India Ltd. –(2005 version) (Section – I Communicate - Units 1-6 only)**

<b>Unit-I</b>	Textual Lessons 1 & 2 Synonyms & Antonyms, One word substitutes, Words often confused, Phrasal Verbs	(8 Hours)
<b>Unit-II</b>	Textual Lesson – 3 Foreign Phrases, Tenses, Concord	(8 Hours)
<b>Unit-III</b>	Textual Lesson – 4 Error Analysis, Single Sentence Definitions, Paragraph Writing	(8 Hours)
<b>Unit-IV</b>	Textual Lesson – 5 Essay Writing, Dialogue Writing, Reading Comprehension	(8 Hours)
<b>Unit-V</b>	Textual Lesson – 6 Note Making, Précis Writing	(8 Hours)

**Text Prescribed: Part – I (Communicate - Units 1 to 6 only) of**

- ***Creative English for Communication*, N. Krishnaswamy & T. Sriraman. Macmillan India Ltd. (2005 version)**

Supplementary Reading:

*Current English for Colleges*, N. Krishnaswamy & T. Sriraman. Macmillan.

*Examine Your English*, Margaret Maison. Macmillan.

**Note:** Figures in parentheses indicate number of approximate expected hours of instruction.

\* \* \*



## B.Tech. (CE) I SEMESTER

### ENGINEERING MATHEMATICS – I

Code: EURMT102  
Credits: 4  
Department: BSH

Category: MT  
Hours: 4 per week

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

#### Unit - I.

##### **Linear Differential Equations of Higher order** (12 hours)

Definition, Complete solution, Operator D, Rules for finding complementary function, Inverse operator D, Rules for finding particular integral, Method of variation of parameters.

#### Unit-II

##### **Equations reducible to Linear Differential Equations and Applications** (08 hours)

Cauchy's and Legendre's linear equations, Simultaneous linear equations with constant coefficients and applications of linear differential equations to Oscillatory Electrical circuits LC and LCR Circuits, Electromechanical Analogy.

#### Unit –III

##### **Multiple Integrals and its Applications :** (08 hours)

Double integrals, Change of order of integration, Double integrals in Polar coordinates, Areas enclosed by plane curves, Triple integrals, Volume of solids, Change of variables, Area of a curved surface.

#### Unit –IV

##### **Special Functions and its Applications:** (08 hours)

Beta function, Gamma function, Relation between Beta and Gamma functions, Dirichlet integrals of type I and type II.

#### Unit-V

##### **Infinite Series** (12 hours)

Definitions of convergence, divergence and oscillation of a series, General properties of series, Series of positive terms, Comparison tests, Integral test, D' Alembert's Ratio test, Raabe's test, Cauchy's root test, Alternating series, Leibnitz's rule, Power series, Convergence of exponential, Logarithmic and binomial series (without proofs).

#### **Text Prescribed :**

*Higher Engineering Mathematics,* Dr.B.S Grewal. Khanna Publishers.

#### **References :**

*Advanced Engineering Mathematics,* Erwin Kreyszig. Wiley Eastern Pvt. Ltd.

*Textbook of Engineering Mathematics,* N.P.Bali. Laxmi Publications (P) Ltd.

*Higher Engineering Mathematics,* Dr.M.K.Venkata Raman. National Pub. Co.

**Note:** The figures in parentheses indicate approximate number of expected hours of instruction.

## B.Tech. (CE) I SEMESTER

### ENGINEERING PHYSICS – I

Code: EURPH 103

Category: BS

Credits: 4

Hours: 4 per week

Department: BSH

The aim of the course is to impart knowledge in Basic Concepts of Physics relevant to Engineering applications.

#### UNIT - I

(9 hours)

**Thermodynamics:** Heat and Work - First Law of Thermodynamics and Applications - Reversible and Irreversible Processes - Carnot's Cycle and Efficiency - Second Law of Thermodynamics - Carnot's Theorem - Entropy - Entropy in Reversible and Irreversible Processes - Entropy and Second Law - Entropy and Disorder - Entropy and Probability - Third Law of Thermodynamics.

#### UNIT - II

(9 hours)

**Ultrasonics:** Introduction - Production of Ultrasonics by Magnetostriction and Piezo-Electric Effects - Detection and Applications of Ultrasonics.

**Electric Field:** Calculation of E: Line of Charge, Ring of Charge, and Dipole - Dipole in an Electric Field - Concept of Electric Flux - Gauss's Law - Gauss's Law and Coulomb's Law - Gauss's Law Applications - Capacitance - Parallel Plate Capacitor - Dielectrics and Gauss Law - RC Circuit.

#### UNIT - III

(11 hours)

**Electromagnetism:** Magnetic Field - Magnetic Force on Current - Torque on a Current Loop - Hall Effect - Ampere's Law - Magnetic Induction for a Solenoid and a Toroid - Force between two Parallel Conductors - Biot Savart Law - Magnetic Induction near a Long Wire - Magnetic Induction for a Circular Loop - Faraday's Law of Induction - Lenz's Law - Inductance - Calculation of Inductance - Inductance for a Solenoid and a Toroid - LR Circuit - Induced Magnetic Fields - Displacement Current - Maxwell's Equations.

#### UNIT - IV

(8 hours)

**Dielectric Properties:** Introduction - Fundamental Definitions - Local Field - Clausius Mossotti Relation - Different Types of Electric Polarizations (electronic, ionic, and bipolar polarizations) - Frequency and Temperature Effects on Polarization - Dielectric Loss - Dielectric Breakdown - Determination of Dielectric Constant - Properties and Different Types of Insulating Materials - Ferroelectric Materials - Spontaneous Polarization in BaTiO<sub>3</sub> - Electrets.

#### UNIT - V

(8 hours)

**Magnetic Properties:** Introduction - Fundamental Definitions - Different Types of Magnetic Materials - Weiss Theory of Ferromagnetism - Domain Theory of Ferromagnetism - Hysteresis - Hard and Soft Magnetic Materials - Ferrites - Microwave Applications - Magnetic Bubbles.

#### **Prescribed Books :**

*Physics part I & II,*  
*Solid State Physics,*

Robert Resnick and David Halliday. Wiley- Eastern Limited.

P.K. Palanisamy. Scitech Publications (India) Pvt. Ltd., Chennai.

#### **Reference Books:**

*Engineering Physics,*

R.K.Gaur and S.L.Gupta. Dhanpat Rai & Sons, Delhi.

*Solid State Physics,*

S. O. Pillai. New Age International (P) Limited, New Delhi.

*Materials Science,*

Dr. M. Arumugam. Anuradha Agencies, Kumbhakonam.

*The Feynman Lectures on Physics,* Addison-Wesley.

**Note:** The figures in parentheses indicate approximate number of expected hours of instruction.

\* \* \*

## B.Tech. (CE) I SEMESTER

### ENGINEERING CHEMISTRY-I

Code: EURCH 104

Category: BS

Credits: 4

Hours: 4 per week

Department: BSH

The objective of the Course is to provide knowledge in the basic concepts of the Chemistry of Engineering materials

#### UNIT – I

**Water Technology - Sources and Purification Of Water:** (8 hours )

Sources of Water – Impurities in Water- Hardness of Water – Temporary and Permanent Hardness-Units. Municipal Water treatment- Sedimentation – Coagulation–Filtration-Sterilisation - Desalination of Brackish Water - Reverse Osmosis and Electrodialysis.

#### UNIT – II

**Water Technology-Softening Methods and Boiler Troubles:** (8 hours )

Industrial Water treatment- Lime - Soda Ash Method - Chemical reactions –Problems - Zeolite and Ion exchange processes. Boiler Troubles -- Scale and Sludge formation - Caustic Embrittlement and Boiler corrosion - Internal conditioning methods – phosphate and carbonate conditionings- Priming and Foaming

#### UNIT – III

**Crystal Structure, Metals and Alloys:** (9 hours )

Classification of solids – Amorphous and Crystalline solids. Types of Crystal Imperfections – point defects – line defects and surface defects. Liquid crystals – properties and applications.

Properties of Aluminium, Iron and Titanium

Selective ferrous alloys: Composition and applications of cast iron, steels, heat resisting steels, stainless steel.

Selective non- ferrous alloys: Brass, Bronze, Aluminium alloys and Titanium alloys.

#### UNIT – IV

**Polymers:** (9 hours)

Types of Polymerization– Mechanism of addition polymerization-Moulding constituents. Differences between Thermo Plastic and Thermosetting Resins. Preparation and Properties of Polyethylene, PVC, Polystyrene, Polyamides (Nylon-6:6), Polycarbonates and Bakelite - Engineering applications of Plastics. Examples of simple composite materials - metal matrix and polymer matrix.

#### UNIT – V

**Engineering Material Science :** (11 hours)

**Refractories:**– Classification - criteria of a good refractory. Preparation and properties of silica, magnesite and silicon carbide refractories - clay bond, silica nitride bond and self bond in silicon carbide.

**Glass:** – Manufacture of glass – types of glasses: Soft glass, hard glass and pyrex glass.

**Ceramics:** – Structural clay products, White wares and Chemical stone wares.

**Cement :** Chemical composition of Portland cement. Manufacture, Setting and Hardening of Cement.

#### Text Books Prescribed :

*Engineering Chemistry,* P.C. Jain and M. Jain.

Dhanapat Rai & Sons, Delhi.

*Engineering Chemistry,* B.K.Sharma.

Krishna Prakashan, Meerut.

*A Textbook of Engineering Chemistry,* Sashi Chawla.

Dhanapath Rai & Sons, Delhi.

#### Reference Books :

*A Textbook of Engineering Chemistry,* S.S.Dara.

S.Chand & Co. New Delhi.

*Material Science and Engineering,* V.Raghavan.

Prentice-Hall India Ltd.

**Note:** The figures in parentheses indicate approximate number of hours of instruction.

## B.Tech. (CE)I SEMESTER

### PROGRAMMING WITH C

Code            EURCS 105  
Credits:        3  
Department:   CSE

Category: BS  
Hours: 3 per week

The Aim of the course is to acquaint the student with C and the applications of C.

#### UNIT – I (8 periods)

##### **Variables, Expressions and Basic Input-Output:**

Introduction to C, Historical Development of C, Features of C, Compilers, Linker, Preprocessor, Character Set, Constants, Variables, Data Types and Keywords, Typedef statement, Operators, Operator – Precedence and Associativity, Typecasting.

Basic Input-Output: Introduction, Single Character Input-Output, String Input-Output, Types of Character in format String, Search sets.

#### UNIT – II (8 periods)

**Control Structures:** Introduction, the if statement, if-else statement, Multiway decision, Compound statements, Loops-for Loop, While Loop, do-while Loop, Break statement, Switch statement, Continue statement, Goto statement, simple examples algorithms and flowcharts.

#### UNIT – III (8 periods)

**Functions:** Introduction, Function main, where are functions useful, Functions accepting more than one parameter, User Defined and Library functions, Concepts Associated with Functions, Function Parameters, Call by Value and Call by Reference, Return Values, Recursion, Comparison of Iteration and Recursion, Variable Length Argument Lists.

**Storage classes:** Automatic, Register, Static and external storage classes.

#### UNIT – IV (8 periods)

**Arrays And Strings:** Introduction to Arrays, Initialization of Array, How arrays are useful, Multi dimensional Arrays.

**Strings:** What are Strings, Arrays of Strings and Standard Library String Functions.

**Pointers:** Introduction, Definition and use of pointers, Address operator, Pointer variables, Dereferencing Pointers, Void Pointers, Pointer Arithmetic, Pointers to Pointers, Pointers and Arrays, Passing arrays to Functions, Pointers and Functions.

#### UNIT – V (8 periods)

##### **Structures, Unions And Files:**

Introduction, Declaring and Using Structures, Structure initialization, Structure within a Structure, Operations on Structures, Array of Structures, Array within Structure, Pointers to Structures, Pointers Within Structures, Structures and Functions,

**Unions:**, Differences between Unions and Structures, Operations on Unions, Scope of a Union, Bit fields.

**Files:** Introduction, File Structure, File handling functions, File Types, Unbuffered and Buffered Files, Error Handling.

##### **Text Books:**

MASTERING C,            by K R Venugopal, S R Prasad published by Tata McGraw Hill.

##### **Reference Books:**

Programming with ANSI and Turbo C    by Ashok N. Kamthane,    published by PEARSON Education  
Let us C by            Yashwant Kanetkar, published by BPB Publications.

**Note:** The figures in parentheses indicate approximate number of expected hours of Instruction.

\* \* \*

**B.Tech. (CE) First Semester  
GEOMETRICAL DRAWING**

Code            EURME106/205  
Credits:        2  
Department:   Mech Engg

Category: BE  
Hours: 2 per week

**UNIT – I Orthographic projections and projections of points:**

Introduction to Orthographic projections- First angle projection and third angle projection. Projection of points

**Projections of straight lines:**

Projections of straight lines: line parallel to one or both planes, line perpendicular to one of the planes, line inclined to one plane, line inclined to both the planes. True length of straight line and true angles and its traces.

**UNIT – II Projections of planes:**

Introduction, types of planes – perpendicular planes – perpendicular to one plane and parallel to other plane, perpendicular to one plane and inclined to other plane, oblique planes.

Projections on auxiliary planes: types of auxiliary planes, perpendicular to one plane and parallel to other plane, perpendicular to one plane and inclined to other plane, oblique planes.

**UNIT – III Projections of Solids:**

Introduction- types of solids – polyhedral-tetrahedron, prism, pyramid and solids of revolution-cylinder, cone. Projection of solids – simple positions, axis inclined to one plane and parallel to other, axis inclined to both the planes.

**UNIT – IV Development of Surfaces:**

Developments of lateral surfaces of right solids – cube, prisms, cylinders, pyramids and cones.

**Sections of Solids:**

Introduction – section planes, sections and true shape of a section. Sections and sectional views of solids – prism, pyramid, cylinder and cone.

**UNIT – V Isometric Projections:**

Introduction – isometric axes, lines and planes. Isometric scale, isometric view and projections of solids in simple position - prism, pyramid, cylinder, cone and sphere.

**Text books:**

“Engineering Drawing” by N.D .Bhatt and V.M.Panchal (Charotar Publishing house Private Limited) Forty-ninth edition;2008

**References:**

“Engineering Drawing” by Basant Agarwal and C.M.Agarwal(Tata McGraw-Hill Publishing company Ltd)

“Engineering Drawing With A Primer On Autocad” by Arshad N. Siddiquee (Prentice-hall Of India Pvt Ltd)

“Textbook On Engineering Drawing Engineering Drawing” by K.L Narayana and P Kannaiah (Scitech Publications (india) Pvt Lt)

"Fundamentals of Engineering Drawing" by Warren J. Luzzader (Prentice Hall of India)

5. "Principles of Engineering Graphics" by Fredderock E. Giesecke and Alva Mitchell (Maxwell McMillan Publishing)

6. "Engineering Drawing" by D. N. Johle ( Tata Mcgraw-hill Publishing Co. Ltd..)

**B.Tech. (CE)  
First Semester**

**WORKSHOP TECHNOLOGY**

Code            EURME111/211  
Credits:        2  
Department:   Mech Engg

Category: BE  
Hours: 3 per week

Course Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem End Exam	Sessionals	
EURME 111/211	BE	--	3	3	40	60	2

The main aim of Workshop Technology is to acquaint the student with the basic tools used in Workshop Technology and to develop skills in using these tools to perform simple tasks. The students should be able to work with these tools to prepare simple jobs in Wood Work Technology, Sheet Metal Working, Forging Technology and Fitting Technology .

An illustrative list of tasks to be performed by the student is given below:

**I. Wood Working Technology** - Familiarity with different types of woods used and tools used in wood Working technology.

Tasks to be performed:

- |                                  |                                    |
|----------------------------------|------------------------------------|
| 1) To make Half – Lap joint      | 2) To make Mortise and Tenon joint |
| 3) To make Corner Dovetail joint | 4) To make Bridle joint.           |

**II. Sheet Metal Working** – Familiarity with different types of tools used in sheet metal working, developments of sheet metal jobs from GI sheets, knowledge of basic concepts of soldering.

Tasks to be performed:

- |                           |                            |
|---------------------------|----------------------------|
| 1) To make Square Tray    | 2) To make Taper side Tray |
| 3) To make Conical Funnel | 4) To make Elbow Pipe.     |

**III. Forging Technology** – Familiarity with different types of tools used in forging technology.

Knowledge of different types of furnaces like coal fired, electrical furnaces etc...

Tasks to be performed:

- |  |  |
|--|--|
| 1) To make round M.S rod to square rod | 2) To make L bend in given M.S. Rod.                                 |
| 3) To make S bend in given M.S. Rod.   | 4) To perform heat treatment tests like annealing, normalizing etc.. |

**IV. Fitting Technology** – Familiarity with different types of tools used in fitting technology.

Tasks to be performed:

- |                             |                                  |
|-----------------------------|----------------------------------|
| 1) To make “V” – fitting    | 2) To make Rectangular fitting   |
| 3) To make Dovetail fitting | 4) To make Semi circular fitting |
| 5) To make Hexagon fitting  |                                  |

❖ **Student is required to work individually and complete at least three jobs in each technology.**

**Dress Code:**

❖ **For Boys** : Blue Colour Long Apron, Khaki Trousers, Half Sleeve Shirt (Tucked-in ), Black Leather Shoes.

❖ **For Girls** : Blue Colour Long Apron, Salwar Suit, Black Shoes.

**Reference Book:**

*Workshop Technology, Part 1*, W.A.J. Chapman, Viva Low Priced Student Edition.  
*Elements of Workshop Technology, Volume 1*, S.K.Hajra Choudhury, S.K.Bose.  
A.K.Hajra Choudhury and Nirjhar Roy, Media Promoters and Publishers Pvt. Ltd.

\* \* \*

**B.Tech. (CE)First Semester****ENGINEERING PHYSICS LAB**

Code EURPH 112/212

Credits: 2

Department: BSH

Category: BS

Hours: 3 per week

The main aim of the course is to acquaint the students with basic concepts in Engineering Physics using the following illustrative list of experiments.

1. J - by Callender and Barne's Method.
2. Thermal Conductivity of a Bad Conductor - Lee's Method.
3. Magnetic Field along the Axis of a Circular Coil Carrying Current - Stewart and Gee's Galvanometer.
4. Hall Effect - Measurement of Hall Coefficient.
5. Carey Foster's Bridge - Laws of Resistance and Specific Resistance.
6. Calibration of Low Range Voltmeter - Potentiometer Bridge Circuit.
7. Thickness of a Paper Strip - Wedge Method.
8. Newton's Rings - Radius of Curvature of a Plano Convex Lens.
9. Diffraction Grating - Normal Incidence.
10. Determination of Refractive Indices ( $\mu_o$  and  $\mu_e$ ) of a Bi-Refringent Material (Prism).
11. Cauchy's Constants - Using a Spectrometer.
12. Dispersive Power of a Prism - Using a Spectrometer.
13. Determination of Rydberg Constant.
14. LASER - Diffraction.
15. Determination of Band Gap in a Semiconductor.
16. Optical Fibres - Numerical Aperture and Loss of Signal.

\* \* \*

## **B.Tech. (CE)First Semester**

### **PROGRAMMING LAB WITH C**

Code            EURCS 113  
Credits:        2  
Department:   CSE

Category: BE  
Hours: 3 per week

The aim of the Lab is to acquaint the students with C language. The illustrated list of experiments is as follows:

1. Write a Program to Read X, Y Coordinates of Three Points and then Calculate the Area of the Triangle formed by them and Print the Coordinates of the Three Points and the Area of the Triangle. What will be the Output from your Program if the Three Given Points are in a Straight Line?
2. Write a Program to Find the Roots of a Quadratic Equation using if else and Switch Statements.
3. Write a Program which Generates One Hundred Random Integers in the Range of 1 To 100, store them in an array and then prints the average. write three versions of the program using Different Loop Constructs (e.g for, while and do. while).
4. Write a Program for Multiplication of Square Matrices.
5. Write a Program to Find Max & Min Elements with their Positions in a Given Array and then Sort the Above Array.
6. Write a Program to Insert an Element into an Array.
7. Write a Function for Transposing a Square Matrix in Place. (In Place Means that You are Not Allowed To have Full Temporary Matrix).
8. Write a Program to Print Fibonacci Series Using Functions.
9. Write a Program to Find the Factorial of a Given Number using Recursion.
10. Write a Program to Find  ${}^n C_r$  using Non Recursive Function while Finding the Factorial Value Using Recursive Function.
11. Write a Program to find whether the Given String is Palindrome or not without using string functions.
12. Given an Array of Strings Write a Program to Sort the Strings in Dictionary Order.
13. Develop a program to implement a structure to read and display the Name, Birth date and Salary of ten Employees.
14. Develop a program to display the Name, Marks in five subjects and total marks of ten students. ( Using array of structures).
15. Develop a program to read and write to a file.



16. Develop a program to create and count the number of characters in a file.

## **B.Tech. (CE) Second Semester**

### **EUREG 201: English Writing Skills**

Code: EUREG 201

Category: HS

Credits: 3

Hours: 3 per week

Department: BSH

This course is specially designed to teach the elements of effective writing and communicative methods, while imparting the essential skills that help personality development.

A Text with communicative and contemplative approach “Creative English for Communication” by N. Krishnaswamy & T. Sriraman – Macmillan India Ltd. –(2005 version) (Section – II Contemplate - Units 7-13)

<b>Unit – I</b>	Textual Lessons - 7 & 8 Preparation of Abstract, Technical Paper Writing	(8 hours)
<b>Unit - II</b>	Textual Lesson – 9 Notices, Minutes of the Meeting	(8 hours)
<b>Unit -III</b>	Textual Lesson - 10 Letter Writing (Letters of Enquiry, Permission, Regret, Reconciliation, Complaint)	(8 hours)
<b>Unit -IV</b>	Textual Lessons - 11 & 12 Drafting Curriculum Vitae, Resume and Covering Letters, Job Applications	(8 hours)
<b>Unit - V</b>	Textual Lesson -13 Memo, E-mail Etiquette	(8 hours)

#### **References :**

*Technical Communication – Principles and Practic*, Meenakshi Raman & Sangeeta Sharma. Oxford University Press.

*Communication Skills for Engineers & Professionals*, Prasad. S.K.Kataria & Sons.

*Creative English for Communication*, N.Krishnaswamy & T.Sriraman. Macmillan.

*Business Communication and Report Writing*, G.S.R.K. Babu Rao. Himalaya Publishing House.

*Effective English Communication For You*, V.Shyamala. Emerald Publishers.

*Communicative Skills for Technical Students*, M.Faratullah. Orient Longman.

*Practical English Grammar*, Thompson & Martinet. Oxford University Press.

**Note:** Figures in parentheses indicate number of approximate expected hours of instruction.

\* \* \*

## B.Tech. (CE)II SEMESTER

### ENGINEERING MATHEMATICS – II

Code: EURMT202

Category: MT

Credits: 3

Hours: 3 per week

Department: BSH

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

**Unit – I** (10 hours)

#### **PARTIAL DIFFERENTIATION:**

Introduction to Partial differentiation, Total derivative, Differentiation of implicit functions, Geometrical interpretation, Tangent plane and normal to a surface, Change of variables, Jacobians, Taylor's theorem for functions of two variables.

**Unit –II** (08 hours)

#### **APPLICATIONS OF PARTIAL DIFFERENTIATION :**

Total differential, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign, Leibnitz's Rule.

**Unit-III** (10 hours)

#### **PARTIAL DIFFERENTIAL EQUATIONS :**

Introduction, Formation of partial differential equations, Solutions of partial differential equations, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Homogeneous linear equations with constant coefficients, Rules for finding the complementary function, Rules for finding the particular integral.

**Unit-IV** (08 hours)

#### **LINEAR ALGEBRA-1:**

Rank of Matrix, Elementary transformations, Elementary matrices, Inverse, Normal form, Consistency of linear system of equations, Linear transformations.

**Unit-V** (10 hours)

#### **LINEAR ALGEBRA – 2:**

Eigen values and Eigen vectors of a matrix, Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms and canonical forms, Hermitian and Skew- Hermitian matrix, Unitary matrix.

#### **Text Books Prescribed :**

*Higher Engineering Mathematics*, Dr.B.S Grewal. Khanna Publishers.

#### **References :**

*Advanced Engineering Mathematics*, Erwin Kreyszig. Wiley Eastern Pvt. Ltd.  
*Textbook of Engineering Mathematics*, N.P.Bali. Laxmi Publications (P) Ltd.  
*Higher Engineering Mathematics*, Dr.M.K.Venkata Raman. National Pub. Co.

**Note:** The figures in parentheses indicate approximate number of expected hours of Instruction.

\* \* \*

## B.Tech. (CE)II SEMESTER

### ENGINEERING MATHEMATICS – III

Code: EURMT203

Category: MT

Credits: 3

Hours: 3 per week

Department: BSH

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

**Unit-I** (12 hours)

**Fourier Series:**

Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions, Expansions of odd and even periodic functions, Half range series and practical Harmonic Analysis.

**Unit-II** (8 hours)

**Laplace Transforms:**

Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Inverse transforms, Transforms of derivatives, Transforms of integrals, Multiplication by  $t^n$ , Division by  $t$ , Convolution theorem.

**Unit-III** (8 hours)

**Applications Of Laplace Transforms:**

Applications to ordinary differential equations and simultaneous linear equations with constant coefficients, Unit step function, Unit impulse function, Periodic functions (without proofs).

**Unit-IV** (8 hours)

**Vector Calculus (Differentiation) :**

Scalar and vector fields, Gradient, Divergence, Curl, Directional derivative, Identities, Irrotational and Solenoidal fields.

**Unit-V** (12 hours)

**Vector Calculus (Integration) :**

Line integral, Surface integral, Volume integral, Green's theorem in a plane, Stoke's and Gauss divergence theorems with proofs, Introduction of orthogonal curvilinear co-ordinates, Cylindrical co-ordinates, Spherical polar co-ordinates (without proof)

**Text Prescribed :**

*Higher Engineering Mathematics,* Dr.B.S Grewal. Khanna Publishers.

**References :**

*Advanced Engineering Mathematics,* Erwin Kreyszig. Wiley Eastern Pvt. Ltd.

*Textbook of Engineering Mathematics,* N.P.Bali. Laxmi Publications (P) Ltd.

*Higher Engineering Mathematics,* Dr.M.K.Venkata Raman. National Pub. Co.

**Note:** The figures in parentheses indicate approximate number of expected hours of Instruction.

**B.Tech. (CE)II SEMESTER**  
**ENGINEERING PHYSICS – II**

Code: EURPH 204  
Credits: 3  
Department: BSH

Category: BS  
Hours: 3 per week

The aim of the course is to impart knowledge in basic concepts of physics relevant to engineering applications.

**UNIT - I** (9 hours)

**Interference:** Introduction - Interference in Thin Films - Wedge Shaped Film - Newton's Rings - Michelson's Interferometer and Applications.

**Diffraction:** Introduction - Differences between Fresnel and Fraunhofer Diffractions - Single Slit Diffraction (Qualitative and Quantitative Treatment) - Differences between Interference and Diffraction - Gratings and Spectra - Multiple Slits - Diffraction Grating - X-ray Diffraction - Bragg's Law.

**UNIT - II** (9 hours)

**Polarisation:** Introduction - Double Refraction - Negative Crystals and Positive Crystals - Nicol's Prism - Quarter Wave Plate and Half Wave Plate - Production and Detection of Circularly and Elliptically Polarised Lights.

**Lasers:** Introduction - Spontaneous and Stimulated Emissions - Population Inversion - Ruby Laser - He Ne Laser - Semiconductor Laser - Applications.

**UNIT - III** (10 hours)

**Modern Physics:** Matter Waves - Heisenberg's Uncertainty Principle - Schrodinger's Time Independent Wave Equation - Physical Significance of Wave Function ( $\psi$ ) - Application to a Particle in a one Dimensional Box (Infinite Potential Well) - Free Electron Theory of Metals - Band Theory of Solids (qualitative) - Distinction between Metals, Insulators, and Semiconductors - Elementary Concepts of Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac Statistics (No Derivation).

**UNIT - IV** (8 hours)

**Fibre Optics:** Introduction - Optical Paths in Fibre - Optical Fibre and Total Internal Reflection - Acceptance Angle and Cone of a Fibre - Fibre Optics in Communications - Applications.

**Superconductivity:** Introduction - BCS Theory - Meissner Effect - Properties of Superconductors - Type-I and Type-II Superconductors - High  $T_c$  Superconductors - Applications.

**UNIT - V** (9 hours)

**Semiconductors:** Introduction - Intrinsic and Extrinsic Semiconductors - Carrier Concentration in Intrinsic Semiconductors - Carrier Concentration in N-Type Semiconductors - Carrier Concentration in P-Type Semiconductors - Hall Effect and Applications - Variation of Carrier Concentration with Temperature - Conductivity of Extrinsic Semiconductor - PN Junction - Forward Bias - Reverse Bias - VI Characteristics of a PN Junction.

**Prescribed Books :**

*Physics Part I & II,* Robert Resnick and David Halliday. Wiley- Eastern Limited.  
*Solid State Physics,* P.K. Palanisamy. Scitech Publications (India) Pvt. Ltd., Chennai.

**Reference Books:**

*Engineering Physics,* R.K.Gaur and S.L.Gupta. Dhanpat Rai & Sons, Delhi.

*Solid State Physics,* S. O. Pillai. New age International (P) Limited, New Delhi.  
*Materials Science,* Dr. M. Arumugam. Anuradha Agencies, Kumbhakonam.  
*Modern Physics,* Arthur Beiser. Tata Mc Graw-Hill.  
*The Feynman Lectures on Physics,* Addison-Wesley.

**Note:** The figures in parentheses indicate approximate number of expected hours of instruction.

**B.Tech. (CE) Second Semester**  
**EURCH205: ENGINEERING CHEMISTRY-II**

Code: EURCH 205  
Credits: 3  
Department: BSH

Category: BS  
Hours: 4 per week

The objective of the syllabus is to provide knowledge in the basic concepts of the Chemistry of Engineering materials.

**Unit-I** (9 hours)

**Non-Conventional Energy Sources and Applications:** **Chemical:** Electrode Potential –Determination of Single Electrode Potential-Reference Electrodes – Hydrogen and Calomel Electrodes. Electrochemical Series and its Applications. Primary Cell–Dry or Leclanche Cell. Secondary Cell – Lead acid storage cell - Fuel Cell: Hydrogen-Oxygen Fuel Cell.  
**Nuclear :** Nuclear Fission and Nuclear Fusion – Applications of Nuclear Energy  
**Solar :** Photoelectric cells –Applications of Solar Cells

**Unit-II** (11 hours)

**Corrosion Engineering:** Definition of Corrosion. Theories of Corrosion –Dry Corrosion and Electro Chemical Corrosion - Factors affecting corrosion- Nature of the Metal and nature of the Environment. Prevention of Corrosion: Cathodic protection, Inhibitors, Metallic coatings – Anodic and Cathodic coatings -Galvanising and Tinning, Anodized Coatings. Organic Coatings-Paints – Characteristics, Constituents and their functions, Varnishes.

**Unit-III** (9 hours)

**Fuel Technology : Calorific Value And Solid Fuels:** Classifications of Fuels – Characteristics of Fuels- Calorific Value - Units. Determination – Bomb Calorimetric Method- Dulong’s formula. Solid Fuels–Coal, Classification of Coal by Rank-Analysis of Coal –Proximate and Ultimate Analysis. Coke : Manufacture of Coke- Beehive oven and Otto Hoffmann’s by product oven processes.

**Unit-IV** (8 hours)

**Fuel Technology : Liquid Fuels:** Refining of Petroleum - Petroleum products used as fuels - Gasoline - Knocking and Octane number of gasoline. Diesel - Cetane Number - High speed and Low speed Diesel oil. Synthetic Petrol –Bergius and Fischer – Tropisch methods. . Power alcohol - Manufacture, Advantages and Disadvantages - LPG.

**Unit-V** (8 hours)

**Lubricants :** Classification-Properties- Viscosity ,Oiliness, Flash and Fire - Points, Cloud and Pour - Points. Aniline point, Saponification number, Carbon residue, Emulsification number, Volatility, Precipitation number, Specific gravity and Neutralization number. Principles and Mechanism of Lubrication - Fluid Film, Boundary and Extreme - Pressure Lubrications.

**Text Books Prescribed :**

*Engineering Chemistry*, P.C. Jain and M. Jain. Dhanapat Rai & Sons, Delhi.  
*Engineering Chemistry*, B.K.Sharma.Krishna Prakashan,Meerut.  
*A Textbook of Engineering Chemistry*, Sashi Chawla. Dhanapath Rai & Sons, Delhi.

**Reference Books :**

*A Textbook of Engineering Chemistry*, S.S.Dara. S.Chand & Co. New Delhi.  
*Material Science and Engineering*, V.Raghavan. Prentice-Hall India Ltd.

**Note:** The figures in parentheses indicate approximate number of hours of instruction.

## B.Tech. (CE)II SEMESTER

### OBJECT ORIENTED PROGRAMMING WITH C++

Code: EURCS206  
Credits: 3  
Department: CSE

Category: BE  
Hours: 3 per week

The Aim of the course is to acquaint the student with C++ and the applications of C++

#### UNIT-I.

##### **Basics, Tokens, Expressions:**

(8 hours)

Software Crisis, Software Evolution, Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages, Features of OOP. How OOP Differ from POP. Applications of OOP, A Simple C++ Program, Structure of C++ Program. Tokens, Keywords, Identifiers and Constants, Basic Data Types, User Defined Data Types, Derived Data Types, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators.

#### UNIT-II.

##### **Functions, Classes and Objects:**

(8 hours)

Introduction to Classes, Specifying a Class, Defining a Member Functions, A C++ Program with Class Access Specifiers, Inline functions, Nesting of Member Functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Default Arguments, Const Arguments, Function Overloading, Friend Functions

#### UNIT-III

##### **Constructors, Destructors, Inheritance:**

(8 hours)

Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors. Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes, Containership, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

#### UNIT-IV

##### **Pointers, Virtual Functions and Polymorphism:**

(8 hours)

Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors.

#### UNIT-V.

##### **Templates and Exception handling:**

(8 hours)

Introduction, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Member Function Templates. Basics of Exception Handling, Types of exceptions, Exception Handling Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

#### **Text Book Prescribed :**

Object Oriented Programming in C++ by E.Balagurusamy., published by Tata McGraw-Hill.

#### **Reference Book :**

1. Mastering C++ by K.R.Venugopal., published by Tata McGraw- Hill.

**B.Tech. (CE)II SEMESTER**

**ENGINEERING GRAPHICS LAB**

Code: EURME15/215

Category: BE

Credits: 2

Hours: 3 per week

Department: Mech Engg

1. 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) (1 hr practice)
2. Introduction to draw commands – line, circle, rectangle, polygon etc. (1 hr practice)
3. Introduction to modify commands – extend, trim, chamfer, rotate, etc. (1 hr practice)
4. Introduction to dimensioning and object properties. (1 hr practice)
5. Engineering Curves – Conics –general method, cycloid, epicycloids, hypocycloid, involutes. (1 hr practice)
6. Projection of planes (2 hr practice)
7. Sections and sectional views of solids – prism, pyramid, cylinder, cone (2 hr practice)
8. Developments of solids- prism, pyramid, cylinder, cone. (2 hr practice)
9. Intersection of solids- prism to prism, cylinder to cylinder (1 hr practice)



**B.Tech. (CE)II SEMESTER**

**ENGINEERING CHEMISTRY LAB**

Code: EURCH114/214

Credits: 2

Department: BSH

Category: BS

Hours: 3 per week

The objective of the Laboratory Practicals is to make the student to acquire the basic concepts in Engineering Chemistry.

1. Calibration of Volumetric Apparatus.
2. Determination of sodium carbonate in soda ash.
3. Estimation of Iron as Ferrous Iron in an Ore Sample.
4. Estimation of Calcium in Portland cement.
5. Estimation of Volume Strength of Hydrogen Peroxide.
- 6 a) Estimation of Active Chlorine Content in Bleaching Powder.  
b) Determination of Hardness of a Ground Water Sample.
7. Determination of Chromium (VI) in Potassium Dichromate.
8. Determination of Copper in a Copper Ore.
9. a) Determination of Viscosity of a Liquid  
b) Determination of Surface Tension of a Liquid.
10. a) Determination of Mohr's Salt by Potentiometric Method.  
b) Determination of Strength of an Acid by pH metric Method

\* \* \*

## B.Tech. (CE)II SEMESTER

### OBJECTED ORIENTED PROGRAMMING LAB WITH C++

Code            **EURCS 213**  
Credits:        **2**  
Department:   **CSE**

Category: **BE**  
Hours: **3 per week**

The aim of the Lab is for students to get acquainted with C++ language. The illustrated list of experiments is as follows.

1. Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
2. Write a Program to Implement a Class STUDENT having Following Members:

#### **Data members**

Name of the student  
Marks of the student

#### **Member functions**

to Assign Initial Values  
to Compute Total, Average  
to Display the Data

3. Write a Program to Demonstrate Operator Overloading.
4. Write a Program to Demonstrate Function Overloading.
5. Write a Program to Demonstrate Friend Function and Friend Class.
6. Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
7. Write a Program to Demonstrate Containership.
8. Write a Program to Generate Fibonacci Series by using Constructor to Initialize the Data Members.
9. Write a Program to Demonstrate Multiple Inheritance.
10. Write a Program to Invoking Derived Class Member Through Base Class Pointer.
11. Write a Template Based Program to Sort the Given List of Elements.
12. Write a Program to Demonstrate Catching of All Exceptions.
13. Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
14. Write a Program to Demonstrate Dynamic Binding through Virtual Functions.

\* \* \*

## B.TECH. (CE) III SEMESTER

### EURCE 301: ENGINEERING MECHANICS – STATICS AND DYNAMICS

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 301	BE	4			4	60	40	100	4

#### UNIT-I

**Equilibrium:** Free body diagram – Equilibrium of rigid bodies acted on by concurrent and non-concurrent coplanar system of forces. Analysis of Truss – Method of joints.

#### UNIT- II

**Centroids and Centres of Gravity:** Centre of gravity of parallel forces in a plane. Centroids and centre of gravity of composite areas and composite bodies – Distributed Loads on Beams.

#### UNIT-III

**Moments of Inertia:** Definition – Moments of inertia of areas by integrations. Radius of gyration – Parallel axis theorem– Perpendicular axis theorem - Moments of inertia of composite areas — Mass moment of inertia of simple bodies like disc, cylinder, rod, hoop, sphere.

#### UNIT-IV

**Kinematics :** Introduction – Recapitulation of basic terminology and concepts of Kinematics. Newton's Laws of motion. Absolute Motion and Relative motion. Rectilinear motion of a particle. Curvilinear motion of a particle – Projectiles – simple problems.

#### UNIT-V

**Kinetics :** Introduction to Kinetics – Newton's Laws of motion - Work , Energy - Potential energy and Kinetic energy – Law of Conservation of energy - D' Alembert's principle. Work-Energy Principle. Simple Applications of above principles to Rectilinear and Curvilinear motion of a rigid body.

#### REFERENCES BOOKS:

1. Timoshenko and D.H. Young, Engineering Mechanics, McGraw Hill, Fourth edition
2. Engineering Mechanics by Singer, Prentice Hall India.
3. J.L. Meriam John Wiley & Sons, Engineering Mechanics
4. F.B. Beer and E.R. Johnston, Jr., Vector, Mechanics for Engineers Statics and Dynamics, Tata McGraw Hill, Fourth edition, 2002
5. I.B. Prasad, Applied Mechanics, Khanna Publishers, Delhi, Tenth edition 1984
6. A.K.Tayal, Engineering Mechanics

## B.TECH. (CE) III SEMESTER

### EURCE 302: MECHANICS OF SOLIDS

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 302	BE	3	1	-	4	60	40	100	4

#### UNIT-I:

**Effects of force:** tension, compression and shear. Stress as internally elastic resistance of a material – strain – property of elasticity – Hooke's law – stress-strain diagrams. Lateral strain, Poisson's ratio. Complementary Shear Stress, Shear Strain, Shear Modulus. Relation between Modulus of Elasticity, Modulus of Rigidity and Bulk Modulus. Stresses in Composite Assemblies due to Axial Load.

#### UNIT-II:

Effect of transverse force, Shear force, Bending moment diagram for a) Cantilever b) Simply supported and c) Over hanging beams. Theory of simple bending: flexural normal stress distribution.

#### UNIT-III

Stresses on oblique plane – Resultant stress – Principal stress and maximum shear stress and location of their planes. Mohr's circle for various cases of Stresses.

#### UNIT-IV

Theory of pure torsion for solid and hollow circular sections – torsional shear stress distribution.

#### UNIT-V

**Columns and Struts:** Combined bending and direct stresses – kern of a section – Euler's theory – end conditions, Rankine – Gordon formula - Eccentrically loaded columns – Secant formula.

#### Reference books:

1. Timoshenko and Young, Elements of strength of materials Affiliated East-West Press Pvt. Ltd,
2. Pundit & Gupta, Structural Analysis by Tata McGraw Hill Publishing Company Ltd, New Delhi
3. P.N. Singer and P.K. Jha, Elementary mechanics of solids, New Age International Pvt.Ltd
4. Ramamrutham, Strength of materials, Dhanpat Rai & Sons
5. Vazirani and Ratwani, Strength of materials, Khanna Publishers

## B.TECH. (CE) III SEMESTER

### EURCE 303: BUILDING MATERIALS & BUILDING CONSTRUCTION

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Session	End Exa	Total	
		EURCE 303	CE	3			2	5	

#### PART – A – building materials

##### UNIT – I:

##### **Building Stones:**

Stones Classification of rocks basing on geological, physical and chemical etc., characteristics and use of various stones available in India. Stone quarrying methods, precautions to be taken, various explosives to be used; Methods of dressing stones. Various tests on stones as per I.S code. Natural bed of stone. Artificial stones-Varieties.

##### UNIT – II:

##### **Bricks, Glass and its products**

Bricks Qualities of brick earth, Classification of bricks. Manufacture of bricks, tests for good bricks as per I.S Code.

Glass and its products

Raw materials for glass, manufacture of glass, properties and uses.

##### UNIT – III:

##### **Wood**

Cross section details of a tree, Various methods of timber classification, Various types of defects in wood, Methods of seasoning, Properties of timber, Decay of timber, Plywood its types, manufacture of plywood, laminated wood, Batten board and particle board.

##### UNIT – IV:

##### **Paints**

Constituents of a paint, uses, preparation on different surfaces, painting defects.

Cements: Natural and artificial cements, types of artificial cements, uses, manufacture of OPC.

Various field and lab tests on OPC. Storing of cement.

#### PART-B: Building Construction

##### UNIT – V:

##### **Foundations**

Types of foundation, Brief description of shallow foundation, strip, isolated, combined footing, mat foundation. Stone and Brick masonry Types of stone and Brick masonry - Plastering – Pointing, Doors and Windows Types of doors and windows, Staircases, Different types of Stair Cases, Arrangement of Stairs.

Note: Drawings Exercises of Conventional Signs, Masonry, Doors, Windows, and Staircases.

##### **References:**

1. “Civil Engg. Materials”, by Technical Teachers’ Training Institute, Chandigarh, Tata McGraw Hill Publishing Company Ltd, New Delhi.
2. R.C. Smith, “Materials of Construction”, McGraw Hill Company, New York.
3. Surindra Singh, “Engineering Materials”, Konark Publishing Pvt. Ltd, New Delhi, 5<sup>th</sup> Edition
4. Rangwala, Building Materials, Charotar Publishing House, 7<sup>th</sup> edition, 1982.

## B.TECH. (CE) III SEMESTER

### EURCE 304: CONCRETE TECHNOLOGY

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 304	CE	2			2	60	40	100	2

#### UNIT-I:

**Portland Cement:** Historical note, Chemical composition, Hydration of cement, Setting, Fineness of cement, Structure of hydrated cement, Tests on properties of cement.

#### UNIT-II:

**Properties of aggregates:** General classification of aggregates, Classification of natural aggregates, Sampling, Particle shape and texture, Bond of aggregate, Strength of aggregate, Other mechanical properties of aggregate, Specific gravity, Bulk density, Bulking of fine aggregate, Deleterious substances in aggregate, Soundness of aggregate, Alkali-silica reaction, Sieve analysis, Grading requirement, Practical gradings, Grading of fine and coarse aggregates, Maximum aggregate size.

#### UNIT-III:

**Fresh concrete:** Quality of mixing water, Definition of workability, the need for sufficient workability, Factors affecting workability, Measurement of workability.

**Admixtures:** Benefits of admixtures, types of admixtures, accelerating admixtures, retarding admixtures, water-reducing admixtures, Superplasticizer, special admixtures.

#### UNIT-IV:

**Strength of concrete:** Water/cement ratio, effect of age on strength of concrete, relation between compressive and tensile strengths, bond between concrete and reinforcement. **Testing of hardened concrete:** Tests for compressive strength, effect of condition of specimen and capping, comparison of strengths of cubes and cylinders, tests for strength in tension, flexure test, split tension test, accelerated curing test,

#### UNIT-V:

**Concretes with particular properties:** concrete with different cementitious materials, concrete containing fly ash, GGBS, silica fume, high performance concrete, properties of aggregate in HPC. Aspects of HPC in the fresh state, aspects of hardened HPC, durability of HPC, future of HPC. Selection of concrete mix proportions: IS mix design, ACI mix design of Concrete.

#### Reference Books:

1. A M Neville, Properties of Concrete.
2. M S Shetty, Concrete Technology, S.Chand & Company Ltd., First Edition, Reprint, 2005.
3. P K Mehta, Microstructure of Concrete, Cement Ambuja, 1<sup>st</sup> edition, June 1997.

## B.TECH. (CE) III SEMESTER

### EURCE 305: SURVEYING – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 305	CE	3			3	60	40	100	3

#### UNIT-I:

**Chain Survey:** Classification of surveying-Principles of Surveying-Linear measurements, Direct measurement. Problems on Base line measurement- -Offsets-Basic problems in chaining-obstacles in chaining-Problems.

#### UNIT- II:

**Compass Survey:** (a) Introduction to compass survey Definitions of Bearing. True bearing, True meridian, Magnetic Meridian, Magnetic bearing. F.B. & B.B of lines – Designation of bearings – W.C.B. & R.B. – related problems. Theory of Magnetic compass (i.e. Prismatic compass) – Magnetic dip-Description of Prismatic Temporary adjustments of compass-Magnetic Declination – Local attraction-Related Problems-Errors in compass survey.

#### UNIT- III:

**Plane table surveying:** Introduction-Advantages accessories-Temporary adjustment. Methods of plane tabling-Plane table traversing-Three point problem – Mechanical method – Two point problem-Errors in plane tabling.

#### UNIT- IV:

**Levelling:** Definitions of terms-Methods of levelling-Uses and adjustments of dumpy level-Temporary and permanent adjustments of dumpy level leveling, Differential leveling, profile leveling, Reciprocal leveling, H.I. method-Rise and fall method-Checks-Related problems-Reciprocal levelling-Related problems-L.S & C.S Levelling-Problems in levelling-Errors in levelling.

#### UNIT-V:

**Contouring:** Definitions-Interval, Characteristics of contours-methods of locating contours-Direct and indirect methods-Interpolation of contours-Contour gradient-Uses of contour maps. Introduction to Auto Level.

Minor instruments : Uses and adjustments of the following minor instruments (i) Line Ranger, Optical Square, Abney level, Clinometer, Ceylon Ghattracer, Pantagraph, Sextant and Planimeter.

#### Reference Books:

1. Dr. K.R. Arora, Surveying Vo.I, Standard Book House, 6<sup>th</sup> edition, 2000
2. Punmia, Surveying Vol.I, Standard Book House, 9<sup>th</sup> edition, 1985
3. S.K.Duggal, Surveying Vol.I, Tata Mcgraw Hill, 2<sup>nd</sup> edition.

**B.TECH. (CE) III SEMESTER  
EURCE 306: ENGINEERING GEOLOGY**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 306	BS	3			3	60	40	100	3

**UNIT- I:**

- 1.0 Geology – Branches of Geology
- 2.0 Rock weathering process
- 2.1 Soils – Soil Profile, Soil formation, Indian Soil Groups, Soil erosion and conservation.
- 3.0 Landforms – Produced by wind, rivers, glaciers, Sea waves and currents.
- 4.0 Ground Water – Origin, distribution, aquifers, Porosity & Permeability and water bearing properties of rocks.

**UNIT- II:**

- 5.0 Minerals – Physical properties: Form, Colour, Streak, Lustre, Cleavage, Fracture, hardness and specific gravity.
- 5.1 Study of some important rock forming minerals – quartz, Feldspars, Pyroxenes, Amphiboles, Micas and Clays.
- 6.0 Rocks – Classification, Texture, Structure and Mineralogical composition of some typical Igneous, Sedimentary and metamorphic rocks. Granite, Syenite, Diorite, Gabbro, dolerite, Basalt, Breccia, conglomerate, sandstone, shale, limestone, Gneiss, khondalite, Schist, Slate, Marble, Quartzite, Charnockite.
- 6.1 Engineering Properties of Rocks.

**UNIT- III:**

- 7.0 Stratigraphic time scale – Major geological formations of India: Archeans, Cuddapahs, Vindhyan, Gandwanas and Deccan Trap Systems.
- 8.0 Elements of Structural Geology: Strike & Dip, Clinometer/Brunton Compass.
- 8.1 Description and Classification of Folds, Faults and Joints.

**UNIT- IV:**

- 9.0 Remote Sensing: Introduction, Electromagnetic Spectrum, Sensors & Platforms, IRS Satellites – applications to Civil Engineering.
- 10.0 Geophysical investigations of Civil Engineering importance: Introduction, Electrical Resistivity and Seismic refraction methods.
- 11.0 Natural Hazards: Origin, Classification and Mitigation of Earthquakes & Landslides.

**UNIT- V:**

- 12.0 The role and functions of Engineering Geologist at various stages of Civil Engg. Projects.
- 12.1 Geological Investigations for Dams & Reservoirs.
- 12.2 Geological Investigations for Tunnels, Bridge sites & Highways.
- 12.3 Geological investigations for Coastal Structures.

**Reference Books:**

1. Parbin Singh, A Text Book of Engineering & General Geology, SK Kateria & Sons Publishers, Seventh editions, Reprint, 2004-2005.
2. N. Chennakesavalu, A Test Book of Engineering Geology, Macmillan Publishers, First Publishers, First Published 1993, Reprint 1997, 1999, 2003, 2004.
3. P. K. Guha, Remote sensing for the beginner, East West press



**B.TECH. (CE) III SEMESTER  
EURCE 311: CONCRETE LABORATORY**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 311	CE			2	2		100	100	1

1. Determination of cube strength of Cement.
2. Determination of Setting time of Cement.
3. Determination of Fineness of Cement.
4. Determination of Specific Gravity of Cement.
5. Determination of Soundness of Cement.
6. Sieve Analysis of sand.
7. Determination of Specific Gravity of Sand.
8. Sieve Analysis of Coarse Aggregate.
9. Determination of Specific Gravity of Coarse Aggregate.
10. Determination of Workability of Concrete by Slump Cone test.
11. Determination of Workability of Concrete by Compaction factor apparatus.
12. Determination of Workability of Concrete by Vee Bee Consistometer.
13. Determination of Compressive Strength of designed mix Concrete by conducting cube compressive strength test.
14. Determination of Split Tensile Strength of Concrete.
15. Determination of Modulus of Rupture of Concrete Beam.

**B.TECH. (CE) III SEMESTER**  
**EURCE 312: SURVEYING FIELD WORK – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 312	CE			2	2		100	100	1

1. Introduction of instruments used for chain survey, Chain traversing, Preparation of residential building by perpendicular offset, introduction of tie lines, Checkline.
2. Introduction to prismatic compass-Temporary adjustments.
3. Finding the distance between inaccessible points by making use of compass, tape and ranging rods.
4. Introduction to plane table-Use of its accessories: Plotting of Traverse by Radiation and Intersection.
5. Finding the distance between inaccessible points by making use of plane table.
6. Introduction to dumpy level, levelling staff. Temporary adjustments of dumpy level.
7. Introduction to fly levelling-Entering the readings by height of collimation method.
8. Introduction to fly levelling-Entering the readings by rise and fall method-To find closing error.
9. Levelling: L.S. & C.S. of a road profile. Preparation of contour plan for an open area by taking level of the site.

**B.TECH. (CE) III SEMESTER  
EURCE 313: ENGINEERING GEOLOGY LABORATORY**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 313	BS			2	2	--	100	100	1

1. Study of physical properties of some important rock forming minerals. i) Silicate Minerals ii) Non-Silicate Minerals.
2. Study of megascopic properties of some typical rock types. i) Igneous rocks ii) Sedimentary rocks iii) Metamorphic rocks.
3. Description and engineering considerations of Structural Models – Folds, Faults & Joints.
4. Description and engineering considerations of tunnel models.
5. Analysis of Survey of India topo sheet.
6. Visual interpretation of remote sensing imageries.
7. Electrical resistivity survey & data interpretations.

## B.TECH. (CE) IV SEMESTER

### EURCE 401: ENVIRONMENTAL STUDIES

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End	Continuous Evaluation	Total	
EURCE 401	HS	4			4	60	40	100	4

#### UNIT – I:

**The Multidisciplinary nature of environmental studies** – Definition, scope and importance, need for public awareness. **Natural Resources:** Renewable and non-renewable resources. Natural resources and associated problems – Forest Resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: world food problems, changes caused by agricultural and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies. Land resources: Land as a resources, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable life styles.

#### UNIT-II:

**Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystems: Forest ecosystems, Grassland ecosystems, desert ecosystems. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). **Biodiversity and its conservation:** Introduction: Definition: genetic, species of ecosystem diversity. Bio-geographical classification of India. Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels. India as a mega-diversity nation. Hotspots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

#### UNIT-III:

**Environmental Pollution:** Definition, Causes, effects and control measures of Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards. Solid waste management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster Management: floods, earthquakes, cyclones and landslides.

#### UNIT-IV:

**Social Issues and the environment:** From unsustainable to sustainable development. Urban problems related to energy, Water conservation, rain water harvesting and watershed management. Resettlement and rehabilitation of people, its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

**UNIT-V:**

**Human Population and the Environment:** Population growth, variation among nations, Population explosion–Family welfare programme. Environment and human health. Human rights, Value education, HIV/AIDS, Women and Child welfare, Role of information technology in environment and human health. Case Studies.

**Field Work:** Visit to local area to document environmental assets-river/forest/grassland/hill/ mountain. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. Study of common plants, Insects, birds. Study of simple ecosystems – pond, river, hill slopes, etc.

**References:** Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha. Published by – University Grants Commission, Universities Press, India.

\*\*\*

## B.TECH. (CE) IV SEMESTER

### EURCE 402: STRUCTURAL ANALYSIS – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 402	CE	3	1		4	60	40	100	4

#### UNIT-I:

Deflection of statically determinate structures (a) Beams using Macaulay's method, moment - area method, unit load method (b) Trusses (having 9 members or less) using unit load method.

#### UNIT-II:

Shear force and bending moment diagrams for (a) fixed beams (b) three span continuous beams using (i) Theorem of three moments (ii) Slope - deflection method.

#### UNIT-III:

Shear force and bending moment diagrams for (a) fixed beams (b) three span continuous beams using Moment distribution method.

#### UNIT-IV:

(a) Open coiled helical springs subjected to axial load (b) thin & thick and cylinders.

#### UNIT-V:

Moving loads: Maximum Bending moment at a section, under a wheel load and absolute maximum Bending moment in the case of several wheel loads. Influence lines for Beams.

#### References :

1. Pundit & Gupta, Structural Analysis, Tata McGraw Hill Publishing Company Ltd, New Delhi
2. Ramamrutham, Strength of Materials, Dhamapat Rai & Sons, Eleventh edition, 1994
3. Junarkar, Mechanics of structures, Charotar Book Stall, 2<sup>nd</sup> edition, 1957.
4. Timoshenko and Young, Elementary Strength of Materials, Affiated East West Press Pvt. Ltd, 5<sup>th</sup> edition, 1968.
5. Singer. F.L, Strength of materials, Harpe Collins Publishers India Ltd., Delhi.
6. Jain and Arya, Strength of Materials, Khanna Publishers, New Delhi.
7. Vazirani.V.N and Ratwani.M.M, Analysis and Design of Structures, Khanna Publishers, New Delhi.

## B.TECH. (CE) IV SEMESTER

### EURCE 403: BUILDING PLANNING AND DRAWING

	Hours of	o	Marks	r
--	----------	---	-------	---

Course Code	Category	Instruction per week				Semester End Exams	Continuous Evaluation	Total	
		L	T	P					
EURCE 403	CE	2		3	5	60	40	100	4

### UNIT – I :

**Residential Buildings** : Different types of Residential Buildings, Selection of site for residential buildings. Guidelines for planning and drawing of residential building.

### UNIT – II:

Orientation of Buildings, Principles of Planning, Design of Individual rooms with particulars attention to functional and furniture requirements.

### UNIT– III:

General Building regulations and Bye laws for Residential Buildings.

**UNIT– IV:** Climatology: Elements of climate: Sun, Wind, Relative Humidity, Temperature. Mahoney Tables, Comfort conditions for house. Various types of Macroclimatic zones, Design of Houses and layouts with reference to climatic zones. Solar charts. Wind Roses, Ventilation

### UNIT– V:

Anthropometric Data. Housing colonies for different income groups in India – sizes of Plots – Public spaces. Evolutionary housing concept.

Drawing: At least Ten sheets shall be drawn during the semester manually using mini- drafter or set squares.

Conventional signs of materials, various equipment used in a Residential Building (copying exercise) Plan, Sectional Elevation ,Front Elevation and site plan for the following.

A Small House (One Room and Verandah) (Copying exercise).

(4) (5) (6) Three bed roomed House in HOT and ARID zone, Hot and humid zone & Cold zone (copying exercise).

7) Duplex Type House.

8) Flats/Apartments (copying exercise) Not included. in examination.

9) (10) Houses with given Functional requirements and climatic data. Emphasis may be given to Hot and HUMID.

### References:

1. O.H. Koinberger, Manual of tropical housing and building climatic design part-1
2. Deshpande, Modern ideal home for India, Deshpande Publications, 10<sup>th</sup> edition, December 1982.
3. Y.N.Sane, Planning and designing, Allies Book Stall, Pune
4. Gurucharn Singh, Planning Designing & Sheduling, Standard Publishers Distributors, 5<sup>th</sup> edition, Reprint 2004.
5. Dr.B.P.Verma, Civil Engineering Drawing & Housing, Khanna Publishers, Delhi6. Civil Engg. Drawing- 'B' Series by Trimurthy, Premier Publishing House, Hyderabad.

**B.TECH. (CE) IV SEMESTER  
EURCE 404: FLUID MECHANICS – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End	Continuous	Total	
EURCE 404	BE	3	1		4	60	40	100	4

#### UNIT-I:

**Introduction and Fluid Properties:** Definition of Fluid, Fluid as continuum, Mass density, specific weight, specific volume, relative density, viscosity – Newton’s Law of viscosity, Newtonian and Non-Newtonian fluids, Rheological diagram, Kinematic viscosity, surface tension and capillarity, Bulk Modulus, compressibility, vapour pressure. Fluid Statics: Variation of pressure in static fluid, Absolute and gauge pressure – pressure measurement. Manometers and pressure gauges, micromanometers. Static forces and buoyancy: Forces on plane and curved bodies immersed in static Fluids – Centre of pressure – pressure diagram – Lock gates, Archimedes’ Principle – Buoyancy – Centre of Buoyancy – Metacentric Height.

#### UNIT-II:

**Kinematics and Dynamics of Fluid Motion:** Methods of Describing Fluid Motion – Types of Flow – Steady and un-steady flows, uniform and non-uniform flows-Three, Two and one dimensional analysis, Laminar and Turbulent motion – Streamlines, Path lines, Streaklines, acceleration Rotation, Vorticity, Circulation, Stream function, velocity potential, Relation between them, Laplace equation, Flow net and its applications; Fluid dynamics: Equation of motion for ideal fluids – Euler’s equations – deduction of Energy equation from Euler’s equation for irrotational flow – Bernoulli Equation, Energy correction factor. Linear Momentum Equation, Impulse - Momentum equations, Momentum correction factor-Differences between energy and momentum principles with respect to practical applications.

#### UNIT-III:

**Introduction to Laminar and Turbulent Flow and Boundary Layers:** Introduction to Navier stokes and Reynolds Equations, Significance of Euler and Reynolds Numbers. Boundary Layer Theory: Definition, boundary layer growth along a Flat plate with zero pressure gradient – Laminar & Turbulent Boundary Layers – Displacement, Momentum and Energy thicknesses – Relation between various thicknesses – Viscous Drag – Laminar sub-layer.

#### UNIT-IV:

Laminar flow: Laminar Flow through pipes – Hagen – Poiseuille equation for viscous flow – Flow between parallel plates – couette and poiseuille flows – Stokes law.

#### UNIT-V:

**Analysis of Pipe Flow:** Steady flow through pipes – Energy loss – Major & Minor losses Head Loss due to friction, Darcy – weisbach equation for pipe flow Hydraulic gradient line, Total energy line - Pipes in series and parallel – Concept of equivalent pipe length – problems in pipe flow – Syphon – Hydraulic Power Transmission – Water Hammer.

#### Reference Books:

1. A.K. Jain, Fluid Mechanics, Khanna Publishers, Delhi, eighth edition, 1998.
2. P.N. Modi & S.M Seth, Hydraulics and Fluid Mechanics, Standard Book House, Delhi, Fifteenth edition, 2005.



## B.TECH. (CE) IV SEMESTER

### EURCE 405: ENVIRONMENTAL ENGINEERING - I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 405	BE	3	1		4	60	40	100	4

#### UNIT-I:

Introduction – Need for protected water supplies-objectives of water supply systems - Role of Engineers in public health.

Quantity of water: Water demand-Estimating requirements – Design period- per capita consumption, factors effecting –fire demand- fluctuations in demand – Population forecasting.

#### UNIT-II:

Sources of water – Classification – Choice of source with regard to its suitability- quantitatively and qualitatively – Surface and Sub-surface sources, wells – classification, specific yield, sanitary well.

#### UNIT-III:

**Intakes for collection of surface water:** Types of Intakes : Lakes, river and canal intakes. Transportation of Water- types of conduits – capacity and design – materials for pipes – pipe joints – laying and testing of pipes – corrosion of pipes and control – leakages -detection and prevention. Quality of Water : Objectives, Palatability, Quality control of water supply-Impurities in water, Characteristics, Examination of water, water sampling and analysis, water borne diseases, Standards of drinking water for different usages.

#### UNIT-IV:

Purification of Water - Introduction, methods of Treatment: Objectives of water treatment – Basic considerations of treatment – Pretreatment – Plain sedimentation – Coagulation – Flocculation and sedimentation with coagulation-Filtration – Classification – Working principles – Construction and operation – problems in filtration

Treatment of water: Disinfection of water-different methods-chlorination practices-chlorine demand – taste and odour control – Removal of hardness- Iron and manganese- Fluorides.

#### UNIT-V:

**Distribution Systems:** Requirements, classification- Layouts and systems of layouts – analysis of pipe network – different methods — Fixing the capacities of Service Reservoirs.

Water supply Installations in buildings- plumbing systems, appurtenances in distribution system, pipe fittings, storage of water, Design considerations. Maintenance of water supply Installations.

#### Text Books :

1. Dr. P.N. Modi, Water Supply Engineering, Standard Book House.
2. G.S. Birde & J.S.Birde, Water supply and Sanitary Engineering, Dhanpat Rai & Sons.

3. Duggal, Water supply and Sanitary Engineering, S.Chand & Company (Pvt) Ltd.
4. S.K.Garg, Water & Waste water Engineering, Vol. I, Khanna Publishers, fifth edition, Jan. 1987.
5. Dr.B.S.N. Raju, Water supply and Waste Water Engineering, TaTa Mc.Graw Hill.
6. Metcalf & Eddy, Waste Water Treatment, Disposal and Reuse, McGraw Hill, 2<sup>nd</sup> edition 1979.
7. Dr. P.N. Modi., Sewage treatment and disposal, Standard Book House.
8. Fair /Geyre/okun, Water & Waste water Engineering -Voulme-1, Wiley Toppan.

**B.TECH. (CE) IV SEMESTER  
EURCE 406: SURVEYING – II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 406	CE	3			3	60	40	100	3

**UNIT-I:**

Theodolite- Types of Theodolites – Temporary Adjustments, Measurement of horizontal angle – Method of repetition, Method of reiteration – Uses of Theodolities, Introduction to Total Station.

**UNIT-II:**

Theodolite traversing – Open and closed traverse – Closing errors, Balancing the error – Bowditch method – Transit method, Omitted measurements – Gales traverse table.

**UNIT-III:**

Tacheometer – Principle of tacheometry – Stadia methods – Fixed hair method – Movable hair method – Tangential method – Reduction diagrams

**UNIT-IV:**

Triangulation – Classification-intervisibility of station – Signals and towers-base line measurements – Corrections – Satellite station and Reduction to centre – Basenet.Trigonometric levelling – Elevation of top of the tower same plane, Different planes.

**UNIT-V:**

Curves – Simple curves – Elements of simple curves – Methods of setting simple curves – Rankines method – Two theodolite method – Compound curves – Elements of compound curves.

**Reference Books:**

1. Dr. K.R. Arora, Surveying, Vol. II, Standard Book House, Fifth edition, 2001.
2. Dr.B.C. Punmia, Surveying, Vol. II, Laxmi Publications Pvt. Ltd, Twenth edition 1994.
3. Dr. A.M.Chandra, Higher Surveying, New Age International Publishers.

**B.TECH. (CE) IV SEMESTER****EURCE 411: FLUID MECHANICS LABORATORY – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
		EURCE 411	BE				2	2	

1. Calibration of small orifice, mouthpiece by constant head method and falling head method.
2. Calibration of orifice meter, nozzle meter, and venturi meter.
3. Calibration of sharp-crested and broad-crested weirs, V-notch.
4. Characteristics of flow over a sharp crested full width weir.
5. Impact of a jet on a circular disc.
6. Electrical analogy.
7. Pipe Friction
8. Pitot Tube.

**EURCE 412: ENVIRONMENTAL ENGINEERING LABORATORY – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Sem End Exams	Continuous Evaluation	Total	
		EURCE 412	BE				2	2	

**Experiments on :**

Physical Analysis (1) Turbidity (2) conductivity.

Chemical Analysis: (1) pH (2) Determination of Hardness (Total) (3) Determination of Iron (Total Iron) (4) Determination of Fluorides (5) Determination of Residual Chlorine (6) Acidity (7)

Alkalinity (8) Available Chlorine (9) Determination of Calcium Hardness (10) Determination of Optimum dosage of Coagulant (Jar Test)

**Bacteriological Examination of Water\*** :(1) Determination of MPN and plate count tests

\* Optional

### B.TECH. (CE) IV SEMESTER

#### EURCE 413: SURVEYING FIELD WORK – II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 413	CE			2	2	--	100	100	1

Measurement of Horizontal Angles by Repetition and Reiteration methods. Distance between two inaccessible points by making use of theodolite, measurement of vertical angles, heights and distances Tachometry Finding the gradients, setting out simple curve, Total Station: Basic Measurements.

#### EURCE 414: INDUSTRIAL TOUR

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 414	IT								0

Local tours to Project sites in and around Visakhapatnam.

### B.Tech. (CE) Fourth Semester ENGLISH COMMUNICATION SKILLS LABORATORY

Code: EURCE415

Category: HS

Credits: 2

Hours: 3 per week

Department: BSH

1. Concept and importance of communication.
2. Developing communicative abilities.
3. Paper Presentation – planning, preparation and presentation using audio-visual aids.
4. Proposals and Research Reports.
5. Oral Presentation:
  - a. Group Discussion.
  - b. Interviews
  - c. Conducting a meeting.

d. Telephone Etiquette.

Suggested Texts:

1. *Business Communications. A Guide to Effective Writing, Speaking and Listening*, Himstreet, William C., Gerald W. Maxwell, Mary Jean Onorato. Glencoe Publishing Company. California 1982.
2. *Effective Business Communications*, Murphy, Hurta A et al. Tata McGraw Hill Companies Inc. 1997.
3. *Excellence in Business Communication*, Thill, John V., Bove'e, Courland L. Tata McGraw Hill Companies Inc. 1996.
4. *Report writing for Business*, Lesitar & Pettit. Irwin – McGraw Hill Companies Inc. 1995. Tenth Edition.
5. *Technical Report Writing Today*, Paulery and Riordan. Houghton Mifflin Company. 1999. 5<sup>th</sup> Edition. Reprint.

## B.TECH. (CE)V SEMESTER

### EURCE 501: STRUCTURAL ANALYSIS – II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 501	CE	3	1		4	60	40	100	4

#### UNIT-I:

Analysis of statically indeterminate trusses (having not more than 7 members and 3 supports) containing (a) external redundant supports (b) internal redundant members, using Castigliano's theorem – II.

#### UNIT-II:

Analysis of statically indeterminate frames (Single storey single bay portal frames only) using moment distribution method and kani's method.

#### UNIT-III:

**Arches:** Introduction to Arches. Analysis of three hinged and two hinged arches subjected to concentrated loads and uniformly distributed loads (Rolling loads and influence lines not included).

#### UNIT- IV:

**Introduction to Matrix Methods:** Analysis of two and three span continuous Beams only by Flexibility and Stiffness Matrix methods.

#### UNIT-V:

**Finite element method:** Introduction to finite element method, concept of an element (beam element, truss element), formulation of element stiffness matrix (for beam element and truss element), assemble of global stiffness matrix (for beam element and truss element). Two dimensional constant strain triangle. Modeling, boundary conditions, Solution of banded matrix.

#### Reference Books:

1. C.K. Wang, Statically indeterminate Structures
2. Weaver & Gere, Matrix Methods of Structural Analysis
3. J.S. Kinney, Indeterminate Structural Analysis, Naraja Publishing house, 1<sup>st</sup> Printing, 1987
4. GS Pandit, SP Gupta, R. Gupta, Theory of Structures-Vol. I and II, Tata McGraw-Hill, 2<sup>nd</sup> Reprint, 2003
5. Vazirani and Ratwani, Analysis of Structures Vol. II.
6. Zienkiewicz.P, P., The Finite Element Method in Engineering and Science" McGraw Hill,1971.
7. Tirupathi.R.Chandrupatla, Finite Elements Analysis, Universities Press.

## B.TECH. (CE) V SEMESTER

### EURCE 502: REINFORCED CONCRETE STRUCTURES –I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 502	CE	3	1		4	60	40	100	4

#### UNIT-I:

Loading standards as per IS 875, grades of steel and concrete. Introduction to working stress, ultimate load and limit state methods. Working stress method: Assumptions. Flexure of RCC beams of rectangular section. Under reinforced, balanced and over-reinforced sections. Analysis and design of singly reinforced beams of rectangular sections.

#### UNIT-II:

**Limit state method:** Flexure of RCC beams of rectangular section. Under reinforced, balanced and over-reinforced sections. Analysis and design of singly and doubly reinforced beams of rectangular sections. Design of T-beams: Effective flange width. Analysis and Design of T-Beams.

#### UNIT-III:

**Shear, Torsion and Bond:** Limit state of collapse in shear, types of shear failures, Truss analogy, shear, span/depth ratio, Calculation of shear stress, types of shear reinforcement, Design for shear in beams. Analysis for torsional moment in a member. Torsional shear stress in rectangular sections. Reinforcement for torsion in RC beams. Concept of bond, development length, anchorage.

#### UNIT-IV:

**Design of one-way and two-way slabs (using IS 456):** Design of simply supported slabs on four sides with and without torsional reinforcement at corners. Design of two-way slabs with different edge conditions (with torsion at corners). IS code provisions.

#### UNIT-V:

**Columns:** Short columns, minimum eccentricity, column under axial compression. Analysis and design of short columns subjected to uniaxial moment. Analysis and design of short columns subjected to bi-axial moments.

#### Reference:

1. Pillai & Menon, Reinforced Concrete Design, Tata Mc.Graw Hill, Second edition, 6<sup>th</sup> Reprint 2005.
2. A.K.Jain, Reinforced Concrete Design (Limit state design)– Nem Chand & Bros, Roorkee, 6<sup>th</sup> edition 2002.
3. P.C.Verghese, Limit State Design of Reinforced Concrete, Prentice hall India, 2<sup>nd</sup> edition, 2003.
4. S.N.Sinha, Reinforced Concrete Design, Tata Mc.Graw Hill, 2<sup>nd</sup> edition, 2<sup>nd</sup> reprint 2000.

## B.TECH. (CE) V SEMESTER

### EURCE 503: STEEL STRUCTURES – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End	Continuous Evaluation	Total	
EURCE 503	CE	3	1		4	60	40	100	4

#### UNIT-I:

**General:** Fundamental Concepts of design of structures, Different types of rolled steel sections available to be used in steel structures. Stress – Strain relationship for mild steel, Estimation of wind load on roof trusses as per latest revised code of IS: 875-

#### UNIT-II:

**(a) Riveted and Bolted connections:** Failure of a joint, Strength and efficiency of a joint, Lap Joint, Butt joint and Eccentric connections **(b) Welded Connections:** Types of welds, stresses in welds, Design of welded joints subjected to axial load, Eccentric welded connections.

#### UNIT-III:

**(a) Tension members:** Allowable stress in axial tension, Net effective sectional area for angle and Tee sections, Design of tension members, Lug angles.

#### UNIT-IV:

**Compression members:** Effective length, radius of gyration and slenderness of compression members, Allowable stresses in compression, Design of axially loaded compression members, Built up compression members (I Section & two channels) Laced and Battened columns, eccentrically loaded columns, Column splices.

#### UNIT-V:

**Beams:** Allowable stresses in bending, shear and bearing, Effective length of compression flange, laterally supported and unsupported beams, Design of plated beams, Design of rivets connecting cover plates with the flanges of beams.

\* All the designs conforming to latest revised code of IS-800

#### References :

1. Ramachandra, Design of Steel Structures (Vol. I & II), Standard Book House, 5<sup>th</sup> edition, 1984.
2. Duggal, Design of Steel Structures –Tata McGraw Hill, First Reprint 1995.
3. P. Dayaratnam, Design of Steel Structures – A.H. Wheels & Co. Ltd, Second Edition, 1996.
4. Arya and Azmani, Design of Steel Structures, Nem Chand and Bros, Fourth edition, 1989, Reprinted 1992.
5. Vazirani and Ratwani, Analysis Design & Details of Structures (Vol.III) Steel Structures, Khanna Publishers, Delhi-6, third edition 1968
6. Kazmi and Zindal, Design of Steel Structures.



## B.TECH. (CE) V SEMESTER

### EURCE-504: GEOTECHNICAL ENGINEERING – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 504	CE	3	1		4	60	40	100	4

#### UNIT-I :

**Soil properties-** Origin and formation of soils; Three Phase Representation of Soil Mass, Physical properties of Soil – Void ratio, Porosity, Degree of Saturation, Water content, Unit Weights, Specific Gravity – their functional relationships, Relative density .

**Consistency limits** – Determination and various indices – Plasticity index, Consistency Index, Liquidity index – Significance and Importance, Activity Ratio

**Classification** : Mechanical analysis – Sieve analysis, Stoke’s law, hydrometer Analysis, I.S and MIT Grain Size Classification, Indian Standard Classification for fine grained and coarse grained soils for general engineering purposes.

#### UNIT-II :

**Soil Hydraulics** – Types of soil water, Darcy’s law and its limitations, Determination of Coefficient of permeability, Laboratory methods-constant head and variable head permeameter tests, Factors influencing coefficient of permeability, permeability of stratified soils. Stress Principle for Saturated Soils-Total, neutral and effective stresses, No flow, downward flow and upward flow conditions, quick sand conditions, critical hydraulic gradient.

#### UNIT-III :

**Stress distribution** : Boussinesq’s theory for the determination of vertical stresses due to point loads, assumptions and validity, extension to rectangular and circular loaded areas, 2 : 1 approximate method, Westergaard’s theory, Newmark’s influence chart - Construction and use, Contact pressure distribution beneath rigid footings, founded on cohesive & cohesion less soils.

#### UNIT-IV:

**Consolidation:** Oedometer Tests, e-p and e-log p curves – compression index, coefficient of compressibility and coefficient of volume change. Terzaghi’s assumptions for one dimensional consolidation, equation and application, coefficient of consolidation, degree of consolidation Vs time, curve fitting methods, initial compression, primary compression and secondary compression, determination of pre-consolidation pressure by casagrande’s method. Normally consolidated, over consolidated and under consolidated clayey deposits.

**Compaction:** Mechanism of compaction, Factors affecting compaction, British Standard, Modified AASHO and IS compaction tests. Effect of compaction on physical and engineering properties of soils, Field compaction Equipment and Quality Control, Proctor’s Penetrometer.

#### UNIT-V:

**Subsoil Exploration:** Methods of subsoil exploration Direct, methods, Soundings by Standard, Dynamic cone and static cone penetration tests, Types of Boring, Types of samples, Criteria for undisturbed samples, Transport and preservation of samples, Bore-logs, planning of exploration programs, Report writing.

#### Reference Books:

1. Gopala Ranjan and A.S.R. Rao., Basic and Applied Soil Mechanics, New age international Publishers.
2. V.N.S. Murthy, Soil Mechanics, Foundation Engineering, UBS Publishers, distribution Ltd.
3. K.R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers, New Delhi.
4. Swami Saran, Analysis and Design of Substructures (limit state), Oxford & IBH Publications Pvt Ltd, New Delhi (New edition-Taylor & Francis Ltd Publishers).
5. Donald P. Coduto, Geotechnical Engineering, Prentice-Hall India Publications.
6. B.C.Punmia, Soil Mechanics and Foundations, (SI Units) Laxmi Publications, New Delhi.

## B.TECH. (CE) V SEMESTER

### EURCE 505: FLUID MECHANICS – II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 505	CE	3	1		4	60	40	100	4

#### UNIT-I:

Dimensional Analysis, Similitude and Modelling: Dimensional Analysis – Buckingham  $\pi$  Theorem – Rayleigh method – Similarity Laws – Reynolds, Froude, Weber, Mach and Euler Numbers, Principles of Modelling – Scale Models in Hydraulic Engineering – Application to Practical problems.

#### UNIT-II:

Boundary Layer separation. Drag and Lift: Definitions, Deformation drag, friction drag and form drag; Drag over flat plate, Drag characteristics of two dimensional bodies(cylinder, stream lined strut) and three dimensional bodies (sphere, circular disc): Flow past air foil; separation and wake effects; Von Karman Vortex Street. Lift and propulsion: Circulation and lift, Magnus effect; lift characteristics of cylinder, and air foil, characteristics of propellers.

#### UNIT-III:

**Flow through open channels:** Comparison between closed conduit and free surface flow - classification of free surface flows – pressure distribution in open channels - Uniform flow, normal depth, Chezy's and Manning's equations, prismatic and non-prismatic channels; Most efficient channel sections for rectangular, trapezoidal cross sections; Specific energy and specific force in open channels; Energy principles in open channels - Specific energy - Critical flow, critical depth – Flow in channel transitions – Flow through channels with varying bed width and depths. Specific Force - Hydraulic jump in channels - loss of energy in jump for rectangular channels. Gradually varied flow in rectangular channels; Equation of GVF; Water surface slopes w.r.t. channel bed; Classification of slopes; GVF profiles-M1, M2, M3, S1, S2, S3, C1, C3, H2, H3, A2 and A3 Curves.

#### UNIT-IV:

**Impact of free jets, Turbines:** Classification of Turbines – Impulse Turbines - Reaction Turbines – Various components and their functions – Draft Tubes – Radial, axial and mixed flow turbines – Impulse Turbines – Speed ratio Working of Impulse Turbines – Design Principles of Impulse and Reaction Turbines – Unit quantities, Specific Speed and Performance characteristics of Turbines.

#### UNIT –V:

**Pumps:** centrifugal Pumps – Single and Multistage Pumps – Working Principles – Priming – Head, Power and Efficiency – Cavitation in Turbines and Pumps – Minimum starting speed of Centrifugal Pumps – Characteristic Curves and Specific Speed – Reciprocating pumps – working Principles – Indicator Diagram – Cavitation in Reciprocating Pumps – Power Requirement – Air Vessels – Jet Pumps – Vertical Turbine Pumps – Submersible Pumps.

#### Reference Books:

1. A.K. Jain, Fluid Mechanics, Khanna Publishers, Delhi-6, eighth edition, 1998.
2. P.N. Modi & S.M. Seth, Hydraulics and Fluid Mechanics & Hydraulic Machines, Standard Book House, Delhi, 15<sup>th</sup> editions, 2002.
3. K. Subramanya, Flow in Open Channels, Tata McGraw Hill Publishing Company Limited, New Delhi, 1986.

## B.TECH. (CE) V SEMESTER

### EURCE 506: ENVIRONMENTAL ENGINEERING – II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 506	CE	3	1		4	60	40	100	4

#### UNIT-I:

Introduction – Sanitation – Systems of sanitation – relative merits & demerits – collection and conveyance of waste water.

#### UNIT-II:

Sewerage –classification of sewerage systems – sewers – types of sewers – Quantity of sewage – fluctuations – Hydraulics of sewers – design of sewers – materials for sewers – appurtenances in sewerage systems – safety of sewer workers. Design: Pumping of waste water – Pumping stations – location – component parts.

#### UNIT-III:

**Bacteriology of sewage:** Characteristics of sewage – decomposition – cycles of decomposition – sampling and analysis of waste water – BOD – COD.

#### UNIT-IV:

**Waste water treatment :** Primary treatment- Screens-grit chambers – grease traps – floatation – sedimentation – design of primary and pretreatment units -Design of Septic Tank, Imhoff tank .-Sludge digestion and disposal, Secondary treatment : Sewage filters – Classification – trickling filters – mechanism of impurities removal – filter problems – design operation – recirculation-Activated sludge process – principles and designs – modifications of activated sludge process . Design Sludge treatment and disposal : Characteristics of sludge thickening – digestion – drying – sludge Miscellaneous methods – Oxidation ponds, oxidation ditches – aerated lagoons,- Stabilization ponds ,disposal.-Sewer Less sanitation practices, Different kinds of privies.

#### UNIT-V:

**Sanitary Installations :** Sanitary fittings, plumbing systems of drainage – single stack system – one pipe and two pipe systems – Design of building drainage, Maintenance of Sanitary Installations Sewage disposal: meaning, objectives and methods –disposal by dilution-self purification of running streams-zones of pollution-disposal by irrigation-reuse of treated sewage-ground water recharge.

#### Books:

1. G.S.Birde & J.S.Birde, Water supply and Sanitary Engineering, Dhanpat Rai & Sons.
2. S.K.Garg, Water & Waste water Engineering- Vol II, S.K.Garg, Khanna Publishers.
3. Dr. P.N. Modi., Sewage treatment and disposal, Standard Book House.
4. G.S.Birde & J.S.Birde, Water supply and Sanitary Engineering, Dhanpat Rai & Sons.
5. Duggal, Water supply and Sanitary Engineering, S.Chand & Company (Pvt) Ltd.
6. Dr.B.S.N. Raju., Water supply and Waste Water Engineering, TaTa Mc.Graw Hill.
7. Metcalf & Eddy, Waste Water Treatment, disposal and Reuse, TaTa Mc.Graw Hill, Tenth Reprint 1990, 2<sup>nd</sup> edition.
8. Hammer and Hammer Jr, Water and Wastewater Technology, Prentice Hall India,4<sup>th</sup> edition, 03.
9. Fair / Geyre / okun, Water & Waste water Engineering -Voulme-2, Wiley Toppan.

**B.TECH. (CE)V SEMESTER**  
**EURCE 511 : GEOTECHNICAL ENGINEERING LABORATORY – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 511	CE			2	2	--	100	100	1

**I. Water Content Determination:**

- 1) Oven Drying Method
- 2) Rapid/ Speedy Moisture Meter

**II. Atterberg's Limits ( LL / PL /SL )**

- 3) Liquid Limit Test
- 4) Plastic Limit Test
- 5) Shrinkage Limit Test

**III. Field density:**

- 6) Core Cutter Method
- 7) Sand replacement method.

**IV. Grain size analysis:**

- 8) Sieve Analysis
- 9) Sedimentation Analysis.

**V. Specific gravity:**

- 10) Pycnometer Method
- 11) Density bottle method.

**VI. Permeability of soil:**

- 12) Variable head permeameter test

**VII. Compaction of Soil:**

- 13) I.S. Light Weight Compaction Test
- 14) I.S. Heavy Weight Compaction Test

**DEMONSTRATION EXPERIMENTS :**

- 1) Consolidation Test.

**B.TECH. (CE) V SEMESTER****EURCE 512: FLUID MECHANICS LABORATORY-II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 512	CE			2	2	-	100	100	1

1. Characteristics of a hydraulic jump.
2. Characteristics of flow over an ogee spillway.
3. Open channel Transitions.
4. Drag characteristics of a circular cylinder with its axis normal to the direction of flow.
5. Lift – Drag Characteristics of an Airfoil.
6. Performance characteristics of a Centrifugal pump.
7. Performance characteristics of a Reciprocating pump.
8. Performance characteristics of a Pelton Turbine.
9. Performance characteristics of a Francis Turbine.

**B.TECH. (CE) V SEMESTER  
EURCE 513: ENVIRONMENTAL ENGINEERING LAB.-II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 513	CE			2	2	-	100	100	1

**Experiments on :**

- (1) Determination of Total Solids, Suspended solids, dissolved solids, fixed and volatile solids.
- (2) Determination of Settleable Solids
- (3) Determination of Dissolved oxygen.
- (4) Determination of B. O. D.
- (5) Determination of C. O. D.
- (6) Determination of Total Nitrogen- Khezadal method.
- (7) Determination of Chlorides
- (8) Determination of Sulphates
- (9) Determination of Phosphates.

**EURCE 514: SURVEY CAMP**

Course code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 514	PW					-	100	100	2

**B.TECH. (CE) VI SEMESTER**  
**EURCE 601: REINFORCED CONCRETE STRUCTURES –II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 601	CE	3	1		4	60	40	100	4

**Limit State Method:**

**UNIT-I:**

**Design of staircase supported on two beams/walls. Footings:** types of footings. Distribution of base pressure. General Design considerations for footings. Design of Isolated rectangular and square footing.

**UNIT-II:**

**Retaining Walls:** Types of retaining walls, forces on retaining walls, stability requirements, Preliminary proportioning of cantilever/ counterfort retaining walls. Design of cantilever and counterfort retaining walls.

**UNIT-III:**

**Bridges:** components of a bridge in sub structure and superstructure. Classification of bridges. Loadings or forces acting on a bridge. Highway loading standards. Design of solid slabs for Class AA loading (tracked vehicle only)

**UNIT-IV:**

**Piles and pile caps:** Design of bored cast-in-situ piles (bearing and friction types), under reamed piles. Design of Pile cap for three and four piles using bending method.

**UNIT-V:**

**Water Tanks: (working stress method):** Impermeability requirements, Design of rectangular and circular water tanks resting on ground.

**Reference:**

1. P.C.Vargheese, Limit state Design of Reinforced Concrete, Prentice Hall India, 2<sup>nd</sup> edition.
2. S.N.Sinha, Reinforced Concrete Design, Tata Mc.Graw Hill, 5<sup>th</sup> Reprint 1995.
3. Pillai & Menon, Reinforced Concrete Design, Tata Mc.Graw Hill, 6<sup>th</sup> Reprint 2005.
4. A.K.Jain, Reinforced Concrete Design (Limit state design), Nem Chand & Bros, Roorkee, 3<sup>rd</sup> edition, reprint 1990.
5. P.C.Vargheese, Advanced Reinforced Concrete Design, Prentice Hall India, 2<sup>nd</sup> printing 2002.

## B.TECH. (CE) VI SEMESTER

### EUR CE 602: STEEL STRUCTURES–II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 602	CE	3	1		4	60	40	100	4

#### UNIT-I:

##### **Rivettted Plate Girders:**

Components of a plate girder, Economical depth, Design of flanges, curtailment of flange plates, connection of flange angles to web and flange angles to flange plates

#### UNIT-II:

**Design of riveted stiffeners & splices** :- Web stiffeners, Vertical stiffener, horizontal stiffener, Bearing stiffener. Design splices for riveted Plate Girders.

#### UNIT-III:

**Design of Welded Plate girders:** Design of cross section of Plate Griders, Design of connection, Vertical, horizontal and Bearing stiffener.

#### UNIT-IV:

**Column bases and foundations:** Slab base, Gusset base and Grillage foundations for axially loaded columns.

#### UNIT-V:

**Plastic analysis:** Introduction, Upper and Lower bound theorems, Shape factor, collapse loads for beams (simply supported, propped cantilever, fixed and two span continuous beams)

\* All designs confirming to latest revised IS-800

#### **References :**

1. Ramchandra, Design of steel Structures (Vol. I & II), Standard Publishers.
2. Duggal, Design of Steel Structures, Tata McGraw Hill.
3. P. Dayaratnam, Design of Steel Structures, A.H. Wheeler & Co. Ltd.
4. Arya and Azmani, Design of Steel Structures, Nem Chand & Bros.
5. Vazirani and Ratwani, Analysis and Design of Steel Structures, Khanna Publishers.
6. Kazmi.S.M.A and Zindal.R.S, Design of Steel Structures, Prentice Hall of India.



**B.TECH. (CE)VI SEMESTER  
EURCE603: GEOTECHNICAL ENGINEERING – II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 603	CE	3	1		4	60	40	100	4

**UNIT-I:**

**Shear Strength of Soils :** Stress at a point, Mohr circle of stress, Mohr coulomb failure theory shear tests – shear box, unconfined compression, tri-axial compression tests, field vane shear tests, shear parameters, types of shear tests in the laboratory based on drainage conditions, shear strength of sands, critical void ratio and dilatancy, shear strength of clays, total stress analysis and effective stress analysis, Skempton’s pore pressure coefficients.

**UNIT-II:**

**Shallow foundations:** Safe bearing capacity and allowable bearing pressure, Terzaghi’s bearing capacity equations its modifications for square, rectangular and circular foundation, General and local shear failure conditions. Factors affecting bearing capacity of Soil. Allowable bearing pressure based on N-values. Bearing capacity from plate load tests. Factors effecting locations of foundation and design considerations of shallow foundations, choice of type of foundations. Foundations on expansive soils.

**Settlement analysis :** causes of settlement, Computation of settlement, allowable settlement. Measures to reduce settlement.

**UNIT-III:**

**Pile Foundations:** Types, Construction, load carrying capacity of single pile – Dynamic Formula, Static formula, Pile load tests, Load carrying capacity of pile groups, settlement of pile groups, Negative skin friction.

**Caissons :** introduction , various forces acting and Types of caissons, box/ open/ pneumatic caissons, Different shapes and cross sections of well foundations. Different Components of well, Grip length, problems in well sinking and remedial measures.

**UNIT-IV:**

**Earth Pressure:** Types of Earth pressures, Rankines Active and Passive earth pressure, Smooth Vertical wall with horizontal backfill. Extension to Coloumb’s wedge theory, Rebhann’s graphical method for active earth pressure. **Bulkheads**– introduction and Classification. Introduction to ground improvement techniques.

**UNIT-V:**

**Stability Analysis of Slopes:** Finite Slopes, Fellinius method of locating critical slip centre, Friction circle method of stability analysis and Taylors stability number, types of failure of finite slopes – Toe, slope and Base failure. Factors influencing Slope Stability.

**Note:** This course does not cover structural design of foundations.

**Reference Books:**

1. Shamsher Prakash, Gopal Ranjan and Swami Saran, Analysis, Design of Foundations and Earth retaining Structures, M/S. Saritha Prakashan, Meerut.
2. J. E. Bowles, Foundation Analysis and Design, Mcgraw Hill, Publishers.
3. K.R. Arora, Soil Mechanics and Foundation Engg, Standard Publications, 6<sup>th</sup> edition, reprint 2005.
4. B.C. Punmia (SI-units), Soil Mechanics & Foundations, Lakshmi Book house, 9<sup>th</sup> edition, 1985.

## B.TECH. (CE) VI SEMESTER

### EURCE 604 : WATER RESOURCES ENGINEERING – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
		EURCE 604	CE	3		1		4	

#### UNIT-I:

**Surface Water Hydrology:** Water Resources in India, Hydrology in water Resources Planning – Precipitation – Types, Measurement of rainfall, Average depth of rainfall over an area, Mean annual rainfall, consistency of rainfall record – Double mass curve, Infiltration – Factors affecting and its determination, Evaporation and Evapo – Transpiration. Runoff – factors affecting runoff, methods of determination of runoff, stream gauging, hydrograph analysis, base flow separation, unit hydrograph – Hydrograph of different durations, applications of unit hydrograph, S-hydrograph, Flood Forecasting Techniques.

#### UNIT-II:

**Ground Water Hydrology:** Mechanics of interstitial flow, definitions, sub surface distribution of water, ground water movement, Darcy's law–permeability. Well hydraulics – steady flow into different types of aquifers and wells – determination of hydraulic properties of aquifer, well losses, specific capacity of well, and well efficiency, pumping test and recovery test methods for determination of well yield.

#### UNIT-III:

**Reservoir Planning:** Types of reservoir investigations for reservoir planning, selection of site for a reservoir, zones of storage in a reservoir, purpose of reservoir, reservoir yield, mass curve and demand curve, determination of reservoir capacity, yield from a reservoir of given capacity, operating schedules, guide curve for reservoir operation, apportionment of total cost of a multi purpose project. Reservoir sedimentation, control of reservoir sedimentation, life of reservoir.

#### UNIT-IV:

**Irrigation:** Definition of irrigation, types of irrigation systems – direct and indirect, lift and inundation irrigation system, methods of irrigation – surface and sprinkler methods, drip irrigation, Soil moisture constants, depth of water held by soil in root – zone. Water requirements of crops, duty, delta and base period their relationship, crops – seasons, factors affecting duty and methods of improving duty, consumptive use of water – determination of canal capacities for cropping patterns.

#### UNIT-V:

**Canal Systems:** Classification of irrigation canals – canal alignment, design of unlined canals, regime theories – Kennedy's and lacey's theories, tractive force method, design problems – balancing depth.

#### Reference Books:

1. P.N.Modi, Irrigation, Water Resources and Water Power Engg., Standard Book House, Delhi, 6<sup>th</sup> edition, 2004
2. B.C. Punmia and Pande B.B.Lal, Irrigation and Water Power Engg., Laxmi Publications Pvt. Ltd., New Delhi, 12<sup>th</sup> edition, 1992.

3. S.K. Garg, Irrigation Engineering and Hydrology Structures, Khanna Publishers, Delhi-6, 14<sup>th</sup> revised edition 1999.
4. Dr. P. Jayarami Reddy, A Text book of Hydrology, Laxmi Publication, Delhi, reprint, 1999.
5. K. Subramanya, Engineering Hydrology, Tata-Mc Graw Hill Publishing, Delhi, 1<sup>st</sup> Revised edition.

## B.TECH. (CE) VI SEMESTER

### EURCE 605: TRANSPORTATION ENGINEERING – I

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
		EURCE 605	CE	3		1		4	

#### UNIT-I:

##### **Highway Development & History Of Roads:**

History of development of roads, Highway Development in India, Classification of Roads, Planning Surveys, Highway Alignment, Engineering Surveys for Highway Alignment.

#### UNIT-II:

##### **Highway Geometric Design:**

Highway Cross-Sectional Elements, Stopping Sight Distance, Overtaking Sight Distance, Intermediate Sight Distance, Camber, Super elevation, Extra Widening, Setback Distance at horizontal curves, Design of horizontal curves, Transition curves, Vertical curves.

#### UNIT-III:

##### **Pavement Design:**

Design of Pavements: Design of Flexible Pavement by C B R method as per IRC 37-2002 and theory of empirical mechanistic method. Stresses in Rigid pavement by Westergaards and IRC methods. Design of Overlay by Benkelman Beam method.

#### UNIT-IV:

**Highway Materials, Construction & Maintenance:** Highway materials: Aggregate properties and tests, Bitumen properties and tests. Highway Construction: Earthen roads, WBM roads, bituminous roads and Cement Concrete Roads. Highway Maintenance: Failure of Flexible and Rigid pavements and their maintenance. Highway Drainage: Surface and Sub surface Drainage System.

#### UNIT-V:

**Traffic Engineering:** Traffic Characteristics: Road User Characteristics and Vehicle Characteristics. Traffic Studies: Traffic Volume study, Speed studies and Origin and Destination studies. Traffic Control Devices: Signs, Signals & Markings and Traffic Islands. Intersection: Unchannelised and Channelised Intersections and Rotary Intersections.

#### **Referece Books:**

1. Khanna & Justo, Highway Engineering, Nem Chand & Bros, Roorkee, 5<sup>th</sup> edition, reprint 1984.
2. Dr. L.R. Kadiyali & Dr. N.B.Lal, Principles and Practice of Highway Engineering, Khanna Publication.
3. Partha Chakraborty & Animesh Das, Principles of Transportation Engineering, Prentice Hall of India Publications.
4. S.P. Bindra, Highway Engineering, Dhanpatrai Publications.
5. L.R.Kadiyali, Traffic Engineering, Khanna Publishers, 7<sup>th</sup> edition 2007.
6. C. Jotin Khisty & B. Kent Lal, Introduction to Highway Engineering, Prentice Hall India.
7. Khanna & Justo, Highway Material Testing, Nemeserd and Brother Publications.

**B.TECH. (CE)VI SEMESTER  
EURCE 606: PROJECT ESTIMATION AND CONTRACTS**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 606	CE	3	1		4	60	40	100	4

**UNIT-I:**

**Introduction:** Meaning. Errors in estimation, types, related terms in estimate, Contingencies, different types of approvals, rules, Standard units, Units of measurement of different items of work. Specifications: Meaning, purpose, types Specifications, Method of preparation of specification, general specification, detailed specifications of different items of buildings and other structures.

**UNIT-II:**

**Contracts:** Definition, Element of contract, offer acceptance and consideration, valid contract, Types of contracts – Lumpsum contract, schedule contract, Item rate contract, sub-contracts, joint ventures, Department execution of works, Muster Roll Form 21. Piece work Agreement form, work order.

Contract system with tenders – Definitions – Contract Contractor- Quotation, Earnest money- Security money. Tender - Tender notice, Tender form, Bidding procedure, Irregularities in Bidding, award, Arbitration Disputes and claim settlement.

**UNIT-III:**

Detailed estimate 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.

**UNIT-IV:**

Rate analysis – Data sheet for materials and various items of work in buildings and other structures, schedule of rates, abstract estimate of buildings.

**UNIT-V:**

**Valuation and rent fixation of buildings;** different terms used in valuation and their meaning, purpose, different method of building valuation and rent fixation.

Roads: Estimation of earth work; different formulae for calculations, Concrete Roads, Bituminous Roads.

**Reference Books :**

1. M.Chakraborti., Estimation, Costing, Specifications and Valuation in Civil Engineering, 17<sup>th</sup> editions, 2004
2. B.N. Dutta., Estimating and Costing in Civil Engineering, VBSPD Publishers, 16<sup>th</sup> reprint 1996.
3. Textbook of estimating and costing (Civil Engg.) by G.S. Birde.
4. V N Vazirani & S P Chandola, A Text book of Civil Engineering Estimation and Costing, Khanna Publishers, 3<sup>rd</sup> edition, 2001.
5. D.D. Kohli and R.C. Kohli, Textbook on Estimating, Costing and Accounts (Civil).
6. Guna and Sen Gupta, Construction Management Planning.

**B.TECH. (CE) VI SEMESTER**

**EURCE 611: STRENGTH OF MATERIALS LABORATORY**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 611	CE			2	2	-	100	100	1

1. Tension test on mild/HYSD bars.
2. Compression test on wood (parallel and perpendicular to grains).
3. Tests on springs for the determination of rigidity modulus and spring constant.
4. Brinell's and Rockwell hardness tests.
5. Charpy and Izod impact tests.
6. Double shear test on mild steel specimen.
7. Bending test.: Load deflection test for the determination of Young's modulus on simply supported and cantilever beams (wood and steel).
8. Study of forces in coplanar force system.

**B.TECH. (CE) VI SEMESTER**  
**EURCE 612: GEOTECHNICAL ENGINEERING LABORATORY-II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 612	CE			2	2	--	100	100	1

1. Field identification & classification of soils
2. Relative density test
3. Differential free swell test
4. Swell Pressure test.
5. Direct shear test
6. Unconfined compression test
7. Tri-axial test
8. Determination of Group Index Value.
9. Determination of CBR Value.

**Demonstration Experiments**

10. Plate Load Test (subject to availability)
11. Standard Penetration Test
12. Static Cone Penetration Test (subject to availability)
13. Dynamic Cone Penetration Test (subject to availability)
14. Other Miscellaneous Tests.

**B.TECH. (CE) VI SEMESTER**  
**EURCE 613: TRANSPORTATION ENGINEERING LABORATORY-I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 613	CE			2	2	--	100	100	1

**1. TESTS ON AGGREGATE:**

- 1.1 Specific gravity
- 1.2 Sieve analysis
- 1.3 Flakiness index
- 1.4 Elongation index
- 1.5 Crushing value
- 1.6 Impact value
- 1.7 Abrasion value.

**2. TESTS ON BITUMEN:**

- 2.1 Specific gravity
- 2.2 Penetration
- 2.3 Viscosity
- 2.4 Softening point
- 2.5 Ductility
- 2.6 Flash and Fire point.

**3. TESTS ON SOILS:**

- 3.1 California Bearing Ratio Test

**REFERENCE BOOK:** Highway material testing by Khanna & Justo.

**VI SEMESTER  
EURCE 614: PERSONALITY DEVELOPMENT**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 614	HS			3	3				0

CRT material shall consists of

**UNIT-I:** Verbal Ability 1

**UNIT-II:** Reasoning 1

**UNIT-III:** Quantitative Aptitude

**UNIT-IV:** Geometry

**UNIT-V:** Mock Tests, Interview & Group Discussion

**B.TECH. (CE) VII SEMESTER**  
**EURCE 701: WATER RESOURCES ENGINEERING-II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 701	CE	3	1		4	60	40	100	4

**UNIT- I:**

**Storage Works:** Classification of dams, factors governing selection of type of dam, selection of site, preliminary investigations. Gravity Dams: Forces acting on a gravity dam, stability criteria, modes of failure- elementary and practical profiles, stability analysis, stress analysis, construction joints, openings in dams- galleries, foundation treatment of gravity dam.

**UNIT- II:**

**Earth Dams:** Types, foundation for earth dams, design of earth dams, causes for failure of earth dams, criteria for safe design, phreatic line, seepage analysis – seepage control through body and foundation. Spillways: Essential requirements, spillway capacity, components, types of spillways and their working, design of ogee spillway, spillway crest gates, energy dissipation below spill way, scour protection, use of hydraulic jump as energy dissipator – design of stilling basins – IS standard basins.

**UNIT – III:**

**Diversion Head Works:** Location and components, effects of construction of weirs on permeable foundation, Bligh's, Lane's and Khosla's theories, weirs and barrages, weirs on permeable foundations, design of barrage, canal head regulator, silt control devices. Regulation Works: Canal falls, definition, necessity and location, classification of falls, design principles of notch fall, and distributary cross regulator and off-take head regulator.

**UNIT – IV:**

**Cross Drainage Works:** Types, factors affecting the suitability of each type, classification, design principles of Aqueduct (Type-III). River Engineering: Classification of Rivers, River Training and its objectives, Classification of River Training Works, Methods for River Training, Marginal Embankments or Levees, Guide Banks or Guide Bunds, Groynes or Spurs, Cutoffs, Bank Pitching and Launching Aprons, Pitched Islands, Miscellaneous Methods.

**UNIT – V:**

**Water Power Engineering:** Development of hydro power in India, assessment of available power, utilisation factor, load factor, diversity factor, storage and pondage, types of hydro power schemes, components of hydel schemes – forebay, intake structure, trash racks, water hammer, surge tanks, sub structure and super structure of power house.

**Reference books :**

1. P.N.Modi, Irrigation, Water Resources and Water Power Engineering, Standard Book House, Delhi-6, sixth edition 2004.
2. S.K.Garg, Irrigation Engineering, and Hydraulic Structures, Khanna Publishers, Delhi-6, 14<sup>th</sup> Revised Edition.
3. B.C.Punmia and Pande B.B.Lal, Irrigation and Water Power Engineering, Laxmi Publications Pvt. Ltd., New Delhi, 12<sup>th</sup> edition 1992.
4. R.S.Varshney, S.C. Gupta, and R.L. Gupta, Theory & Design of Irrigation Structures, Vol.II, Nem Chand & Bros., Roorkee, Sixth edition, 1993.



**B.TECH. (CE) VII SEMESTER**  
**EURCE 702: TRANSPORTATION ENGINEERING – II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 702	CE	3			3	60	40	100	3

**UNIT-I:**

**Railway Engineering-I:** Historical Development of Railways in India, Advantages of Railways, Classification of Railways, Permanent Way & its components, functions. Track volume and Track capacity.

**UNIT-II:**

**Railway Engineering-II:** Rail Joints, Welding of rails and Creep of rails. Track Geometric Design, Gradients, Horizontal and Vertical curves, super elevation, Negative Super elevation, Coning of Wheels,

**UNIT-III:**

**Railway Engineering-III:** Turnouts: Left Hand Turnout, Track Junctions, Points and crossings, Tracks Drainage, Railway Stations and Yards, Signaling.

**UNIT-IV:**

**Dock And Harbour Engineering:** Layout of Port, Components and Functions, Classification of Ports, Harbour and its classification, Site selection of ports & harbours, Natural phenomenon - Tides, Wind, Waves & Currents, Navigational aids.

**UNIT-V:**

**Airport Engineering:** Layout of Airports, Aircraft components and functions, Aircraft characteristics, Airport site selection, Airport obstructions, Wind rose Diagram, Runway design, Taxiway.

**Referece Books:**

1. S.C. Saxena & S Arora, Railway Engineering, Dhanpatrai Publications, 6<sup>th</sup> edition, Reprint 2004.
2. Srinivasan, Docks & Harbour Engineering, Charotar Publishing House, 7<sup>th</sup> edition, 1983.
3. S.K. Khanna & M.G. Arora & S.S. Jain, Airport Planning & Design, Nem Chand & Brothers – 1994, Roorkee, 5<sup>th</sup> Edition

**B.TECH. (CE) VII SEMESTER****EURCE 703: CONSTRUCTION MANAGEMENT**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 703	HS	3	1		4	60	40	100	4

**UNIT-I:**

**PERT and CPM :** Introduction : Origin of PERT and CPM, Planning, Scheduling and controlling, Bar charts, Milestone charts, weaknesses in Barcharts, PERT and CPM networks – Comparison, Event, Activity, Rules for drawing networks, Numbering the events (Fulkerson’s law), Dummy activities.

**UNIT-II:**

**CPM-PERT- Network Analysis :** Time estimate-Expected time, Earliest allowable occurrence time, Latest allowable occurrence time, slack, project duration, probability of completion, Start and Finish time estimates, Floats, Project scheduling, Critical and sub-critical path. Updating – Process of updating; when to update.

**UNIT-III:**

**CPM Cost Model & Resources allocation, Resource scheduling :** Cost Analysis; direct and indirect costs, operation time, Normal and crash times and costs, optimising project cost, crash limit, Free float limit, Optimization. Resource smoothening. Resource & leveling - Theory.

**UNIT-IV:**

**Management** – Scope of Construction Management; Significance of Construction Management; Concept of Scientific Management; Psychology in Management; A historical account of Management Philosophy; Qualities of Manager; The roles/functions performed by effective and competent Managers; The Manager: i) as a decision maker; ii) as a motivator, iii) as a communication-link; iv) as a conflict-resolver; v) as a well – wisher of co-employees and the employer; etc.

**UNIT-V:**

**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.

**Reference Books :**

1. L. S. Srinath, PERT and CPM, Afflicted East West Press Pvt. Ltd, 2<sup>nd</sup> Edition 1975
2. PERT and CPM – Punmia, Laxmi Publications, 3<sup>rd</sup> edition 1987.
3. Guha and Sen Gupta, B, Construction Management and Planning.
4. A Shapero, Managing Professional People: Understanding Creative Performance.
5. Groups-G Egan, Interpersonal living: A Skill/Contract Approach to Human Relations Training.
6. U.K. Shrivastava, Construction Planning and Management –New Delhi, Galgotia Publications Pvt. Ltd – 1999.

**B.TECH. (CE)VII SEMESTER****EURCE 711: COMPUTER APPLICATIONS IN CIVIL ENGINEERING (CACE)**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 711	CE			5	5	-	100	100	3

**UNIT-I:**

Structural Analysis and Design

1. Introduction to STAAD Pro Software and Basic Beam Analysis
2. Analysis of RC Plain and Three dimensional frames.
3. Analysis and Design of structures subjected to Wind and Earthquake Loads.
4. Analysis and Design of Steel Truss.
5. Design of structural components – Slabs, Footings, Pile caps, Retaining walls(Using NISA civil software).

**UNIT-II:**

Geological Information Systems

1. Land use, Land cover, Hydromorphology, Network of roads using GIS Software/ (ESRI or ILWIS)
2. DEM Generation using digital photogrametry software/ using PHOTOMOD/ ERDAS Leica.

**UNIT-III:**

Pipe network application: EPANET

**UNIT-IV:**

Project Management Application: MS Projects/Primavera

\* Note: Students should learn any three software packages.

**EURCE 712: NON - DESTRUCTIVE TESTING LABORATORY**

		Hours of	T o	Marks	C r
--	--	----------	-----	-------	-----

Course Code	Category	Instruction per week				Semester End Exams	Continuous Evaluation	Total	
		L	T	P					
EURCE 712	CE			2	2	--	100	100	1

1. Assessment of Compressive Strength by Rebound Hammer Test.
2. Assessment of Compressive Strength by UPV Test.
3. Measurement of Cover and Bar Diameter by Profometer.
4. Evaluation of Permeability of Concrete using Poroscope
5. Measurement of Corrosion of reinforcement by Half Cell Potential measurements.
6. Measurement of Crack Width of RC Beams.
7. Measurement of Surface Strains of RC Beam under external loading.
8. Plotting of Stress-Stain Curve for Concrete.
9. Rapid estimation of Compressive Strength of Concrete.
10. Carbonation Test.
11. Determination of Chloride content in cement concrete.

## B.TECH. (CE) VII SEMESTER

### EURCE 713: TRANSPORTATION ENGINEERING LABORATORY-II

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 713	CE			2	2		100	100	1

#### LABORATORY TESTS:

1. Bituminous mix design by Marshall Stability test.
2. Determination of Bitumen content by centrifuge extractor.
3. Stripping value test for bitumen.

#### FIELD TESTS / DEMONSTRATION TESTS:

4. Pavement structural evaluation by Benkleman beam test.
5. Field CBR test.
6. Traffic Volume Studies
7. Spot Speed Studies
8. Determination of roughness of the pavement by Bump Integrator.

#### REFERENCE BOOKS:

1. Highway material testing by Khanna and Justo, Nem Chand & Brothers, 4<sup>th</sup> Edition-1989
2. Principle of transportation engineering by Partha Chakraborty and Animesh Das, New Delhi, Prentice Hall of India - 2003
3. Principles of pavement design by Yoder and Lit Zorck.
4. Pavement material by Huang.

**B.TECH. (CE) VII SEMESTER  
EURCE 714: PROJECT**

Code No	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End exams	Continuous Evaluation	Total	
EURCE 714	PW			4	4	50	50	100	2

**EURCE 715: INDUSTRIAL TRAINING**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 715	IT						100	100	2

**EURCE 721 -727: DEPARTMENTAL ELECTIVE – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 721-727	DE	3	1		4	60	40	100	4

## **B.TECH. (CE) VII SEMESTER**

### **EURCE 721: Elective-I: ADVANCED REINFORCED CONCRETE STRUCTURES-I**

#### **UNIT-I:**

Yield Line Analysis: Analysis and Design of Slabs using yield line theory. Slabs supported on four edges, three edges and two opposite edges subjected to uniformly distributed load.

#### **UNIT-II:**

Grid Floor: Analysis and Design of Grid Floors as per IS Code and more rigorous method.

#### **UNIT – III:**

Design of Bunkers

#### **UNIT – IV:**

Design of silos, Slipform construction and Silos

#### **UNIT-V:**

Flat Slabs – Different Components of a Flat Slab, Direct Design Method, Bending Moments in the interior and end Spans.

#### **Reference books:**

1. N. Krishnam Raju, Advanced Reinforced Concrete designed, CBS Publishers & Distributors, First Reprint, 1988.
2. P. Dayaratnam, Design of Reinforced Concrete Structures, Oxford & IBH Publishing Co., 4<sup>th</sup> edition, reprinted 2002
3. Park and Pauly, John Wiley & Sons, Reinforced Concrete Structures.

### **EURCE 722: Elective-I: MULTI-STOREYED STRUCTURES**

#### **UNIT-I:**

]Analysis of Gable by Moment Distribution Methods with and without sway.

#### **UNIT-II:**

Introduction to Matrix methods: Analysis of continuous beams and single bay single storey portal frames by stiffness method.

#### **UNIT-III:**

Analysis of single bay single storey portal frames and continuous beams by Flexibility matrix methods.

#### **UNIT-IV:**

Analysis of Multistoreyed frames by substitute frame method.

#### **UNIT-V:**

Analysis of Multistoreyed frames for wind loads by portal, cantilever and Girder Factor methods.



**Reference:**

1. V.N. Vazirani & M.M.Ratwani, Analysis of Structures Vol.II, Khanna Publishers, Fifty reprint, 2004.
2. S.P. Gupta, G.S.Pandit, R. Gupta, Theory at Structures, Vol.II, Tata McGraw Hill, Second Reprint 2003.
3. S.S.Bhavikatti, Structural Analysis Vol.II, Vikas Publishing House Pvt. Ltd, Second Edition, 2005.

**B.TECH. (CE) VII SEMESTER****EURCE 723: Elective-I: DESIGN OF BRIDGES****UNIT-I :**

Loading Standards as per IRC, Railway load, Equivalent Uniformly Distributed live load, Influence line diagram for member of Pratt truss

**UNIT-II:**

Slab Bridge, T-Beam Bridge

**UNIT-III:**

Balanced Cantilever Bridge.

**UNIT-IV:**

Steel Truss Bridge.

**UNIT-V:**

Piers, abutments, wing walls factors effecting and stability, well foundations. Design of well, construction; open sinking of wells, Plugging, sand filling and casting of well cap

**Reference:**

1. D. Johnson Victor, Essentials of Bridge Engineering, Oxford & IBH Publishing Co.Pvt.Ltd, 5<sup>th</sup> Edition 2001.

## DEPARTMENTAL ELECTIVE – I

### EURCE 724 Elective-I: DESIGN OF FOUNDATIONS FOR DYNAMIC LOADING

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 724	DE	3	1		4	60	40	100	4

#### UNIT-I:

**Elements of Soil Dynamics:** Free and forced vibrations with and without damping for single degree of freedom, natural frequency of foundation soil system – Barken, pressure bulb concept, Pauw's analogy.

#### UNIT-II:

**Wave Propagation:** Waves in elastic half space, Elements of seismic methods, steady state vibrations.

#### UNIT-III:

**Elastic Properties of Soil:** Field and Laboratory methods, stress strain characteristics of soil under dynamic loads, damping properties.

#### UNIT-IV:

**Bearing capacity of soil :** Under dynamic loads by pseudo static analysis and vibration Isolation.

#### UNIT-V:

**Liquefaction:** Mechanism, Laboratory methods, Evaluation of liquefaction in the field, factors affecting liquefaction, Anti liquefaction measures, earthquake zones.

#### References:

1. Swami Saran, Soil Dynamics & Machine Foundations
2. Shamsher Prakash, Soil Dynamics, 2<sup>nd</sup> Impression, 1964.
3. Srinivasulu. P. and Vydyanathan, Hand Book of Machine Foundations
4. Junkies, Foundation Dynamics
6. Barken, Dynamics of Bases and foundations.
7. Richart, Vibration of Soil and Foundation
8. Relevant IS Codes.
9. Nayak, N.V., Foundations Design Mamual, Dhanpat Raj & Sons, 3<sup>rd</sup> edition, 1985

## B.TECH. (CE)VII SEMESTER

### EURCE 725 Elective-I: HYDRAULIC STRUCTURES

#### UNIT-I:

**Straight Gravity concrete Dams:** Multiple-step design, Internal stresses in gravity dams, stress distribution around openings, stress distribution around a circular hole in an infinite plate due to a normal stress on the plate, stress distribution around a horse shoe shaped gallery using phillips and zanger's tables, design of reinforcement around galleries in dams. Arch Dams: Economic central angle of an arch dam, constant radius method, constant angle method, and variable radius and variable angle design of arch dams, trial load method of analysis of arch dams.

#### UNIT-II:

**Earth Dams:** Seepage analysis, stability analysis of infinite slopes with and without seepage, stability analysis of finite slopes – friction circle method, method of slices, ordinary method of slices, simplified Bishop method of slices, spencer's method.

#### UNIT-III

**Spillways:** Design of reinforcement in the crest region of an ogee spillway, hydraulic design of chute spillways, morning glory spillways, and side channel spillways. Intake structures, Trash Racks.

#### UNIT-IV:

**Water Conductor System:** Economic analysis for determination of sizes of water conductors, analysis and design of lined pressure tunnels, water hammer analysis, analysis and design of surge tanks of various types, design of anchor blocks for penstocks, design of penstock junctions, design of scroll cases and draft tubes.

#### UNIT-V:

**Gates and Valves:** Vertical lift gates, tainter gates, cylindrical gates, butterfly valves, Howell – Bunger valves, needle valves, flow induced forces on vertical lift gates, flow induced vibration of vertical lift gates.

Layout of Power Houses.

#### References :

1. Creager, W.P. Justin, J.D., and Hinds J., Engineering for Dams, Vol.II, Wiley Eastern Private Limited, 1945.
2. Creager W.P. & Justin J.D., Hydro Electric Hand Book, John Wiley & Sons Inc., Newyork, 1949
3. U.S.B.R., Design of Small Dams, 1960.
4. Davis.C.V. and Sorensen.K.E, Handbook of Applied Hydraulics, Mc Graw Hill Book Co., 1969.
5. T.W.Lambe and R.V.Whitman, Soil Mechanics, J.I.Version, John Wiley & Sons, 1979.
6. Streeter, V.L. and Wylie, G.B., Hydraulic Transients, Mc Graw Hill Book Company, 1967.
7. Hanif Chaudhry, M., Applied Hydraulic Transients, Van Nostrand Reinhold Company, 1979.

## **B.TECH. (CE) VII SEMESTER**

### **EURCE 726: Elective-I: ELEMENTS OF ENVIRONMENTAL SANITATION**

#### **UNIT-I:**

Origin and spread of Communicable diseases like Cholera, Smallpox, Tuberculosis, Malaria, Filariasis, and Plague – common methods. Role of Public Health Engineers in the preventive aspects of the above diseases – Role of vectors in transmitting diseases.

#### **UNIT-II:**

Rural water supply and sanitation – Sanitary protection of wells – springs, Economic methods of treatment.

#### **UNIT-III:**

Food Sanitation – Food poisoning /Food preservation sanitary maintenance of catering and eating establishments - market places - slaughter houses etc / milk and milk products - milk sanitation.

#### **UNIT-IV:**

Refuse sanitation – Quality and quantity of garbage, night Soil – methods of conveyance and sanitary disposal methods, latest technologies adopted to dispose of the solid wastes. Insect vector and Rodent control.

#### **UNIT-V:**

Institutional Sanitation: Sanitary Requirements and Maintenance of Public Places - Schools, hospitals, jails and offices.

#### **Text Books:**

1. Ehlers Steel., Municipal and Rural Sanitation, Tata McGraw Hill
2. Salvato, Environmental Sanitation, Tata McGraw Hill, Toppan Printing Company 1958.

## B.TECH. (CE) VII SEMESTER

### DEPARTMENTAL ELECTIVE – I

#### EURCE 727: Elective-I: ENVIRONMENTAL IMPACT ANALYSIS

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 727	DE	3	1		4	60	40	100	4

#### UNIT– I:

Introduction to EIA. Definition of E IA and EIS.C.E. guidelines in USA, preparation of EIS, Elements of EIA.

#### UNIT–II:

Agency Activities, Environmental setting. Environmental attributes, air, water, soil, ecology, noise Socio-Economic aspects, Culture and human aspects (Human settlements – rehabilitations).

#### UNIT–III:

Environmental impacts, Identification measurement, Aggregation, Secondary and Cumulative Impacts.

#### UNIT–IV:

Criteria for selection of methodology, impact assessment methodologies, procedure for reviewing environment impact statement.

#### UNIT–V:

Case studies, Economic impact analysis / Energy production impact analysis, cost benefit analysis, Environmental impact mitigation and control measures.

#### Reference Books :

1. Urban & Jain, Environmental Impact Analysis.
2. Canter, Environmental Impact Analysis –McGraw Hill Publishers, 2<sup>nd</sup> edition.

**B.TECH. (CE) VIII SEMESTER****EURCE 811: PROJECT**

Course code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End	Continuous	Total	
EURCE 811	PW			8	8	50	50	100	4

**EURCE 831 - 836: DEPARTMENTAL ELECTIVE – II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 831-836	DE	3	1		4	60	40	100	4

**EURCE 841- 846: DEPARTMENTAL ELECTIVE– III**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 841-846	DE	3	1		4	60	40	100	4

**EURCE 851 - 8520: INTER DEPARTMENTAL ELECTIVE – I**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Sem End Exams	Continuous Evaluation	Total	
EURCE 851-8524	IE	3	1		4	60	40	100	4

**EURCE 8601 – 8620: FREE ELECTIVE – II**

Course Code	Category	Hours of Instruction per week			Total Hours	Marks			Credits
		L	T	P		Semester End Exams	Continuous Evaluation	Total	
EURCE 861-8620	IE	3	1		4	60	40	100	4

**B.TECH. (CE) VIII SEMESTER****EURCE 831: ELECTIVE –II: INDUSTRIAL STRUCTURES****UNIT-I:**

Connections: Design of Frame, seated moment resisting connections (both welded and riveted).

**UNIT-II:**

Analysis of Pitched (Gable) Portal frames, Assumptions, Bending Moment and Shear Force diagrams. Design of portal frame (dead, live and wind loads).

**UNIT-III:**

Analysis and design of gantry girders, Steel Bracket design.

**UNIT-IV:**

Towers, Principles of Analysis and Design of Lattice towers, Transmission towers. Design of lattice towers and transmission towers (only sessional work).

**UNIT- V :**

Analysis of Mill Bends.

**Reference Books:**

1. M.Raghupati, Design of Steel Structures.
2. Arya and Azmani, Design of Steel Structures, Nem Chand & Bro's, 4<sup>th</sup> edition 1989.
3. P. Dayaratnam, Design of Steel Structures, A.H.Wheeler & Co., 2<sup>nd</sup> edition, 1996.
4. Kazmi and Zindal, Design of Steel Structures.

**EURCE 832: Elective-II: ADVANCED REINFORCED CONCRETE STRUCTURES-II****UNIT-I:**

**Deflection of Reinforced Concrete members:** Introduction, Short-term deflection of beams, Deflection due to imposed loads, short-term deflection of beams due to applied loads, calculate deflection by IS 456.

**UNIT-II:**

**Estimation of crack width in Reinforced Concrete Members:** Introduction, factors affecting crack width in beams, Calculation of crack width, estimation of crack width in beams by IS 456.

**UNIT-III:**

**Redistribution of Moments in Reinforced Concrete Beams:** Introduction, Redistribution of moments in fixed beams, positions of points of contra flexure, conditions for moment redistribution, Final shape of redistributed bending moment diagram, moment redistribution for a two-span continuous beam, advantages and disadvantages of moment redistribution.

**UNIT-IV:**

**Design of Staircases:** Introduction to Helicoidal Staircases, Design of Helicoidal Staircases

**UNIT-V:**

**Design of Reinforced Concrete Members for Fire Resistance:** Introduction, grading or classifications, Effect of high temperature on steel and concrete, Effect of high temperature on different types of structural members, fire resistance by structural detailing from tabulated data, analytical determination of the ultimate bending moment, capacity of reinforced concrete beams under fire.

**References:**

1. P. C. Varghese, Advanced Reinforced Concrete Design, Prentice hall India, 2<sup>nd</sup> printing 2002.
2. Park & Paulay, Reinforced Concrete.

**B.TECH. (CE) VIII SEMESTER****EURCE 833: Elective-II: PRESTRESSED CONCRETE****UNIT-I:**

Introduction, Basic concepts of prestressing, need for high strength steel and concrete, advantages of prestressed concrete. Materials for prestressed concrete, high strength concrete and high strength steel. Prestressing systems (1) Fressinet System (2) Gifford Udall, Tensioning devices, anchoring devices, Pretensioning and Post tensioning, Grouting.

**UNIT-II:**

Prestressing losses due to Elastic shortening, shrinkage and creep of concrete friction, slip of anchorage etc. I.S. code provisions.

**UNIT-III:**

Analysis of prestressed members, assumptions, pressure or thrust line concept of load balancing, cable profile, kern distance, stress in tendons as per IS 1343, cracking moment.

**UNIT-IV:**

Limit state design of flexural members, I.S. code provisions, design of symmetrical beams, Design for shear, I.S. code provisions.

**UNIT-V:**



Transfer of Prestress (Pretensioned members), Transmission length, bond stress, Transverse tensile stress, End Zone reinforcement, flexural bond stress, I.S. Code Provisions. (b) Anchorage zone in post tensioned members, stress distribution in end block, Guyon's method of approach of analysis of end block (Not more than 2 cables).

**Reference Books:**

1. P. Dayaratnam, Prestressed Concrete, Oxford & IBH Publishing, Reprint 1996.
2. T.Y. Lin and Ned. H. Burns, Design of Prestressed Concrete Structures, John Wiley & Sons, 3<sup>rd</sup> edition.
3. N. Krishna Raju, Prestressed Concrete, Tata McGraw Hill, 3<sup>rd</sup> edition, eleventh reprint 2003.

**EURCE 834: Elective –II: GROUND IMPROVEMENT TECHNIQUES**

**UNIT-I:**

In-situ densification methods in granular soils – Introduction of Vibration at the ground surface, Impact at the Ground surface. Vibrofloatation technique and other techniques like dynamic replacement etc.

**UNIT-II:**

In-situ Densification methods in cohesive soils:- introduction, preloading, dewatering, sand drains, sand wicks, Geodrains/ band drains. Methods of dewatering systems – open sumps and ditches, well point system, deep well system, vaccum dewatering, Electro-Osmosis method.

**UNIT-III:**

Reinforced Earth: Principles, components of reinforced earth, factors governing design of reinforced earth walls. Geotextiles: Introduction, types of Geotextiles, Functions and their application.

**UNIT-IV:**

Stabilization of Soils: Soil aggregate mixture, properties and proportioning techniques, soft aggregate stabilization, compaction, field compaction control. Cement, lime and bituminous stabilization.

**UNIT-V:**

Stone Columns: Introduction, construction practice, design principles, Case studies indicating the efficacy and importance of ground improvement Technique.

**Reference Books:**

1. Robert M.Koerner: Construction and Geotechnical Methods in Foundation Engg, McGraw Hill
2. E. J. Yoder: Principles of pavement design, John Wiley and sons.
3. Leonards, G.A. Foundation Engineering.
4. Khanna S.K. and Justo C.E.G: Highway Engineering Nemchand Publications.
5. Sowers G.F.: Introductory Soil Mechanics and Foundations.
6. Hausemen: Principles of Ground improvement, Mcgraw Hill Publishing Co., New Delhi, 1999
7. Dr. P. Purushothama Raj: Ground Improvement Techniques, Laxmi Publication (P) Ltd, New Delhi, 1999.

**B.TECH. (CE)VIII SEMESTER**

**EURCE 835: Elective –II: COASTAL ENGINEERING**

**UNIT-I:**

Mechanics of Wave Motion: Wave fundamentals and classification of waves, small amplitude wave theory, wave celerity, length, and period, orbital motions, pressure distribution, wave trains and wave energy, transformation of waves, higher order wave theories, stokes higher order wave theories, cnoidal wave theory, wave refraction, wave diffraction, wave reflection, wave breaking.

**UNIT-II:**

Tides, Storm surges, Tsunamis - Wave Prediction: Wave height variability, energy spectra of waves, directional spectra of waves, wind information needed for wave prediction, estimating the wind characteristics

**UNIT-III:**

Delineating a fetch, forecasts for lakes, bays, and estuaries, significant wave method, wave spectrum method, forecasting wind waves in shallow water, deep water relation for wave decay, hurricane waves.

**UNIT-IV:**

Littoral Processes: Ocean currents, long shore currents and setup due to ocean waves, sediment transport in the offshore zone, surf zone, bar-berm prediction and budget of the littoral zone.

**UNIT-V:**

Wave runup, over topping and transmission - Wave Forces: Wave forces on cylinders and walls.

**References :**

Ippen, A.T., Estuary and coastline hydrodynamics, Mc Graw – Hill book company Inc., 1966.  
Sorensen, R.M., Basic Coastal Engineering, John Wiley & Sons, 1978.  
U.S. Army Coastal, Engineering Research Center, Shore protection manual, Vols. I, II and III, 1977.

**EURCE 836: Elective-II: PRINCIPLES OF INDUSTRIAL WASTE TREATMENT****UNIT-I:**

Characteristics of waste water of specific industries, characteristics of treatment plant effluents, Effect of waste water on self purification capacity of streams, Primary treatment of waste water.

**UNIT-II:**

**Principles of biological waste treatment:** Facilities Microbiological growth rate kinetic equations, sludge production, oxygen requirements, continuous flow treatment models. Aerobic treatment studies in continuous and semi-continuous reactors. Anaerobic treatment, studies, Nitrogen and Phosphorus removal.

**UNIT-III:**

**Process designs of the following units w.r.t. Industrial Wastes;** Activated sludge process; trickling filter; sludge digestion units; Aerated lagoons; Stabilization ponds (oxidation ponds); oxidation ditches (Pasveer); Rotating Biological contactor; Anaerobic filter.

**UNIT- IV:**

**Principles of Industrial waste Treatment:** Waste reduction pretreatment of wastes, collection and segregation of wastes, reduction in volume and strength neutralisation; equalisation; proportioning.

**UNIT-V:**

**Manufacturing processes, flowsheets;** Characteristics and treatment of wastes and disposal methods of the following industries – Sugar, Dairy, Distillery, Paper, Tannery, Textile, Sheet, Fertiliser, Oil refinery and Petrochemicals.

**References :**

1. M.N. Rao and A. K. Datta; Waste Water Treatment.

2. Metcalf and Eddy; A waste water Engineering Treatment, disposal and Reuse –Tata Mc. Graw-Hill Co., 3<sup>rd</sup> edition, 1995.

## **B.TECH. (CE) VIII SEMESTER**

### **EURCE 841: ELECTIVE-III: FINITE ELEMENT METHOD**

#### **UNIT-I:**

Introduction of Finite Element method, Concept of an element, Various Element Shapes

#### **UNIT-II:**

Displacements models, element stresses and strains, direct formulations of element stiffness and loads.

#### **UNIT-III:**

Plane Stress/Strain Triangular elements, quadrilateral elements, modeling and mesh refinement.

#### **UNIT-IV:**

Construction of stiffness matrix and loads, boundary conditions

#### **UNIT-V:**

Finite Element modeling and solution techniques, symmetry in Finite Element method, nature of Finite Element method solution, errors, convergence and adaptively.

#### **Books:**

1. Zienkiewicz, O.C., and Taylor, R.L., The Finite Element method, Butterworth Heinemann, New Delhi, 2002.
2. Cook, R.D., et al, Concept and Applications of Finite Element Analysis, John Wiley & Sons, 2002.
3. Chandrakant. S. Desai, and John . F. Abel., Introduction to the Finite Element method, CBS Publishers & Distributors, New Delhi, 2002.
4. Chandraguptal, T.R. and Belegundu A.D., Introduction to Finite Elements in Engineering, Prentice Hall, Indian, Edn., 2003.

### **EURCE 842 : Elective-III: INTRODUCTION TO EARTHQUAKE ENGINEERING**

#### **UNIT-I:**

Introduction of Structural Dynamics – Types of prescribed Loads – Analysis of Dynamical behaviour of Structures – Mathematical and Analytical Models – Degrees of Freedom. Single degree freedom — Free body diagram – Solution of Differential equation of Motion – Frequency, period and Amplitude – Logarithmic decrement – Simple Problems.

#### **UNIT-II :**

Un-damped and Damped Systems, Types of Damping Systems, Vibration measuring instruments,

#### **UNIT-III:**

Free Vibration of SDOF Systems – Response of SDOF System to Harmonic Excitation, Dynamic Excitation – Raleigh's method, Stodola method — Response Spectra.

#### **UNIT-IV:**

Mathematical model of MDOF Systems – Vibration of Un-damped two Degrees of Freedom system – Simple problems – Free vibration of MDOF System – Natural Frequencies & Mode shapes – mode Superposition method as per IS 1893 Code Provisions.

#### **UNIT-V:**

Introduction of Earth Quake Response of Structures – Response of SDOF and MDOF systems to earth quake excitation – Simple problems on SDOF system – Concept on Seismic Design -IS 1893 (1984)- Provisions for Seismic Design: Reinforcement detailing as per IS Code.

## Reference Books:

1. Mario Paz, Structural Dynamics.
2. R.W. Clough & J. Penzien, Dynamics of Structures
3. Anil, K. Chopra, Dynamics of Structures
4. A.R. Chandrasekharan & Jaikrishna, Earth quake Engineering

## B.TECH. (CE)VIII SEMESTER

### EURCE 843: Elective-III: SOIL DYNAMICS AND MACHINE FOUNDATIONS

#### UNIT-I:

Resonance and its effect – free and forced Vibrations with and without damping – Constant force and rotating mass type excitation – Magnification factor – Phase difference between forces and displacement for steady state vibrations – Logarithmic decrement.

#### UNIT-II:

Natural frequency of foundation soil system – Barkan's and I.S. methods of determining natural frequency. Tachehotarioff's reduced natural frequency.

#### UNIT-III :

Elastic properties of soil for dynamical purpose and related properties

#### UNIT-IV:

Types of machine foundations – General requirements, Permissible amplitudes and bearing pressures. Analysis and Design requirements of foundations for rotary, reciprocating and impact type of machine – as per I.S. codes.

#### UNIT-V:

Vibration isolation – types and methods of isolation - Active isolation and passive isolation. Dynamic properties of isolation materials. Case Studies pertaining to vibration problems of foundations.

#### References :

1. Srinivasulu and Vaidyanathan, Hand-book of machine foundations, M/s. Tata McGraw Hill Publications.
2. Relevant I.S. Codes.
3. B.C.Punmia, Soil Mechanics and Foundation Engineering, Standard Book House, 9<sup>th</sup> edition, 1985
4. Shamsheer Prakash, Gopala Ranjan and Swamisaran, Analysis and Design of Foundations and Retaining Structure, M/s Saritha Prakashan, Meerut.
5. Richart Hall and Woods, Vibrations of soils and Foundations, Prentice Hall Inc.,New Jersey

### EURCE 844: Elective-III: AIR POLLUTION AND ITS CONTROL

#### UNIT-I:

Air Pollution and its definition – Factors influencing air pollution – Classification of pollutants -particulates – Gases-Sources of pollution – Air quality standards – effects – Location of Industries.

#### UNIT – II :

Meteorology – Wind roses – lapses rates – mixing depth- atmospheric dispersion – plums behavior-accumulation, estimation of pollutants – Effective stack height – Ambient air quality monitoring and stack monitoring.

**UNIT-III:**

Air Pollution effects on human beings, animals, plants and materials, Air Pollution Episodes in India and abroad.

**UNIT-IV:**

Air quality standards – effects – Location of Industries, Ambient air quality monitoring and stack monitoring.

**UNIT-V:**

Control of air pollution – Removal of pollutants – particulate and gaseous – Air pollution control equipments (units) such as settling chamber, cyclones, wet scrubbers/collectors, scrubbers, centrifugal scrubbers spray towers, packed beds, electrostatic precipitators, after burners-absorption – adsorption – Diffusion.

**References :**

1. T. Painter., Air Pollution Control Technology, Mc.Graw Hill
2. Prof. T. Shivaji Rao, Elements of Air Pollution Control
3. M.N.Rao. & H.V.N.Rao, Air Pollution and its Control, TaTa Mc.Graw Hill, 15<sup>th</sup> reprint, 2000
4. Dr. B.S.N. Raju, Fundamentals of Air Pollution, Oxford & I.B.H.
5. K.V.S.G Murali Krishna, Air Pollution and its Control, Kanghal & Co.,

**B.TECH. (CE) VIII SEMESTER**

**EURCE 845: Elective-III: TRANSPORTATION PLANNING AND PAVEMENT DESIGN**

**UNIT-I:**

**Transportation Planning Process:** Introduction, System approach to Transportation Planning, Stages in transportation planning, and difficulties in transportation planning process.

**UNIT- II:**

**Transportation Survey:** Introduction, Definition of the study area, zoning, types of surveys, Inventory of transportation facilities, land use and economic activities.

**UNIT- III:**

**Transport Demand Analysis:** Introduction, 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- IV:**

**Pavement Analysis:** Introduction, Parameters of pavement analysis – Elastic modulus, Poisson's ratio, Wheel load, Wheel configuration and Tyre pressure. Analysis of Bitumen's Pavement Structure, layered elastic solution.

**UNIT-V:**

**Pavement Design:** Design of flexible pavements – theoretical, empirical and semi-empirical methods, Burmister, AASHO method, IRC method. Design of Rigid pavements -PCA method, AASHTO Design method.

**Reference Books:**

1. Partha Chakraborty and Animesh Das, Principles of Transportation Engineering.
2. Yoder and Wit Zork, Principles of Pavement Design.
3. Dr. L.R. Kadiyali, Traffic Engineering and Transportation Planning, Khanna Publishers, 7<sup>th</sup> Edition, 2007.



## **B.TECH. (CE) VIII SEMESTER**

### **EURCE 846: Elective-III: REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS**

#### **UNIT-I:**

##### **Fundamentals of Remote Sensing:**

Introduction, Electromagnetic radiation, Electromagnetic Spectrum, Energy interactions with Earth's surface materials and Atmosphere, Sensors and Platforms, False Colour Composite (FCC) image, Image interpretation techniques, Satellite remote sensing – Indian context.

#### **UNIT-II:**

##### **Fundamentals of GIS:**

Introduction, Elements of GIS, Vectorization, Rasterization, Geo-referencing, Map Projections, Digitization Process, Data Base handling, Types of data structures, overlay analysis, surface terrain models – Digital elevation model (DEM), Triangulated irregular network (TIN), and Slope models.

#### **UNIT-III:**

##### **RS & GIS Techniques for Natural resources Management:**

Landuse/land cover classification systems, Forest cover, agriculture and wasteland management. Water Resources Management.

#### **UNIT-IV:**

##### **RS & GIS Techniques for Infrastructure Planning and Management:**

Urban utilities, cadastral mapping and transport network. GPS Navigation system for various applications.

#### **UNIT-V:**

##### **RS & GIS Techniques for Natural Disasters Management:**

Earthquakes, Landslides, cyclones and Floods – Hazard Zonation, Risk assessment, Relief and Rehabilitation measures.

#### **Text Books:**

1. P.K. GUHA, Remote Sensing for the Beginner, EWP Ltd.
2. M.ANJIREDDY, Text Book of Remote Sensing and Geographical Information Systems, BSP Publishers.
3. Lillesand, T.M. and Kiefer, Remote Sensing and Image Interpretation, R.W. John Wiley & Sons Publishers.



**B.TECH. (CE) VIII SEMESTER**  
**EURCE 852: Elective-I: Data Base Management Systems**

**Prerequisite: File processing**

**UNIT I:**

Introduction to DBMS – Overview, File system vs DBMS, Advantages of DBMS, Storage data, queries, Transaction Management, DBMS Structure

**UNIT II:**

E-R model Entities, Attributes and Entity sets, Relation ship and Relation ship sets, Features of ER model, Conceptual database design with ER model.

**UNIT III:**

Relational model – integrity constraints over relations and enforcement, Querying relation data, Logical database design, views, destroying/altering tables and views. Relational algebra and calculus

**UNIT IV:**

SQL – Basic SQL, Query, union, interest, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, cursors, ODBC and JDBC, Triggers and Active database, designing active databases

**UNIT V:**

Transaction management, concurrency control & crash recovery – Transaction concept, transactions and schedules, concurrent execution of transactions, lock – based concurrency control, crash recovery.

Case Study: Oracle0i (SQL, PL/SQL & Triggers)

**Text Book:**

- a. Database Management Systems – Raghu Ramakrishnan and Johannes Gehrke McGraw-Hill
- b. Data System Concepts – H.F.Korth and A.Silberschatz McGraw-Hill

**Reference Book:**

1. Fundamentals of Database System – R.El. Masri and S.B.Navathe

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 853: Elective-I: Software Engineering**

**UNIT I:**

Introduction - Software problem – Software Engineering Problem – Software Engineering Approach

**UNIT II:**

Software Process – Software Process – Characteristics of Software Process – Software Development Process – Project management process – Software Configuration Management Process – Process Management Process.

**UNIT III:**

Software Requirements Analysis & specification – Software Requirements – Problem Analysis – Requirements Specifications – Validation – Metrics

**UNIT IV**

Planning a Software Project – Cost Estimation – Project Scheduling – Staffing & personnel Planning – Software Configuration Management plans – Quality Assurance Plans

**UNIT V:**

Function Oriented Design – Design Principles – Module Level Concepts – Design Notation and Specifications – Structured Design Methodologies – Verification – Metrics  
Testing – Testing Fundamentals – Functional Testing – Structural Testing – Testing Procedure

**Text Book:** An Integrated Approach to Software Engineering by Pankaj Jalot – Narosa Publishers

**Reference Book:** Software Engineering a practitioner's approach by Pressman

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 854: Elective-I: Systems Modeling & Simulation**

**UNIT-I**

- **System Models:** Concept of a system, System Environment, Stochastic activities, continuous and Discrete Systems, System Modeling, Physical and Mathematical Models for Systems, Static and Dynamic Categorization of these physical and mathematical Models. Principles used in modeling.

**System Simulation: MONTE-CARLO Method:** Comparison of Simulation and analytical methods, Experimental nature, Types of Simulation, Numerical Computation Technique for continuous model and for Discrete model, Distributed Lag Models, Cobweb Models.

**UNIT-II**

- **Continuous System Simulation:** Differential Equations, Analog Computers, Analog Models, hybrid Computers, digital – Analog Simulations, Continuous System Simulation Languages (CSSLS), CSMP – III, Hybrid Simulation, Feedback Systems, Simulation of an \_\_\_\_\_, Interactive Systems, Real-Time Simulation.

- **System Dynamics:** Exponential Growth Models, Exponential Decay Models, Logistic Curves, Generalization of Growth Models, Simple System Dynamics Diagrams, Multi-segment Models, Representation of Time Delays, WORLD Models.

**UNIT-III**

- **Probability Concepts In Simulation:** Stochastic Variables, Discrete Probability functions, Continuous Probability functions, Measures of Probability functions, Numerical Evaluation of Continuous Probability functions, continuous Uniformly Distributed Random Numbers, A Uniform Random Number Generator, Generating Discrete Distributions.

- **Arrival Patterns And Service Times:** Poisson's Arrival patterns, Exponential Distribution, Erlang Distribution, Hyper-Exponential Distribution, Normal Distribution, Queuing Disciplines, Mathematical Solutions of Queuing Problems.

**UNIT-IV**

- **Introduction To GPSS:** GPSS Programs, General Description Action Times, Succession of Events, Choice of Paths, Simulation of a manufacturing Shop, Conditional Transfers, Control Statements, Functions, Simulation of a Super Market, Transfer modes, GPSS Model of a Simple Telephone system.

**UNIT-V**

- **Random Access Systems:**

Aloha, Slotted Aloha, Carrier Sense Multiple Access, Delay Calculations in CSMA/CD, Performance comparisons, Reservation Techniques.

**Routing And Flow Allocation:** Routing Model, Shortest Path Algorithms, Capacity Constrains, Flow control and Routing, Routing in Practice.

**Text Books:**

System Simulation by GEOFFREY GORDON, PHI, Second Edition.

Modeling and Analysis of computer Communications Networks. Networks Jeremiah F. Hayes, Khanna Publications.

**References :** Geoffrey Gordon

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 855: Elective-I: Software Project Management**

**Unit I:**

Conventional Software Management, Evaluation of Software Economics.

**Unit II:**

Improving Software Economics.

**Unit III:**

The old way and the new, Life-Cycle Phases.

**Unit IV:**

Artifacts of the Process, Model-Based Software Architectures Workflows of the Process, Checkpoints of the Process, Iterative Process Planning.

**Unit V:**

Project Organisations and Responsibilities, Process Automation. Project Control and Process Instrumentation, Tailoring the process.

**Text Book:**

1. Software Project Management, A real world guide to success by Joel Henry.
2. Software Project Management by Royce.
3. Software Project Management in practice by Pankaj Jalote
4. Quality Software Project Management by Futrell

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 856 Elective-I: Artificial Intelligence**

**UNIT I:**

Introduction to Artificial Intelligence, Artificial Intelligence Problems, Artificial Intelligence Techniques, problems, problem space and search-defining the problem as a state space search, Production System, Problem Characteristics.

Heuristic Search Technologies Generate & Test Hill Climbing, Best First search, Problem reduction, Constraint satisfaction, Means Endo Analysis

**UNIT II:**

Knowledge Representation Knowledge using predicate logic representing simple facts in logic, representing instance and is relationship, computable functions and predicates resolution.

**UNIT III:**

**Representing Knowledge Using Rules:** Procedural Vs Declarative knowledge, Logic programming, Forward Vs backward Reasoning, Matching, Control Knowledge.

**UNIT IV:**

Symbolic Reasoning under uncertainty – Introduction to Non-monotonic Reasoning, logics for Non-monotonic Reasoning, Implementation: depth first search – Dependency – Directed Backtracking. Justification – based truth maintenance, logic based truth maintenance systems Statistical Reasoning – UNIT V: Probability and bayes theorem, Certainty factors and rule – base systems beyesian networks, Dempster – Shaffer theory.

Wek & Strong Slot and Filler Structures Sematic nets, Frames, Conceptual dependencies, Scripts

Prescribe Books: Artificial Intelligence – Rich E & Knight K TMH 1991

Reference Book: Artificial Intelligence structures and strategies complex problem solving – George F-Lugar Pearson Education.

## B.TECH. (CE) VIII SEMESTER

### EURCE 857: Elective-I: Transducers & Signal Conditioning

#### UNIT-I

Static Characteristics of instruments: accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance – loading effect generalized mathematical model of measurement systems – dynamic characteristics – operational transfer function – zero, first and second order instruments – impulse, step, ramp and frequency responses of the above instruments.

#### UNIT-II

Resistive transducers – Resistance potentiometer – loading effect – strain gauges – gauge factor – types of strain gauges: rosettes, semiconductor strain gauges – strain measuring circuits – resistance thermometers – materials of construction, characteristics – thermo wells – thermistors.

#### UNIT-III

Inductive transducers – Induction potentiometers – variable reluctance transducers – LVDT construction – applications – RVDT – Magneto strictive transducers. Capacitive transducers – variable area type – variable air gap type – variable permittivity type – application as level transducer – capacitor microphone – frequency response.

#### UNIT-IV

Piezoelectric transducers – piezoelectric crystals – accelerometer – Hall effect transducers – Thermocouple transducers – IC sensors for temperature and pressure – Introduction to fiber optic and intelligent sensors.

#### UNIT-V

Signal conditioning – Introduction, Signal conditioning for Differential amplifiers – Instrumentation amplifier – Filters – AC and DC Bridges – A / D and D / A converters.

#### Text Books:

1. Mechanical measurements and instrumentation, A.K.Sawhney, Dhanpat Raj
2. Industrial instrumentation, D.Patranabis, TMH
3. Measurement systems – application and design, E.O. Doebelin, McGraw Hill

#### Reference:

1. Practical Instrument Transducers, F.G. Oliver, Pitman Publishing Co.
2. Transducers Engg. S. Rangathan, Allied Publishers

## B.TECH. (CE) VIII SEMESTER

### EURCE 858: Elective-I: Biomedical Instrumentation

#### UNIT I:

**Bioelectric Signals and Electrodes:** Origin of bioelectric signals – action potentials, Recording electrodes – Skin – contact impedance – Electrodes for ECG – Electrodes for EEG – Electrode for EMG – Electrical conductivity of electrode jellies and creams – microelectrodes.

#### UNIT II:

**Physiological Transducers:** Pressure transducers, Transducers for body temperature measurement – Pulse sensors – Respiration sensors.

#### UNIT III:

**Biomedical recorders:** Electrocardiograph – Block diagram, ECG leads, effects of artifacts on ECG recordings; Phonocardiograph; Electroencephalograph – Electromyograph – Preamplifier, filters, delay circuits, stimulators.

#### UNIT IV:

**Biomedical telemetry:** Wireless telemetry – single channel telemetry systems – Temperature telemetry system – Multichannel wireless telemetry system – Multipatient telemetry – Implantable telemetry systems – Transmission of analog physiological signals over telephone lines.

#### UNIT V:

**Patient safety:** Electric shock hazards – Leakage currents – Test instruments for checking safety parameters of biomedical equipments.

#### Text Books:

1. R.S.Khandpur, Hand Book of Biomedical Instrumentation, TMH, New Delhi, 2001
2. Cromwell, Weibell and Pfeiffer, Biomedical instrumentation and measurements, Pearson Education 2003.

#### Reference:

John. G. Webster., Medical Instrumentation application and design, John Wiley & sons inc., 3<sup>rd</sup> edition, 1999.

## B.TECH. (CE) VIII SEMESTER

### EURCE 859: Elective-I: Power Electronics

#### UNIT-I

**Power Semiconductor Switches:** Power diodes, Power transistors – Thyristor family – SCR – Triac – GTO – Power MOSFET – IGBT – two transistor model – Gate characteristics – static and dynamic characteristics – Turn – ON – Turn – OFF methods – Series and Parallel operation of Thyristors – Gate triggering circuits – UJT as an SCT trigger – Thyristor ratings. Protection circuits.

#### UNIT-II

**Phase Controlled Rectifiers:** Single phase and three phase – half wave – full wave – and Bridge controlled rectifiers – Daul converters – effect of load and source inductances – Natural commutation.

#### UNIT-III

**Choppers:** Principle of operation, step up choppers – step down choppers – various types of choppers – Morgan – Jones – Oscillation chopper – commutation circuits.

#### UNIT-IV

**Inverters:** Claassificatin – series and parallel inverters – single phase and three phase inverters McMurny – McMurray Bedford inverter – Voltage control – Harmonic reduction – current source invertes.

#### UNIT-V

**AC to AC Converters:** Principle of operation of CYclo-converter – single phase to single phase Cyclo-converter – Cyclo-converter circuits – three phase output.

Single phase and three phase voltage controllers using Thyristor and Traic – AC choppers.

#### Text Books:

- 1.Power Electronics, M.Rashid. PHI
- 2.Power Electronics, P.S. Bimbira, Khanna Publishers
3. Power Electronics, Singh M.D. and Khanchandani. TMH

#### Reference Books:

1. An introduction to Thyristors and their applications, M.Rama Murthy, East-West Press
2. Power Electronics, R.Ramshaw.
3. Thyristorised Power Controllers, Dubey., Wiley Eastern Ltd.

## B.TECH. (CE) VIII SEMESTER

### EURCE 8510: Elective-I: Project Planning and Management

#### UNIT-I

Project Management Systems, Organization, Scope of construction management, Significance, concept of scientific management, qualities of manager, organization – authority policy, recruitment process and training.

#### UNIT- II

**CPM and PERT:** Introduction of Pert and CPM, Planning scheduling and controlling, Bar charts, Pert and CPM networks.

#### UNIT-III

Estimation, Resource Analysis, Justification and Evaluation – Introduction – Costing Proposals – Budgets – Resource analysis – Pricing Projects – Project Risk analysis – Cash Flow Consideration – Strategic Investment Decisions.

#### UNIT-IV

The role of Management and Leadership in Project environment – Individual Skills and Attitudes – Individual Motivation – Structural implications for Project managers – Cultural Implications – Management Style – Development of Management Thinking.

#### UNIT-V

Project Review – Project Completion & Handover – Long term Project audit and review – Continuous improvement – Bench Marking of Performance and Process – The role of Project Leader in the World Class Projects.

#### Text Book:

Harvey Maylor, Mac Millan India Ltd., Delhi

#### Reference Book:

Punmia: Laxmi Publications

**EURCE 8511: Elective-I: Neural Networks**

**UNIT-I**

Fundamentals of artificial Neural Networks – Biological neurons and their artificial models, Neural processing, learning and Adaptation, Neural Network Learning Rules – Hebbian, Perceptron, delta, widrow – hoff, correlation, winner – take – all, outstar learning rules.

**UNIT-II**

Single Layer Perceptions – Multi player Feed forward Networks – Error back propagation training algorithm, problems with back propagation, Boltzmann training, Cauchy training, Combined back propagation / Cauchy training.

**UNIT-III**

Hopfield networks, Recurrent and Bi-directional Associative Memories, Counter Propagation Network, Artificial Resonance Theory (ART)

**UNIT-IV**

Applications of neural networks – Handwritten digit and character recognition, Traveling salesman problem, Neuro controller – inverted pendulum controller,

**UNIT V:**

Applications of neural networks - cerebellar model articulation controller, Robot kinematics, Expert systems for Medical Diagnosis.

**Text Books:**

Introduction to artificial Neural System, S.M.Zurada, Jaico Publishing House (1992)

**References:**

1. Neural Computing – Theory and Practice, Philip D.Wesserman, Van Nostrand Rein Hold, New York (1989)
2. Neural Networks and Fuzzy Systems, Bart Kosko, Prentice Hall, NJ, (1992)





**EUREC 8512: Elective-I: Introduction to Micro Electro Mechanical Systems(MEMS)**

**UNIT I**

1. **Introduction:** History of MEMS, Overview of MEMS Processes, Properties of Silicon, A Sample MEMS Process. Definitions and Terminology, A sample Process, Lithography and Etching. (3 hrs.)
2. Micromachining: Subtractive Processes (Wet and Dry etching), Additive Processes (Evaporation, Sputtering, Epitaxial growth). (4 hrs)
3. Fundamental Devices and Processes: Basic mechanics and electrostatics for MEMS, parallel plate actuators, pull-in point, comb drives. Electrostatic actuators; MEMS foundries, Cronos MUMPs (multi user MEMS process). (5 hrs)

**UNIT II**

1. **MUMPs (Multi User MEMS Process):** JDS Uniphase MUMPs processing sequence and design rules. Design rules; applications; micro hinges and deployment actuators. 5 Hrs.
2. CMOS MEMS: CMOS foundry processes, integrated IC/MEMS, MEMS postprocessing, applications. (4 Hrs)

**UNIT III**

1. **Thermal Transducers:** bimorphs, "heatuators", cilia arrays. (3 hrs.)
  2. **MicroOptoElectroMechanical Systems (MOEMS):** Micro Scanners, Digital Mirror Display, Retinal Scanning Display. Grating light valve, coroner cube retroreflector, optical switches, other micro-optical devices (5 hrs)
- iezoresistivity; Scanning Probe Microscopy: scanning tunneling icroscope (STM), atomic force microscope (AFM)(3 Hrs)

**UNIT IV**

1. **Wireless MEMS:** mechanical and electrical resonators, Q-factor, switches, filters (3 hrs)
2. **Power for MEMS:** thin film batteries, micro fuel cells, energy fields, MEMS Packaging and Assembly: microassembly: serial and parallel, deterministic and stochastic; microgrippers: HexSil process; packaging techniques (4 hrs)

**UNIT V**

1. **The future of MEMS:** Biomems – neural implants, gene chips, diagnostic chips; MEMS in space; mechanical computers; invisible and ubiquitous computing (3 hrs)

**Text Books:**

Fundamentals of Microfabrication: The Science of Miniaturization, Second Edition ISBN: 0849308267, CRC Press, 1997 by Marc J Madou

MEMS a Practical Guide of Design, Analysis, and Applications

**Korvink, Jan, Paul, Oliver**

2006, Approx. 9800 p., Oliver

ISBN: 3-540-21117-9

Mechanics of Microelectromechanical Systems

**Lobontiu, Nicolae, Garcia, Ephrahim**

2004, XII, 405 P.295 illus., Hardcover

ISBN: 1-4020-8013-1

MEMS & Microsystems TMGH 2002 by Tai-ran Hsu

Microsensors, MEMS & Smart Devices John Wiley 2002 by JW Gardner & VK Varadan

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8513: Elective-I: Entrepreneurship**

**UNIT I**

**Introduction:**

Meaning, importance, benefits of Entrepreneurship-characterizes, factors of Entrepreneurship-Barriers of Entrepreneurship-Difference between Entrepreneurship and management-Evolution of the concept of entrepreneur-Difference between entrepreneur and entrepreneur. Motivational aspects of entrepreneur (McClelland theory)

**UNIT II**

Project identification and selection:

Meaning, classification of projects-Factors involved in project identification. Selection-significance contents, formulation of a project report – specimen of a project report-planning commission's guidelines for formulating a project-Basics of capital budgeting-Pay back period. Net present value. Internal Rate of Return.

**UNIT III**

**Sources of finance:**

Cost of capital-importance of a capital-Basic concepts, rational assumptions-cost of debt, reference, equity capital-source of finance-internal, external sources-institutional finance to entrepreneurs and institutional support to entrepreneurs.

**UNIT IV**

Project appraisal:

Concept project appraisal-Methods of project appraisal, Economic analysis, Financial analysis, Market analysis Technical feasibility and Managerial competence (assessment of working and fixed capital Govt. Policies, qualitative methods of market analysis, Life cycle segmentation).

**UNIT V**

Ownership Structures & Evaluation of Edps:

Ownership structures-sole trader, partnership (Partnership deed) types of partnership-Joint stock companies-Difference between private and a public company – Advantage and disadvantages of the ownership structures – Distinction between MDP and EDP – Training methods and Role playing (Games).

**Text Books:**

1. Harold Koontz & Heinz Weihrich. *Essentials of Management, McGraw Hill International.*
2. Hirich R.D. & Peters Irwin M.P., *Entrepreneurship, Mc Graw Hill*
3. Rao T.V. & Deshpande M.V., Prayag Metha, Nadakarni M.S. *Developing Entrepreneurship, Hand Book. Learning Systems.*
4. Donald Kurado & Hodgelts R.M., *Entrepreneurship A Contemporary Approach.* The Dryden Press.
5. Dr Patel V.G. *Seven Business Crisis*, Tata McGraw Hill
6. Timmons J.N. *New Venture Creation – Entrepreneurship for 21<sup>ST</sup> century*, Mc Graw Hill International.

**References:**

1. Patel J.B .Nold S.S. *A Manual on Business Opportunity Identification, Selections*, EDH.
2. Rao C.R. *Finance for Small Scale Industries.*
3. Pandey M.W. *Compiers Guide to Successful Entrepreneurship.* Vikas Publishing

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8514: Elective-I: Public Administration**

Definition, nature and scope of public administration; the chief executive; leadership qualities of administrator, principles of organization; organization of Ministries of Home and Finance; personnel administration – bureaucracy; recruitment, promotion, conduct and discipline, employer – employe relations; administration at work-planning, policy formulation, decision making supervision, coordinator, integrity in administration; public corporations in India; financial administration in India; local administration in India.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8515 Elective-I: Fundamentals of Communication**

**UNIT-I**

**Amplitude Modulation:** Modulation, Frequency Translation, Amplitude modulation, AM equation, Modulation index, AM generation, AM detection, Applications of linear modulation systems, Frequency division multiplexing.

**UNIT-II**

**Angle Modulation:** Angle modulation, FM, modulation index, frequency deviation, NBFM, WBFM, Phase modulation, Comparison of FM and PM, Generation of FM, Phasor representation of FM and AM, FM demodulation, Pre-emphasis and De-emphasis, Comparison of AM and Fm.

**UNIT-III**

**Radio Transmitters & Receivers:** Classification of Radio Transmitters, AM Transmitters, FM Transmitters, Classification of Radio Receivers, TRF Receiver, Superhetrodyne Receiver, AGC.

**UNIT-IV**

**Discrete modulation techniques:** Sampling sampling Theorem for low pass and bandpass signals, Time Division Multiplexing, Pulse Amplitude Modulation, Pulse time modulation – Pulse Width Modulation and Pulse Position Modulation – generation and detection.

**UNIT-V**

**Digital Modulation Techniques:** Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation, Binary Amplitude Shift Keying Binary frequency shift Keying Binary Phase Shift Keying, Different Phase Shift Keying.

**Text Books:**

Electronic Communication Systems G.Kennedy, McGraw Hill Communications Systems Simon Haykings, PHI

**Reference:**

1. Applied Electronics and Radio Engg. GK. Mithal
2. Modern Digital and Analog Communications Systems B.P. Lathi, BSP.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8516: Elective-I: Equipment for Construction Industry**

**Unit I:**

Earth Work – Introduction, use of available equipment, suitability of job conducting, Excavation equipments, loading and lifting, transporting equipments, compacting equipments.

**Unit II**

Foundation – Introduction, blasting, Drilling, Piling, Anchoring, Drainage.

**Unit III:**

Concreting – Introduction, Concrete mixtures, types, Concrete batching plants, vibrators, lifts, pumps, cutting, bending, cranes.

**Unit IV:**

Miscellaneous – Road Pavers, sand blasting, grouting, compressors, gate valves – control equipment for out let – and spillways, types of control gates.

**UNIT V**

Advanced Construction - Methods and Equipments for Scaffolding, Slip form technique for – shuttering, tall chimneys and shafts, steel fabrication, reinforcement fabrication

**Text Books & References:**

1. Construction equipment and its planning and applications – Varma Mahesh, Metropolitan book Co. Pvt. Ltd., New Delhi.
2. Construction planning equipment and methods – Peurifoy R L, Led better WB, Mc Graw – Hill Education(INDIA) LTD books.
3. Construction Equipment & Management by S.C.Sharma, Khanna Publishers, New Delhi.
4. Construction Equipment & Job Planning by S.V. Deodhar, Khanna Publishers, New Delhi.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8518: Elective-II: Data Structures with C<sup>++</sup>**

**UNIT I**

Introduction to Object Oriented Programming – Data Abstraction – Data Encapsulation – Abstract Data Types – Objects – Classes – Inheritance – Polymorphism.

**UNIT II**

**Data Representation:** Introduction, linear lists, formula based representation, indirect addressing, simulating pointers, comparisons and applications. Arrays, Matrices, Special and sparse matrices.

**UNIT III**

**Stacks:** definitions, operations and applications, array and linked representation of stacks. **Queues:** definitions and operations. Array and linked representation of queues applications>

**UNIT IV**

**Trees:** Definitions and properties, representation of binary trees, operations. Binary tree traversal.

**UNIT V:**

**Searching & Sorting:** Merge sort, quick sort, selection sort, heap sort. Complexity analysis, Sequential search, binary search. Various types of hashing.

**Text Books:**

1. Data structures in C<sup>++</sup> by S K Chadda and AMit Chadda, Tata Mc Graw Hill.
2. Object Oriented Programming by Bala Guruswamy.

**Reference:**

1. Author Seymour Lipschutz (Schaum's Outline series) – publisher: McGraw-Hill
2. Author: Sartaz Sahani Publisher: McGraw – Hill
3. Author: S.K.Srivatsava, Deepli Srivatsava, Publisher- BPB Publications.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8522: Elective-I: Basic Electronics**

**UNIT I:**

Semiconduction Diode – Classification of semiconductors – Conductivity of semiconductors – Characteristics of PN junction diode – Halfwave Rectifier – Fullwave Rectifier – Bridge Rectifier – Ripplefactor – efficiency – Regulation – ener Diode – LED – Varactor Diode – Photo Diode.

**UNIT II:**

Transistors – The Bipolr junction transistor – Operation of PNP and NPN transistors – CB, CE, CC configurations – Small Signal model of transistor – Transistor biasing – fixed bias – self bias.

**UNIT III:**

Field effect transistor – Junction field effect transistor – JFET Characteristics – small signal model of FET – MOSFET – Depletion and Enhancement MOSFET – biasing the FET – FET as voltage variable resistor.

**UNIT IV**

Transistor Amplifiers – CB, CE, CC amplifiers – small signal analysis of single stage BJT amplifiers – RC coupled amplier and its frequency response.

**UNIT V**

: Feedback Amplifiers and Oscillators – Basic concept of feedback – effects to negative feedback – feedback topologies – Oscillators – RC phase shift oscillator – Weinbridge oscillator – Crystal oscillator (elementary treatment only)

**Text books:**

- Integrated Electronics – Millman & Halitain, TMH
- Electronic Devices at Circuits – D.R.Chelulen & B.T.Krishna – Pearson Education.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8524: Elective-I: Computer Organization**

**UNIT I:**

**Digital Logic Circuits and Components:** Digital Computers – Logic gates – Boolean Algebra – Map Simplifications Combinational Circuits: Half-Adder, Full-Adder, decoders, Encoders, Multiplexers Sequential Circuits: Flip flops, Registers, Shift Registers, Binary Counters – Memory Unit.

**UNIT II:**

**Data Representation:** Data Types – Complements – Fixed Point Representation – Floating Point Representation – Other Binary Codes – Error detection Codes.

**UNIT III:**

**Processor Organisation:** General Register Organisation – ALU – Instruction codes – Instruction Formats – Stack Organisation – Addressing modes Control Unit: Register transfer and micro operations, Timing and Control, Control Memory, micro programming Hard Wired control

**UNIT IV:**

**Input / Output Organisation:** I/O Interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access.

**UNIT V:**

**Memory Organisation:** Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory.

**Text Book :**

Computer System Architecture, M.Morris Mano, Prentice Hall of India Pvt. Ltd., Eastern Economy Edition, Third Edition, Sept. 2002

Micro Processor Architecture, programming & Applications with the 8085, Ramesh S Goankar Penram International Publishing (India) Pvt. Ltd., Fourth Edition, 2002

**Reference Book:**

Computer Architecture and Organisation, William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003

**B.TECH. (CE) VIII SEMESTER**

**EURCE 862: Elective-II: Operating Systems**

**UNIT I:**

**Introduction:** Operating systems: Fundamentals Definition, Types of O.S, Batch Processing Systems, multiprogramming catch systems, time sharing systems, distributed systems, real time systems, services, system calls, system programs.

**UNIT II:**

**Operating system:** Process management , Process concept, Process scheduling, operations on processes, cooperating processes, threads, inter-process communications. CPU Scheduling - Scheduling algorithms, multiple processor and real time scheduling. Process synchronization – Critical lsection problems, semaphores.

**UNIT III:**

**Leadlocks:** Characterization, handling, Prevention, Avoidance, Detection & Recovery.

**UNIT IV:**

**Storage management:** Memory management – swapping, paging, segmentation, segmentation& paging. Virtual memory – What is virtual memory? Demand Paging, Page Relacement, frames, thrashing demand segmentation.

**UNIT V:**

**Case study: UNIX:** Fundamental Concepts in UNIX, MS-DOS: Fundamental Concepts in MS-DOS

**Text Book:** Applied Operating Systems Concepts – Avil Silberschatz & j Peter Galvin, Grey Gagne

**Reference:** Modern Operating Systems – Andrew S. Tanenbaum, PHI.

**B.TECH. (CE) VIII SEMESTER**

**EURCE 863: Elective-II: Web Technology**

**UNIT I:** Introduction to Web Technology: Internet, WWW, Web Browsers, Web Servers, URL.

**UNIT II:** Introduction to HTML & DHTML: Syntax, Forms, Cascade Style Sheets.

**UNIT III:** The Basic of java Script, Perl, Primitives, Operator and Expression. Dynamic Document with Java Script.

**UNIT IV:** Introduction to Java Servelets Programming., Introduction to Applet Programming.

**UNIT V:** Structure of Web Application, Deploying Web Application.

**Text Books:**

1. Programming the World Wide Web by Robert W Sebesta
2. Professional Java Servelets 2.3 by John Bell Wrox Publical
3. Beginners PHP, Apache, MY Sql, Web Development, by Michael Glass Wrox.



**B.TECH. (CE) VIII SEMESTER**  
**EURCE 864: Elective-II: Industrial Electronics**

**UNIT I:**

**Thyristors:** NPN Diode: Basic structure. Two transistor version. Volt –Ampere characteristic. Holding current. Temperature dependence. Rate effect. Bilateral PNP diode switch (DIAC): Basic structure. Volt Ampere characteristics. Silicon Controlled Rectifier (SCR): Basic structure. Two transistor Representation. Volt-Ampere characteristics. ON and OFF times of gate. SCR rating. Silicon Controlled switch (SCS): Basic structure. Two transistor equivalent. Diode transistor equivalent.

**Tiac:** Basic structure. Volt-Ampere characteristics. Positive bias and Negative bias operations In Junction Transistor: Basic structure, potential divider equivalent Static emitter characteristics, gate circuit of SCR. Two SCRs connected back-to-back. Delayed firing of SCR by phase shifted AC. Wave Delayed firing of SCR by UJT.

**UNIT II:**

**Polyphase Rectifiers:** Three phase half-wave delta-ye rectifier with resistive load. Six-phase star half-wave rectifier with resistive load. Delta-to double wye half-wave rectifier with inter phase transformer and with resistive load. Three-phase delta-ye bridge rectifier with resistive load. General m-phase rectifier. DC power outputs, efficiencies and ripple factors. Transformer utility factor. Rectifier performance. Cumulation in polyphase rectifiers.

**UNIT III:**

**Resistance Welding & Healing :** Basic circuit for a.c. resistance welding. Spot welding, Projection welding, Butt welding, Seam welding and Pulsating welding arrangements. Induction Heating: Principle of induction heating, Applications, High frequency power source for induction heating. Electric Heating: Principle of dielectric heating Electrodes used in dielectric heating, Methods of coupling of electrodes to R.F. Generator. Applications

**UNIT IV:**

**Controller Rectifiers(outlines of topics only):** Single Phase Controlled Rectifiers: Half-wave controlled rectifier with resistance load. Full-wave Controlled rectifier with resistance load. – Three phase Controlled rectifiers: Half wave controlled rectifier with resistance load. Six-phase half wave.- controlled rectifier with resistance load.

**UNIT V:**

**Electronic speed control of motors (outlines of topics only):** DC Motor speed control: Methods of speed control, single phase SCR drive, Three phase SCR drives. Closed-Loop motor control system. Half-wave feedback circuit for series motor drive. Half controlled SCR bridge for Series motor drive. Chopper controlled dc drive. AC Motor speed control: Methods of speed control. The chopper-controlled rotor resistance scheme. Speed control by variation of stator voltage using SCRs. Closed-loop speed control of an induction motor by variation of stator voltage using SCRs. Variable-frequency A.C. motor drive. Voltage-fed inverter control. P.W.M. control scheme. Current-fed inverter control.

**Text Books:** 1. Industrial Electronics by G.K. Mithal and Ravi Mittal. Khanna publishers  
2. Power Electronics by P.C. Sen, T.M.H.  
3. Thyristor Engineering by M.S. Berde  
4. Power Electronics by P.S. Bimbra

## B.TECH. (CE) VIII SEMESTER

### EURCE 865: Elective-II: Computer Aided Design

#### UNIT I

**Fundamentals of CAD** – Introduction – The design process- Application of computers for design – Operating systems – Hardware in CAD: The design work station – I/O Devices – CAD system configuration – Creating database for manufacturing – benefits of CAD.

#### UNIT II

Interactive Computer Graphics – Graphic display devices – Graphics system – Graphics standards – Graphical user interface – Transformation systems – windowing – clipping – 2D and 3D transformations – Linear transformation – Display files for 3D data – Geometric Modeling – Modeling Techniques – Wire frame Modeling – Surface Modeling – 3D Solid Modeling.

#### UNIT III

Introduction to finite element Analysis – CAD techniques to finite element data preparation – Automatic mesh generation – presentation of results – 3-dimensional shape description and mesh generation – CAD applications of FEM.

#### UNIT IV

CAD applications and Exposure to CAD packages: Simple examples of computer aided drafting, design and analysis – introduction to simple machine elements – Analysis of cross sectional area, centroid & moment of inertia-Kinematics of crank-slider mechanism and other simple design applications. Introduction to CAD packages like ANSYS, NASTRON, NISA – II.

#### UNIT V

Introduction to Artificial Intelligence Introduction to Artificial Intelligence – Applications of AI in design and CAD.

#### Text Books:

1. CAD/CAM- Computer Aided Design & Manufacturing, by M.D. Groover & E.Q.Zimmer, Pearson.
2. Computer Aided Design and Manufacturing by Dr. Sadhu Singh, Khanna Publishers.

**References:** 1. Computer Aided Design in Mechanical Engineering, by V. Rama Murthy. 2. Elements of Computer Aided Design 7 manufacturing, by Y.C. Rao, 3. Computer Aided Kinetics for Machine Design, by D.L.Ryan. 4. computer Aided Design and Manufacturing, by C.B. Besant & C.W.K. Lui. 5. computer Aided Analysis & Design by S. Ghosal, Prentice Hall of India. 6. CAD/CAM/CIM by Radhakrishna, New age international.

## B.TECH. (CE) VIII SEMESTER

### EURCE 866: Elective-II: Robotics and Automation

#### UNIT I

**Introduction:** Historical robots, robots in science fiction, future trends of robots, definitions of robots, present application status.

**Robot End Effectors:** Classification of end effectors, drive systems for grippers, mechanical grippers, magnetic grippers, vacuum grippers, adhesive grippers, hooks, scoops and miscellaneous devices, active and passive grippers.

#### UNIT II

**Robot Drives Actuators and Control:** Functions of drive system, general types of control, Pump classification, and introduction to pneumatic systems, electrical drives, DC motor and transfer function, stepper motor, drive mechanisms.

#### UNIT III

**Robot Kinematics:** Forward and reverse kinematics of 3 DOF arm, forward and reverse kinematics of 4 DOF arm, Homogeneous transformation, kinematics equations using homogeneous transformations.

#### UNIT IV

**Robot Sensors:** Need for sensing systems, types of sensor, robot vision, robot tactile system, proximity sensors.

#### UNIT V

**Robot applications:** Capabilities of robots, material handling, machine loading and unloading, machining and fettling robot assembly, welding, future applications. Introductory concepts.

#### Text Books:

- 1) Robotics Technology and Flexible Automation by S.R. Deb

**B.TECH. (CE) VIII SEMESTER**

**EURCE 867: Elective-II: Mechatronics**

**UNIT I:**

**Introduction:** Multi disciplinary Scenarios, Origins, Evolution of Mechatronics. An overview of electronics, Introduction to Manufacturing Design.

**UNIT II:**

**Sensors and Transducers:** Introduction and background, difference between transducer and sensor transducers types, transduction principle, photoelectric transducers, thermistors, thermo devices, thermo couple, inductive transducers capacitive transducers, pyroelectric transducers, piezoelectric transducers. Half effect transducers, Fibre optic transducers.

**UNIT III:**

**Actuators:** Introduction, types and application areas electromechanical actuators. DC motors AC motors...

**UNIT IV:**

**System modeling:** Introduction, system making mechanical system, electrical system, fluid system, thermal systems, translational mechanical system with spring damper and mass. Modeling electric motor, modeling pneumatic actuator.

**UNIT V:**

**Digital logic:** Digital logic number system.....

**B.TECH. (CE) VIII SEMESTER**

**EURCE 868: Elective-II: Education Research & Methodology**

**Research methodology:** An Introduction – meaning of research – objectives of research – motivation in research – types of research – research approaches – significance of research – research methods versus methodology – research and scientific method – importance of knowing how research is done – research process criteria of good research – Defining the research problem – selecting the problem – necessity of the defining problem – technique involved in defining a problem – an illustration – Research design:- meaning of research design – need for research design – features of a good design-important concept relating to research design – different research designs – basic principles of experimental designs.

**Interpretation and report writing:** Meaning of interpretation – why Interpretation? – technique of interpretation – precaution in interpretation – significance of report writing – different steps in writing report – layout of the research report – types of reports – oral presentation – mechanics of writing a research report – precautions for writing research reports.

**Text Books:**

- 1.C.R.Kothari, research methodology – Methods and techniques, Second edition, Wishwa Prak.
- 2.Research in Education, Best Pearson.

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 869: Elective-II: Professional Ethics**

Ethics, nature and purpose; ethical theories; ethics in business and management, ethics in engineering, global ethical issues, Professional Ethics concerns one's conduct of behavior and practice when carrying out professional work. Such work may include consulting, researching teaching and writing, codes of Ethics are concerned with a range of issues, including:

1. Academic Honesty
2. Adherence to confidentiality Agreements.
3. Data Privacy
4. Handling of Human subjects
5. Impartiality in data analysis and professional consulting
6. Professional accountability

Reference: <http://www/is.cityu.edu.hk/research/resources/isworld/ethics/>

**B.Tech. (Civil Engineering), VIII-SEMESTER**  
**EURCE 869: Elective-II: Professional Ethics**

**Unit-I**

Ethics, nature and purpose, Ethical theories.

**Unit-II**

Ethics in business and management, ethics in engineering, global ethical issues.

**Unit-III**

Professional ethics concerns - one's conduct of behavior and practice when carrying out professional work. Consulting, researching, teaching and writing, codes of Ethics.

**Unit-IV**

Academic Honesty  
Adherence to confidentiality Agreements.  
Data Privacy

**Unit-V**

Handling of Human subjects  
Impartiality in data analysis and professional consulting  
Professional accountability

References :

1. Professional Ethics by Clancy Martin.
2. Professional Ethics by Lloyd C . Irland.
3. Engineering Ethics by C.G.Krishnadas Nair,  
Harishree Publishing Company, Bangalore.
4. <http://www/is.cityu.edu.hk/research/resources/isworld/ethics/>

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8611: Elective-II: Thermodynamics**

**UNIT I**

Introduction – Basic concepts – Thermodynamic systems, Micro & Macro systems – Homogeneous and heterogeneous systems – Concept of continuum – Pure substance – Thermodynamic equilibrium, State Property, Path, Process – Reversible and irreversible cycles – Energy as a property of the systems – energy in state and transition, work Heat, Point function, Path function – Heat transfer. Zeroth Law of thermodynamics – Concept of equality of temperatures – Joule’s experiments –

**UNIT II**

First law of thermodynamics – Corollaries – Isolated systems and steady flow systems – Specific heats at constant volume and pressure – First law applied to flow systems – systems undergoing a cycle and change of state – First law applied to steady flow processes – Limitations of first law of thermodynamics.

**UNIT III**

Perfect gas laws – Equation of state – Universal gas constant various non-flow processes – Properties of end states – Heat transfer and work transfer – change in internal energy – throttling and free expansion. Second law of thermodynamics – Kelvin Plank statement and Clausius statement and their equivalence, Perpetual motion machines of first kind and second kind – Carnot Cycle – Heat engines and heat pumps – Carnot efficiency – Clausius theorem – Clausius inequality – Concept of entropy – Principles of increase of entropy – Entropy and disorder.

**UNIT IV**

**I.C. engines:** Classification, comparison of two stroke and four stroke engines, comparison of SI and CI engines. Air cycles – Otto, Diesel, Dual, Stirling, Ericsson and Atkinson cycles and their analysis. Valve timing and port timing diagrams – Efficiencies – air standard efficiency, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, volumetric efficiency and relative efficiency. Testing and performances of I.C. engines. Basic principles of carburetion and fuel injection.

**UNIT V**

**Refrigeration & Air Conditioning:** Bell-Coleman cycle, Vapor compression cycle-effect of suction and condensing temperature of cycle performance. Properties of common refrigerants, Vapor absorption system, Electrolux refrigerator.

**Reference books:**

Engineering Thermodynamics, by P.K.Nag, Tata McGraw Hill Publications company.

**References:**

1. Thermal Engineering, by M.L.Mathur and F.S.Mehta, Jain Brothers.
2. Applied Thermodynamics-II by R. Yadav
3. I.C. Engines, by Mathur and Mehta
4. I.C. Engines by V Ganesan.  
Thermal Engineering by P.L.Ballaney Khanna Publishers

**B.TECH. (CE) VIII SEMESTER**

**EURCE 8612: Elective-II: Digital Signal Processing**

**UNIT I:**

**Characterization of system in Discrete Time:** Impulse response and system function  $H(z)$  of digital systems, Frequency response, stability analysis, Direct Form-I, Direct form-II, Cascade and Parallel realization structures of digital filters, finite word length effects limit cycle and Dead band effect.

**UNIT II:**

Discrete Fourier Transform(DFT) Discrete - Time Fourier transform, computation of DFT, circular convolution and linear convolution using DFT, circular convolution and linear convolution using DFT, overlap-add method, overlap-save method, Fast Fourier Transforms(FFT), Radix-2 decimation-in-time and decimation-in frequency algorithms, Inverse FFT.

**UNIT III:**

**Design of IIR filters:** linear phase characteristics, Fourier series method, window function technique, comparison between IIR and FIR filters. Design of FIR filters, linear phase characteristics, Fourier series method, window function technique, comparison between IIR and FIR filters.

**UNIT IV:**

DSP architecture for signal processing, Harvard architecture, pipelining, hardware multiplier, accumulator, general purpose digital signal processors, Fixed point digital processors, floating point digital signal processors.

**UNIT V:**

**Applications of DSP:** in spectrum analysis and filtering, Application of DSP in audio applications, telecommunication and bio-medical.

**Text Book:** Oppenheim A.V &R.W. – digital signal processing,. PHI

**References:** Sanjay K.Mitra-digital signal processing – Acomputer based approach, TMH  
Ifeacher E.C. & Jervis B.W., digital signal processing – A practical approach, pearson Edu.

**B.TECH. (CE) VIII SEMESTER**

**EURCE 8613: Elective-II: Electronic Measurement & Instrumentation**

**UNIT I:**

**General Principles of Measurement and Instrumentation:** Purpose, structure and classification of measurement systems, Systematic characteristics (range and span, errors and accuracy, linearity, sensitivity and hysteresis), Statistical characteristics (repeatability and reproductibility), Calibration, traceability and standards Mathematical modeling of an instrument, first order type system, second order type system and their response for standard signal inputs.

**UNIT II:**

**Sensing Devices:** Introduction of transducers and sensors- classification of transducers – Resistive, capacitive and inductive transducers – thermocouples and thermistors – Strain gauges and gauge factor – LVDT – yncros – piezoelectric effect, prizoelectric transducer-optical sensors

**UNIT III:**

Measurement of Non-electrical quantities – Load cells – measurement of pressure using electrical transducers as secondary transducers – vaccum gauges – torque measurement – angular velocity using tachometers and digital methods. – LVDT type accelerometer – Flow measurement using electromagnetic – hot wire anemometer and ultrasonic types – capacitance method of liquid level measurement.

**UNIT IV:**

Electronic Instruments (Elementary Treatment only) – Digital voltmeters – digital frequency meter – digital phase angle meter – analog and digital type – Vector impedance meter – Q meter

**UNIT V:**

Analyzers (Elementary Treatment only) – Wave analyzers – spectrum analyzers – Distortion analyzer

**Text Books:**

1. Transducers and Instrumentation by DVS Murthy, Prentice Hall of India
2. Electrical and Electronics MEASUREMENTS AND Instrumentation by A.K.Shawney
3. Modern Electronics Instrumentation and Measurement Techniques W.D.Cooper

**References:**

- 1.Measurement Systems, Applications and Design – by D.O.Doeblin
- Electronics Instrumentation – H.S.Kalsi

**B.TECH. (CE) VIII SEMESTER**

**EURCE 8614: Elective-II: Very Large Scale Integrated System Design (VLSI)**

**UNIT I:**

**Review of microelectronics and introduction to MOS technology:** Introduction MOS and related VLSI technology, NMOS, CMOS, BICMOS, GaAs Technologies, Thermal aspects of processing, production of E beam masks.

**UNIT II:**

**MOS and BICMOS circuit design process:** MOS layers, stick diagrams, design rules and layout, 2i.meter, 1.2i. meter CMOS rules. Layout diagrams, Symbolic diagrams.

**UNIT III:**

**Basic circuit concepts:** Sheet resistance, Area capacitance of layers, delay unit, wiring capacitances, choice of layers. Scaling of MOS circuits: Scaling models, Scaling function for device parameters, Limitation of Scalling.

**UNIT IV:**

**Sub system design process:** Architectural issues, switch logic, examples of structural design(Combinational logic), design of ALU sub system, commonly used storage elements, aspects of design rules.

**UNIT V:**

**Test and Testability:** Design for testability built in self test (BIST), testing sequential logic, practical design for test guide lines, scan design techniques, etc,

**Text Books:**

Basic VLSI design bby Douglas A, Pucknell, Kamran Eshraghian, Prantice-Hall, 1996 3<sup>rd</sup> edition.

**Reference:**

Mead, C A and Conway, L.A, Introduction to VLSI systems, Wesley-Wesley

**EURCE 8616: Elective-II: Engineering Materials**

**UNIT I**

**Metallic Materials:** Ferrous Materials: Iron Materials, Carbon Materials, Phase Distribution. Heat Treatment of steel. Wrought iron. Properties and Classification of Plain Carbon & alloy steels like Marogim Steel, Hard Field Steel. Stainless Steel. Tool Steel. Cast ron and its applications.

**UNIT II:**

**Composite Materials:** Science: Polymer matrix Composites Cement Matrix Composites, Carbon Matrix Composites, Metal matrix Composites. Ceramic matrix Composites. Applications: Structural applications, Electronic application. Thermal applications. Electro chemical applications. Environmental applications. Biomedical applications.

**UNIT III:**

**Polymeric Materials:** Types of polymerization, properties of Macro Molecules, Fabrication of Plastics, preparation of epoxy reins and polycarbonates. Carbon fibre reinforced Plastics. Molecular Computers, Rubbers and Elastomers.

**UNIT IV**

**Ceramic & Refractory Materials:** Ceramics: Classification of white wears. Manufacturing of white wears. Earthen wear Stine wear. Engineering applications of refractory materials.

**UNIT V:**

**Electronic Materials:** Introduction: Metallic glasses – surface ecostic view materials – Biometallic ceramics – Cermets – Electrets – Nano Phase Materials. Intermeterial Compounds. SMART Materials, Conducting Polymers, Electronic detectors and Emitters. Logic Structure Materialization Technology.

**Text Books:**

1. Composite materials Science & Applications. D.L. Chung, Deborah, Springer Publication.
2. Introduction to Physical materials S.H.Aveneer. Tata Mac Grawhill
3. Text Book of Engineering Chemistry, Sashi Chawla, Dhopatrai & Sons
4. Engineering Chemistry, S.S.Dhara



**B.TECH. (CE) VIII SEMESTER**

**EURCE 8617: Elective-II: Computer Networks**

**UNIT I:**

Introduction – Uses of Computer Networks – Network Hardware – Network Software – Reference Models – Example Networks

**UNIT II:**

The Physical Layer – The Theoretical basis for Data Communication – Guided Transmission Media – The Public switched Telephone Network – Community Antenna Television – The local loop: Modems, ADSL and Wireless – Cable Modems

**UNIT III:**

Data link layer – Data link layer design issues – Services provided to the Network Layer – Framing – Error Control – Flow Control – Error detection and correction – Error correction codes – Error – detection codes – Elementary Data link protocols – An unrestricted simplex protocol – A simplex stop and wait protocol – Sliding window protocols – A one-bit sliding window protocol – A protocol using Go Back N – A protocol using selective repeat – Example Data link protocols – HDCL – High level Data Link Control.

**UNIT IV:**

The medium Access Control Sub-layer – The Channel Allocation Problem – Static Channel Allocation in LAN's and MAN's – Dynamic Channel allocation in LANs and MANs – Multiple Access Protocols – ALOHA – Carrier sense Multiple Access Protocol – Collision Free Protocols – Wireless LAN Protocols – Ethernet – Ethernet Cabling – Manchester Encoding – The Ethernet MAC Sub-layer Protocol – IEEE 802.2: Logical Line Control.

**UNIT V:**

Network Layer – Store and forward Packet switching – Store and forward Packet switching – service provided to the Transport by - Implementation of connectionless service – Implementation of connection oriented service – Comparison of virtual circuit and datagram subnets – Routing Algorithms – Optimality principle – Shorter Path routing – Flooding – Link State Routing – Hierarchical routing – Congestion Control Algorithms – General Principles of Congestion Control – Congestion Prevention Policies – Congestion control in virtual – Circuit subnets – Congestion control in datagram subnets – Load shedding – Internet Working – How networks differ? How networks can be connected?

**B.TECH. (CE) VIII SEMESTER**

**EURCE 8618: Elective-II: Micro Processor & Micro Controllers**

1. Intel 8085: Architecture – memory addressing – addressing modes – instruction set – assembly language programming – interrupts – pin configuration – timing diagrams.
2. Peripheral Devices: Programmable peripheral interface(8255) – programmable Communication interface(8251) – Programmable timer (8253) – DMA controller (8259) – programmable interrupt controller (8257)
3. 8051 Micro Controller: Architecture – Addressing modes – Basic Assembly Language programming Concepts – Moving data – Logical Operations – Arithmetic Operations – Jump and call instructions.
4. 8051 serial communication: Basics of serial communication, 8051 serial communication.

**Text Books:**

1. “Microprocessor Architecture, Programming and Applications”, Goankar R.S.; Penram International Publishing (India) P.Ltd
2. “The Intel Microprocessors – Architecture, Programming & Interfacing, Brey B.B.; PHI
3. “8051 Micro-Controller and Embedded Systems”, Mohammed Ali Mazidi, Janice Gillispie Mazidi, Pearson Education India.
4. “Programming and Customizing the 8051 Micro-Controller”, Myke Prediko. TMH

**B.TECH. (CE) VIII SEMESTER**  
**EURCE 8619: Elective-II: Managerial & Engineering Economics**

**UNIT I:**

Fundamentals of Economics- Scarcity and Efficiency Market, Command and Mixed Economics, Basic Elements of Supply and Demand – Law of Demand – Elasticity of Demand.

**UNIT II:**

Business Organizations – Individual Proprietorship – Partnership – The Corporation. Statement of Profit and Loss – The Balance Sheet – Break – Even Analysis – Cost Concepts – Elements of Costs.

**UNIT III:**

Principles and Functions of Management – Evolution of Management Thought – Decision Making Process. Organization Theory and Process – Leadership – Motivation – Communication – Conflict Management in Organization.

**UNIT IV:**

Plant Location – Plant Layout – Production Planning and Control – Product Design and Development – channel of Distribution. Materials Management – Inventory Control.

**UNIT V:**

Industrial Disputes and their settlement – Provision of Factories Act and Industrial Disputes Act – Recent Trends in Contemporary Business Environment.

**References:**

- 1.Economics – Paul A.Samuelson and William D.Nordhaus.
- 2.Engineering Economics – Vol.1- Tara Chand
- 3.Financial Management – S.N.Maheswari
- 4.Essentials of Management – Koontz and O’ Donnel
- 5.Production and Operation management – B.S.Goel
- 6.Modern Production / Operation management – Elwood S.Buffa, Rakesh K.Sarin
- 7.Industrial Law – S.P.Jain
- 8.Industrial Law – R.P.Maheswari and S.N.Maheswari
- 9.Labour and Industrial Laws – Singh, Agarwal and Goel.