ACADEMIC REGULATIONS
B.Tech. Regular Four Year Degree Programme

(For the batches admitted from the academic year 2013-14)
and
B.Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2014-15)

The following rules and regulations will be applicable for the batches of 4 year B.Tech. degree admitted from the academic year 2013-14 onwards.

1. ADMISSION:

1.1 Admission into first year of Four Year B.Tech. Degree programme of study in Engineering:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech Degree programme as per the following pattern.

a) Category-A seats will be filled by the Convener, EAMCET.

b) Category-B seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

1.2 Admission into the Second Year of Four year B.Tech. Degree programme (lateral entry):

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. PROGRAMMES OF STUDY OFFERED BY AITS LEADING TO THE AWARD OF B.TECH DEGREE:

Following are the four year undergraduate Degree Programmes of study offered in various disciplines at Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) leading to the award of B.Tech (Bachelor of Technology) Degree:

1. B.Tech (Computer Science & Engineering)
2. B.Tech (Electrical & Electronics Engineering)
3. B.Tech (Electronics & Communication Engineering)
4. B.Tech (Information Technology)
5. B.Tech (Mechanical Engineering)
6. B.Tech (Civil Engineering)

And any other programme as approved by the concerned authorities from time to time.

3. ACADEMIC YEAR:

The institute shall follow Year-wise pattern for First year course and Semester pattern for II, III and IV years. An academic year shall consist of a first semester and a second semester from second year onwards.

The first year of four year B.Tech programme shall have duration to accommodate a minimum of 180 instruction days. From second year onwards each semester shall have a minimum of 90 instruction days.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

4.1 General Courses comprising of the following: (5 to 10%)

    i. Language / Communication Skills

    ii. Humanities and Social Sciences: Environmental Science

    iii. Economics and Accounting

    iv. Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 25%)

    i. Computer Literacy with Numerical Analysis

    ii. Mathematics

    iii. Physics

    iv. Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch): (15 to 25%)

    i. Engineering Drawing

    ii. Engineering and IT Workshop

    iii. Engineering Mechanics

    iv. Basic Mechanical Engineering

    v. Electrical and Electronics Engineering

    vi. Basic civil Engineering

    vii. Computer Programming

4.4 Compulsory Discipline Courses: (45 to 55%)

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

4.5 Elective Courses: (10 to 15%)

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

4.6 In the final year first semester subject like comprehensive Mechanical Engineering, with 2 hours / week is to be introduced.

4.7 Every programme of study shall be designed to have 42-44 theory courses and 19-22 laboratory/seminar/comprehensive courses.

4.8 Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned.

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Comprehensive Civil Engineering	--	--	02	02
Seminar	--	--	01	01
Final Year Project	--	-	12	12

6. EXAMINATION SYSTEM: All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as year-end/semester-end examination.

6.1 Distribution of Marks:

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
1.	Theory	70	Year-end / Semester-end examination.		The question paper shall be of descriptive type with 8 questions out of which 5 are to be answered in 3 hours duration of the examination.
		30	Mid - Examination of 120 Min. duration - Internal evaluation-**20 marks**. 5 questions - 1st question compulsory – having short answer questions, 4 descriptive out of which 3 are to be answered.		**For I B Tech:** Three (03) mid exams, each for 20 marks are to be conducted. Average of best two performances to be considered. **Mid-I:** After first spell of instructions (II Units). **Mid-II:** After second spell of instructions (III to V Units) **Mid-III:** After third spell of instructions (VI to VIII Units) **For a Semester**: Two mid-exams, 20 marks each, are to be conducted. Better one to be considered. **Mid-I:** After first spell of instructions (IV Units). **Mid-II:** After second spell of instructions (V to VIII Units).
			Remaining **10 marks** for Assignments, 3-5 in number will be given and each assignment will be evaluated for 10 marks and average considered.		
2	Laboratory, Design and / or drawing	70	Year-end / Semester-end Lab Examination.		**For laboratory courses:** **3** hours duration – two examiners. For drawing and/ or Design: like for the theory examination.
		30	20	Day to Day evaluation.	Performance in laboratory experiments.
			10	Internal evaluation.	Practical Tests (For first year average of best two out of three tests and for semester better one out of two tests)

4

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
3	Soft Skills – I and II	70	External Evaluation		The question paper shall be of objective type with 100 questions to be answered in 3 hours duration.
		30	20	Day to Day evaluation.	Performance in tests conducted at the end of every topic.
			10	Internal Evaluation.	Two mid-exams, 10 marks each, are to be conducted. Better one to be considered.
4	Seminar	100	Internal Evaluation: 20 Marks for Report. 20 Marks for subject content. 40 Marks for presentation. 20 Marks for Question and Answers.		Continuous evaluation during a semester by the Departmental Committee (DC).
5	Comprehensive Civil Engineering	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.		
6	Project Work	100	70	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30	Internal evaluation	Continuous evaluation by the DC 15 Marks by DC as detailed under 6.2.1 15 Marks by Supervisor.

6.2 Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member.

6.2.2 The Semester-End Examination (viva-voce) shall be conducted by a Committee consisting of External examiner nominated by the Chief Controller of Examinations, HOD and Supervisor. The evaluation of project work shall be conducted at the end of the IV year.

6.3. Eligibility to appear for the year-end / Semester-End examination:

6.3.1 A student shall be eligible to appear for end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in the year/ semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in first year or each semester may be granted by the Institute Academic Committee, if the reason for shortage is convincing.

6.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

6.3.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute.

6.3.5 Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their End examination of that class and their registration for that semester / year shall stand cancelled.

6.3.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that year/semester when offered next.

6.4 Revaluation / Recounting:

Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a letter or a notice.

6.5 Supplementary Examination:

All Regular examinations are understood as Regular/Supplementary examinations. The supplementary students have to appear for the supplementary examinations along with their regular examinations conducted at the end of each semester. However, separate supplementary examinations will be conducted for the II-Semester subjects at the end of I-Semester and vice-versa. For seminar, a seminar will be given by the supplementary candidate as per the separate schedule given by the exam section.

7. ACADEMIC REQUIREMENTS FOR PROMOTION/ COMPLETION OF REGULAR B.TECH PROGRAMME OF STUDY:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Programme of study.

7.1 For students admitted into B.Tech. (Regular) programme:

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35%of marks in the End examination and a minimum of 40% of marks in the sum total of the internal evaluation and End examination taken together. For the seminar he should secure a minimum of 40% marks.

7.1.2 For promotion from I B.Tech to II B.Tech a student must satisfy the attendance requirements in I year.

7.1.3 A Student shall be promoted from II year to III year, if he fulfills the academic requirements of securing a minimum of 56 credits from I year, II year I-Semester and II year II-Semester examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 86 credits from I year, II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.1.5 **A student shall register for all the subjects and earn all the 236 credits**. Marks obtained in all the credits shall be considered for the calculation of the class based on CCPA.

7.1.6 A student who fails to earn all the 236 credits as indicated in the course structure within **eight** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

7.1.7 **For Lateral Entry Students (batches admitted from 2014-2015):**

7.1.8 Academic requirements for pass in a subject are the same as in 7.1.1 and attendance requirements as in 6.3.

7.1.9 A student shall be promoted from II year to III year if he fulfills the academic requirements of securing a minimum of 28 credits from II year I and II-Semesters examinations conducted till that time.

7.1.10 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 58 credits from II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.1.11 A student shall register for all the subjects and earn all such credits. Marks obtained in all such credits shall be considered for the calculation of the class based on CCPA.

7.1.12 A student who fails to earn all the 180 credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

8. TRANSITORY REGULATIONS:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester/year from the date of commencement of class work for the next batch or later batches with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch he is joining later.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester/year:

$$CPA = \frac{1}{10} \frac{\sum_i (C_i M_i)}{(\sum_i C_{ri})}$$

C_i– Credits obtained in the Course i.

M_i–Marks obtained in the Course i.

9.2 For the entire programme:

$$CCPA = \frac{1}{10} \frac{\sum_n \left(\sum_i (C_{ni} M_{ni}) \right)}{\sum_n \left(\sum_i C_{rni} \right)}$$

n- Semester/Year number

C_{ni}– Credits obtained in the Course i of semester/year n.

M_{ni}–Marks obtained in the Course i.of semester/year n.

9.3 Overall Performance:

CCPA	Classification of final result
7.0 and above	First Class with distinction
6.0 and above but below 7.0	First class
5.0 and above but below 6.0	Second class
4.0 and above but below 5.0	Pass class

10. TRANSCRIPTS:

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

11. ELIGIBILITY:

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

(i)   Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.

(ii) Successfully acquired all **236 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.

(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

The B.Tech Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. GENERAL:

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

15. All legal matters are subjected to Rajampet Jurisdiction only.

Curriculum for the Programmes under Autonomous Scheme							
Regulation	R 2013						
Department	Department of Civil Engineering						
Programme Code & Name	G6, B.Tech Civil Engineering						

I Year B.Tech

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1GC11	English	2	0	0	4	30	70	100
1GC12	Engineering Physics	2	0	0	4	30	70	100
1GC13	Engineering Chemistry	2	0	0	4	30	70	100
1GC14	Mathematics – I	3	1	0	6	30	70	100
1G112	C Programming and Introduction to Data Structures	3	1	0	6	30	70	100
1G511	Engineering Mechanics	3	1	0	6	30	70	100
1G512	Engineering Graphics	1	1	6	10	30	70	100
1GC16**	Engineering Physics and Chemistry Lab	0	0	3	4	30	70	100
1GC17	English Language and Communication Skills Lab	0	0	3	4	30	70	100
1G114	C Programming and Data Structures Lab	0	0	3	4	30	70	100
1G411#	Engineering and IT workshop	0	0	3	4	30	70	100
	Total	16	4	18	56	330	770	1100

Note: L - Lecture; T-Tutorial; P – Practical; C - Credits

** The students attend the Engineering Physics and Engineering Chemistry lab in alternate week i.e. 3/2 per week. The end exam shall be conducted separately and average of two exams will be recorded by examiners.

The students attend the Engineering and IT Work Shop in alternate week i.e. 3/2 per week. The end exam shall be conducted separately and average of two exams will be recorded by examiners.

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Civil Engineering
Programme Code & Name	G6, B.Tech Civil Engineering

II Year B.Tech I Semester

Subject Code	Subject	Hours/ Week			Maximum marks		
		L	P	C	Internal	External	Total
1GC31	Mathematics -II	4	0	4	30	70	100
1G538	Electrical and Mechanical Technology*	4	0	4	30	70	100
1G631	Strength of Materials-I	4	0	4	30	70	100
1G632	Surveying	4	0	4	30	70	100
1G633	Fluid Mechanics	4	0	4	30	70	100
1G634	Building materials and Construction	4	0	4	30	70	100
1GC35	Soft Skills – I	2	0	2	30	70	100
1G635	Surveying Lab I	0	3	2	30	70	100
1G636	Strength of Materials Lab	0	3	2	30	70	100
	Total	24	12	30	270	630	900

NOTE:

*In Electrical and Mechanical Technology two questions from each part should be chosen to answer five questions in the End semester examination.

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Civil Engineering
Programme Code & Name	G6, B.Tech Civil Engineering

II Year B.Tech II Semester

Subject Code	Subject	Hours/ Week		C	Maximum marks		
		L	P		Internal	External	Total
1GC42	Probability and Statistics	4	0	4	30	70	100
1GC43	Environmental Science	4	0	4	30	70	100
1G641	Strength of Materials-II	4	0	4	30	70	100
1G642	Hydraulics and Hydraulic Machinery	4	0	4	30	70	100
1G643	Structural Analysis I	4	0	4	30	70	100
1G644	Building Planning and Drawing	4	0	4	30	70	100
1G645	Fluid Mechanics and Hydraulic Machines Lab	0	3	2	30	70	100
1G646	Surveying Lab II	0	3	2	30	70	100
1G647	Seminar - I	0	2	2	100	00	100
	Total	24	8	30	340	560	900

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Civil Engineering
Programme Code & Name	G6, B.Tech Civil Engineering

III Year B.Tech I Semester

Subject Code	Subject	Hours/Week		C	Maximum marks		
		L	P		Internal	External	Total
1GA51	Managerial Economics and Financial Analysis	4	0	4	30	70	100
1G651	Structural Analysis II	4	0	4	30	70	100
1G652	Engineering Geology	4	0	4	30	70	100
1G653	Engineering Hydrology I	4	0	4	30	70	100
1G654	Environmental Engineering I	4	0	4	30	70	100
1G655	Design and Drawing of Reinforced Concrete Structures	4	0	4	30	70	100
1GC53	Soft Skills – II	2	0	2	30	70	100
1GC51	Advanced English Communication Skills Lab	0	3	2	30	70	100
1G656	Engineering Geology Lab	0	3	2	30	70	100
	Total	26	6	30	270	630	900

	Curriculum for the Programmes under Autonomous Scheme						
Regulation	R 2013						
Department	Department of Civil Engineering						
Programme Code & Name	G6, B.Tech Civil Engineering						

III Year B.Tech II Semester

Subject Code	Subject	Hours/ Week		C	Maximum marks		
		L	P		Internal	External	Total
1G661	Engineering Hydrology II	4	0	4	30	70	100
1G662	Environmental Engineering II	4	0	4	30	70	100
1G663	Design and Drawing of Steel Structures	4	0	4	30	70	100
1G664	Geotechnical Engineering I	4	0	4	30	70	100
1G665	Transportation Engineering	4	0	4	30	70	100
1G666	Estimation and Quantity Surveying	4	0	4	30	70	100
1G667	Environmental Engineering Lab	0	3	2	30	70	100
1G668	Geotechnical Engineering Lab	0	3	2	30	70	100
1G669	Seminar - II	0	2	2	100	00	100
	Total	24	8	30	340	560	900

	Curriculum for the Programmes under Autonomous Scheme						
Regulation	R 2013						
Department	Department of Civil Engineering						
Programme Code & Name	G6, B.Tech Civil Engineering						

IV Year B.Tech I Semester

Subject Code	Subject	Hours/ Week		C	Maximum marks		
		L	P		Internal	External	Total
1G671	Geotechnical Engineering II	4	0	4	30	70	100
1G672	Finite Element Methods	4	0	4	30	70	100
1G673	Bridge Engineering	4	0	4	30	70	100
1G674	Concrete Technology	4	0	4	30	70	100
ELECTIVE –I							
1G675	Earthquake Resistant Design	4	0	4	30	70	100
1G676	Railway Docks and Harbor Engineering						
1G677	Traffic Engineering						
1G678	Construction Planning and Project Management						
ELECTIVE –II							
1G679	Industrial Waste and Waste Water Management	4	0	4	30	70	100
1G67A	Air Pollution and Control						
1G67B	Water Resources System Planning and Management						
1G67C	Construction Technology and Management	0	3	2	30	70	100
1G67D	CAD lab for Civil Engineers	0	3	2	30	70	100
1G67E	Concrete and Highway Engineering Lab	0	2	2	30	70	100
	Total	**24**	**8**	**30**	**270**	**630**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Civil Engineering
Programme Code & Name	G6, B.Tech Civil Engineering

IV Year B.Tech II Semester

Subject Code	Subject	Hours/Week		C	Maximum marks		
		L	P		Internal	External	Total
1G681	Design and Drawing of Irrigation Structures	4	0	4	30	70	100
1G682	Advanced Structural Engineering	4	0	4	30	70	100
ELECTIVE III							
1G683	Remote Sensing and GIS Applications	4	0	4	30	70	100
1G684	Ground Water Development and Management						
1G685	Ground Improvement Techniques						
1G686	Environmental Impact Assessment and management						
ELECTIVE IV							
1G687	Soil Dynamics and Machine Foundations	4	0	4	30	70	100
1G688	Advanced Structural Analysis						
1G689	Pre-stressed Concrete						
1G48B	Neural Networks and Fuzzy Logic						
1G68A	Seminar - III	0	2	2	100	00	100
1G68B	Project Work	0	12	12	100	00	100
	Total	**16**	**14**	**30**	**320**	**280**	**600**

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech. I Year

(1GC11) ENGLISH

(Common to all branches)

INTRODUCTION

The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students' handbooks.

The teacher should focus on developing LSRW (Listening, Speaking, Reading and Writing) skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

OBJECTIVES

- To improve the language proficiency of the students in English with an emphasis on LSRW skills.

- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.

- To develop study skills as well as communication skills in formal and informal situations.

SYLLABUS

Listening Skills:

Objectives

- To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and dialects.

Students should be given practice in listening and identifying the sounds of English language and to mark stress, right intonation in connected speech.

- Listening for general content

- Listening to fill up information

- Intensive listening

- Listening for specific information

Speaking Skills:

Objectives

- To make students aware of the role of ability to speak fluent English and its contribution to their success.

- To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice

- Describing objects/situations/people

- Role play - Individual/Group activities

- Just A Minute (JAM) Sessions(Using exercises from all units of the prescribed text

Reading Skills:

Objectives

- To develop an awareness in the students about the significance of silent reading and comprehension.

- To develop the ability to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

  - Skimming the text

  - Understanding the gist of an argument

  - Identifying the topic sentence

  - Inferring lexical and contextual meaning

  - Understanding discourse features

  - Recognizing coherence/sequencing of sentences

The students shall be trained in reading skills using the prescribed text for detailed study. They shall be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as articles from magazines/newspaper.

Writing Skills:

Objectives
- To develop an awareness in the students the skill to write exact and formal writing

- To equip them with the components of different forms of writing

  - Writing sentences

  - Use of appropriate vocabulary

  - Paragraph writing

  - Coherence and cohesiveness

  - Narration / description

  - Note Making

  - Formal and informal letter writing

  - Editing a passage

TEXTBOOKS:

For Detailed study: **ENJOYING EVERYDAY ENGLISH**, Sangam Books (India) Pvt Ltd Hyderabad, 2009.

For Non-detailed study: **INSPIRING LIVES**, Maruti Publications, Guntur, 2009.

UNIT I

a) "Heaven's Gate" from **ENJOYING EVERYDAY ENGLISH.**

b) "MokshagundamVisvesaraya" from **INSPIRING LIVES.**

c) **Parts of Speech (apart from the Language Work from prescribed text).**

UNIT II

a) "Sir C.V.Raman" from **ENJOYING EVERYDAY ENGLISH.**

b) "Mother Teresa" from **INSPIRING LIVES.**

c) **Articles and Prepositions (apart from the Language Work from prescribed text).**

UNIT III

a) "The Connoisseur" from **ENJOYING EVERYDAY ENGLISH.**

b) "Vikram Sarabhai" from **INSPIRING LIVES.**

c) **Tenses (apart from the Language Work from prescribed text)**

UNIT IV

a) "The Cuddalore Experience" from **ENJOYING EVERYDAY ENGLISH.**

b) "Sam Pitroda" from **INSPIRING LIVES.**

c) **Active and Passive Voice (apart from the Language Work from prescribed text).**

UNIT V

a) Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH.**

b) Vishwanathan Anand from **INSPIRING LIVES.**

c) **Transformation of Sentences (apart from the Language Work from prescribed text).**

UNIT VI

a) Odds Against Us from **ENJOYING EVERYDAY ENGLISH.**

b) Charlie Chaplin from **INSPIRING LIVES.**

c) Common Errors in English (apart from the Language Work from prescribed text).

UNIT VII Exercises on

Reading Comprehension, Note-taking and Note-making, Paragraph Writing, Letter Writing, Precise Writing and Technical Report Writing.

UNIT VIII Exercises on

Spelling and Punctuation, Synonyms and Antonyms, One-word substitutes, Prefixes and Suffixes, Idioms and Phrases, Words often confused Evaluation.

REFERENCE BOOKS:

1. Meenakshi Raman and Sangita Sharma, *Technical Communication, Principles and Practice*. OUP, 2011, 2nd Ed.

2. Raymond Murphy, *Essential Grammar in Use (with CD)*. Cambridge University Press, 2009, 3rd Ed.

3. Andrea J Ruthurford, *Basic Communication Skills for Technology*, Pearson Education, Asia.

4. Aysha Viswamohan, *English for Technical Communication*. Tata Mc-Graw Hill.

5. David Green, *English Grammar and Composition*. McMillan India Ltd.

6. Raymond Murphy, *Murphy's English Grammar*. Cambridge.

7. Robert J. Dixson, *Everyday Dialogues in English*. Prentice-Hall of India Ltd., 2006.

8. Farhathullah, T.M., *Communication Skills for Technical Students*. Orient Blackswan, 2008.

9. Krishna Mohan, and MeeraBanerji, *Developing Communication Skills*. Macmillan, 2009, 2nd Ed.

10. K. R. Lakshmi Narayanan, *English for Technical Communication. Vol. 1 and 2*, Scitech. Publications.

11. *Longman Dictionary of Contemporary English with DVD*, Pearson Longman.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)

B.Tech I-Year

(1GC12) ENGINEERING PHYSICS

(Common to all branches)

UNIT I
OPTICS: Interference - Interference in thin films by reflection - Newton's rings - Diffraction -Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit - Diffraction grating -Grating spectrum - polarization - Nicol prism - Theory of circular and elliptical polarized light - Quarter and half wave plates.

UNIT
II CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction - Space lattice -Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic - Face Centered Cubic crystals - Miller indices of planes and directions in crystals -Separation between successive (h k l) planes - X-ray diffraction by crystal planes - Bragg's law - Laue and Powder methods.

UNIT III
PRINCIPLES OF QUANTUM MECHANICS: Waves and Particles - de-Broglie's hypothesis - Heisenberg's uncertainty principle -Schroedinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box .

THE ELECTRON THEORY OF METALS & BAND THEORY: Postulates of Classical and Quantum free electron theory-Fermi-Dirac distribution and effect of Temperature (qualitative treatment only) - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands - metals, semi conductors & insulators.

UNIT
IV SEMICONDUCTORS: Intrinsic and extrinsic semiconductors - Law of mass action - Drift & diffusion - Einstein's relation - Hall effect - Direct & indirect band gap semiconductors - p-n junction - Band diagram of p-n junction diode - Diode Equation-LED, LCD & Photo diode.

UNIT V
MAGNETIC PROPERTIES: Introduction - Origin of magnetic moment - Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials.

Dielectric Properties: Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizations (qualitative treatment only) - Local field - Clausius-Mossotti equation -Frequency dependence of polarisability (qualitative treatment only) - Ferro electricity- $BaTio_3$.

UNIT VI
SUPERCONDUCTIVITY: General properties - Meissner effect - Type I and Type II superconductors - Penetration depth - BCS theory - Flux quantization - Josephson effects - Applications of superconductors.

Lasers: Introduction - Characteristics of laser - Spontaneous and stimulated emission of radiation -Einstein's coefficients - Population inversion - Ruby Laser - Helium-Neon Laser - GaAs Laser -Applications of Lasers in Industry, Scientific and Medical fields.

UNIT VII
FIBER OPTICS: Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture - Types of Optical fibers and refractive index profiles - Optical fiber communication systems - Application of optical fibers. **Holography:-**Introduction-construction and reconstruction of hologram-Applications.

UNIT VIII
NANOMATERIALS: Introduction - Basic principles of nano materials - Fabrication of nanomaterials - ball milling -plasma arching - Chemical vapour deposition method - sol-gel methods -properties of nanomaterials - carbon nanotubes - properties and applications of carbon nanotubes -Applications of nanomaterials.

TEXT BOOKS:
1. V. Rajendran and K.Thyagarajan, *Engineering Physics*, Tata McGraw-Hill Co. Ltd (TMH).
2. P.K.Palanisamy, *Engineering Physics*, Scitech Publications.
3. M.R.Srinivasan, *Engineering Physics*, New Age Publications.

REFERENCE BOOKS:

1. Halliday, Resnick and Krane, *Physics Vol. 2.* John Wiley India.
2. S.O. Pillai, *Applied physics.* New Age International.
3. R. K. Gaur and S.L. Gupta, *Engineering Physics.* Dhanpat rai publications
4. M. N. Avadhanulu, and P.G. Kshirasagar, *Engineering Physics.* S. Chand publications.
5. C.Kittel, *Solid State Physics.* John Wiley India.
6. P.K. Mittal, *Engineering Physics*. I.K. International.
7. K.K Chattopadhyay and A.N. Banarjee, *Introduction to Nanoscience and Nano Technology*, Prentice - Hall of India Pvt. Ltd (PHI).

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech I-Year

(1GC13) ENGINEERING CHEMISTRY

(Common to all branches)

UNIT I
WATER TECHNOLOGY: Sources of water, Hardness of water-Temporary and Permanent hardness. Units. Estimation of hardness by EDTA Method. Analysis of Water - Dissolved Oxygen. Disadvantages of Hard Water. Problems on hardness of water. Methods of Treatment of Water for Domestic Purpose - Disinfection: Chlorination, Ozonisation.

Water For Industrial Purpose - Water for Steam Making, Boiler Troubles - Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludge, Caustic Embrittlement. Water Treatment: - Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process.

UNIT II
ELECTRO CHEMISTRY: Conductance - Equivalent Conductance - Molecular Conductance, Conductometric Titrations - Applications of Conductivity Measurements.
Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni-Cd cell). Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell.
Insulators - Definition, Properties and Characteristics of Insulating Materials; Engineering Applications.

UNIT III
SCIENCE OF CORROSION: Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack), Wet Corrosion, Theories of Corrosion and Mechanism, Electro Chemical Theory of Corrosion. Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion - Cathodic Protection - Sacrificial anode and Impressed Current. Uses of Inhibitors. Electro Plating, and Electro less plating (copper and nickel).

UNIT IV
POLYMERS: Definition & Classification of polymers, Functionality. Types of Polymerization - Addition and Condensation Polymerization. Plastics- Thermoplastics and Thermosetting plastics. Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon. Rubber - Processing of Natural Rubber and Compounding of rubber. Elastomers - Buna S, Buna-N, Silicone Rubber.

UNIT V
EXPLOSIVES AND PROPELLANTS: Explosives, Classification, precautions during storage, blasting fuses, important explosives. Rocket propellants, classification of propellants.

Lubricants: Principles and function of lubricants - Classification and properties of lubricants -Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralization Number and Mechanical Strength.

UNIT VI
PHASE RULE: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams - one component system (water system), two component system (lead- silver system) Eutectics.

UNIT VII
FUELS AND COMBUSTION: Definition and Classification of fuels. Solid, liquid & gaseous fuels, Characteristics of a good fuel. Metallurgical Coke - Characteristics & Manufacture (Otto-Hoffmann). Petroleum - Refining - Synthetic Petrol. Calorific Value & its determination (Bomb Calorimeter). Combustion: Flue gas analysis by Orsat's apparatus. Combustion calculations.

UNIT VIII
INORGANIC ENGINEERING MATERIALS: CEMENT: composition of Portland cement, analysis, setting and hardening of cement (reactions).
Refractory Materials: Definition, Classification with Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material.

TEXT BOOKS:
1. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, *Chemistry for Engineers*. McGraw Hill Higher Education Hyd., 2009.
2. S.S. Dara, *A textbook of Engineering Chemistry*. S.Chand and Co, New Delhi, 2008.
3. Jain and Jain, *Text book of Engineering Chemistry.* Dhanpat Rai Publishing Company, New Delhi, 2008, 15th Ed.

REFERENCE BOOKS:

1. Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, *Engineering Chemistry*. Scitech Publications (India) Pvt. Limited, Hyderabad, 2009.
2. B.Viswanath, M.Aulice Scibioh, *Fuel Cells principles and applications*. Universities press.
3. C.V. Agarwal, *Chemistry of Engineering Materials*. Tara Publication, Varanasi, 2008.
4. J C Kuriacose and J. Rajaram, *Engineering Chemistry (Vol.l and 2)*. TMH, New Delhi, 2004.
5. G.D. Gesser, *Applied Chemistry: A Text Book for chemistry for Engineers and Technologists*. Springer, 2000.
6. S. Glasstone and David Lewis, *Physical Chemistry*. Van Nostrand, 1960.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech. I Year

(1GC14) MATHEMATICS – I

(Common to all branches)

UNIT I: Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications of Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT II: Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sinax, cosax, polynomials in x, $e^{ax}V(x)$, xV(x), method of variation of parameters.

UNIT III: Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT IV: Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates.

UNIT V: Multiple integral –Double integral– Evaluation-Change of Variables and Change of order of integration. Triple integral -Evaluation.

UNIT VI: Laplace transform of standard functions – Inverse transform – First shifting Theorem,–Second shifting theorem – Convolution theorem – Laplace transform of Periodic function.

UNIT VII: Transforms of derivatives and integrals-Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT VIII: Vector Calculus: Gradient – Divergence – Curl - Vector integration –Line integral - Area, Surface and volume integrals. Vector integral theorems: Verification of Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (excluding their proof).

TEXT BOOKS:
1. T.K.V. Iyengar, B. Krishna Gandhi and others, *A Text Book of Engineering Mathematics Vol – 1*. Sultan Chand & Company.
2. E. Rukmangadachari, E. Keshava Reddy, *A Text Book of Engineering Mathematics-1*, Pearson Education.

REFERENCE BOOKS:
1. B.V. Ramana, *A Text Book of Engineering Mathematics*. TMH.
2. B.S.Grewal, *Higher Engineering Mathematics.* Khanna publishers, 40th ed.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech. I Year

(1G112) C PROGRAMMING AND INTRODUCTION TO DATA STRUCTURES
(Common to EEE, ME & ECE)

UNIT I
OVERVIEW OF COMPUTERS AND PROGRAMMING: Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method, Number Systems.

UNIT II
INTRODUCTION TO C LANGUAGE: C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements -break, continue, goto.

UNIT III
 ARRAYS: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.
Functions: Library Functions, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands.

UNIT IV
 STRINGS: String Basics, String Library Functions, Longer Strings, String Comparison, Character operations, String-To-Number and Number-To- String Conversions,
Pointers: Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Dynamic Memory Allocation, Programming Applications, Pointer to Functions, Pointers and Strings.

UNIT V

STRUCTURES AND UNIONS: Introduction, Features of Structures. Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

UNIT VI

FILES: Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

UNIT VII

DATA STRUCTURES: Overview of Data Structure, Representation of a Stack, Stack Related Terms, Operation on a Stack, Implementation of a Stack, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Conversion of Expression from Infix to Postfix, Recursion, Queues - Various Positions of Queue, Representation of Queue, Insertion, Deletion, Searching Operations.
Linked List: Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

UNIT VIII

SEARCHING AND SORTING: Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching- Linear and Binary Search Methods.

TEXT BOOKS:
1. J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, *Programming in C and Data Structures.* Pearson Education
2. E.Balaguruswamy, *C and Data Structures.* TMH.
3. Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, *C and Data Structures, A snapshot oriented treatise with live engineering examples*. S. Chand.

REFERENCE BOOKS:
1. B.A.Forouzan and R.F. Gilberg, *C Programming & Data Structures.* Cengage Learning, 3rd Ed.
2. Yeswanth Kanitkar, Let Us C, BPB Publication, 9th Ed.
3. A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Data Structures using C. Pearson Education / PHI, 8th Ed

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech I Year
(1G511) ENGINEERING MECHANICS

UNIT I– Basic concepts - System of forces–Resultant of a force system, Moment of forces and its Application & Couples, Equilibrium system of forces, Free body diagrams

UNIT II- Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading. Spatial Forces-Components in space, Resultant.

UNIT III- Analysis of Frames(Analytical Method)- Types of Frames – Assumptions for forces in members of a perfect frame. Method of Joints, Method of Sections, Cantilever trusses and simply supported trusses.

UNIT IV– FRICTION: Types of friction– Static and Dynamic Frictions, laws of Friction–Limiting friction–Cone of limiting friction– Motion of bodies – Wedge friction

UNIT V– CENTROID AND CENTER OF GRAVITY: Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies – Theorem of Pappu's Centre of Gravity of Composite figures. (Simple problems only).

UNIT VI– Area moment of Inertia - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures, Product of Inertia.
MASS MOMENT OF INERTIA: Moment of Inertia of Simple solids, Moment of Inertia of composite masses. (Simple problems only)

UNIT VII– KINEMATICS: Rectilinear and Curvilinear motion – Velocity and Acceleration – Motion of a Rigid Body – Types and their Analysis in Planar Motion.

UNIT VIII– KINETICS : Analysis as particles and Analysis as a Rigid Body in Translation –Equations of Plane Motion – Fixed axis of Rotation –Work Energy Method – Equation for Translation – Work – Energy application to Particle Motion.
Impulse momentum-linear impulse moment, impact of jets on plates, conservation of momentum.

TEXT BOOKS:

1. Engineering Mechanics-Statics and Dynamics, A.Nelson, Tata McGraw-Hill Company.
2. Engineering Mechanics, R.K Bansal - Laxmi Publications
3. Singer's Engineering Mechanics, B. Vijay kumar reddy – B.S. Publishers.
4. Engineering Mechanics, Bhavikatti and Rajasekharappa

REFERENCES:

1. Engineering Mechanics by Timoshenko & young, Tata McGraw-Hill Company
2. Engineering Mechanics – B. Bhathacharya- Oxford University Publications
3. Engineering Mechanics –Arthur P. Boresi and Richard J. Schmidt. – Brooks/Cole – Cengage Learning
4. Engineering Mechanics-Statics & Dynamics—Johnson & Beer

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech I Year

(1G512) ENGINEERING GRAPHICS

UNIT I
INTRODUCTION TO ENGINEERING GRAPHICS: Engineering Graphics and its Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method and special methods.
b) Cycloid, Epicycloids and Hypocycloid.
c) Involutes.

UNIT II
PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third angle projections. Projections of Points, Lines inclined to both planes, finding true lengths & traces.

UNIT III
PROJECTIONS OF PLANES: Projections of regular Plane surfaces/figures, Projection of lines and planes using auxiliary planes.

UNIT IV
PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT V
SECTIONS AND DEVELOPMENTS OF SOLIDS: Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone. True shapes of the sections.

Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their sectioned parts.

UNIT VI

ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric projections of spherical parts. Conversion of Isometric views to Orthographic Views – Conversion of Orthographic views to Isometric views.

UNIT VII

INTERPENETRATION OF RIGHT REGULAR SOLIDS: Projections of curves of Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

UNIT VIII

PERSPECTIVE PROJECTIONS: Perspective View of Plane Figures and Simple Solids by Vanishing Point Method.

TEXT BOOKS:

1. N.D. Bhatt, *Engineering Drawing.* Charotar Publishers.
2. Johle, *Engineering Drawing.* Tata McGraw-Hill.
3. Shah and Rana, *Engineering Drawing*. Pearson Education, 2nd.

REFERENCE BOOKS:

1. Venugopal, *Engineering Drawing and Graphics.* New age.
2. K.L. Narayana, P. Kanniah, *Engineering Drawing*. Scitech Pub.
3. Venkata Reddy, *Engineering Drawing*. B.S.Publishers.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech I Year

(1GC16) ENGINEERING PHYSICS AND CHEMISTRY LAB

(Common to all branches)

PART A: ENGINEERING PHYSICS LAB

Any <u>TEN</u> of the following experiments are to be performed during the Academic year.
<u>List of Experiments</u>

1. Determination of wavelength of given source - spectrometer - normal incidence method.
2. Dispersive power of the prism - Spectrometer.
3. Determination of wavelength of a laser source - Diffraction Grating.
4. Determination of Frequency of AC source by Sonometer.
5. Determination of thickness of a thin wire using parallel fringes.
6. Newton's Rings.
7. Magnetic field along the axis of a current carrying coil - Stewart and Gee's method.
8. Numerical aperture of an optical fiber.
9. Hall effect.
10. B - H Curve.
11. Energy gap of a material of p-n junction
12. Determination of rigidity modulus of a wire material - Torsional pendulum
13. Determination of dielectric constant.
14. Verification of laws of stretched string - Sonometer.
15. Melde's experiment - Transverse & Longitudinal modes.

<u>Equipment required</u>:

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee's apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde's apparatus

<u>TEXT BOOKS</u>:
1. Dr. Y. Aparna, Dr. K. VenkateswaraRao, *Laboratory manual of Engineering Physics*.
2. Dr. K. Palanisamy, *Laboratory Engineering Physics*, Scitech Publications.

PART B: ENGINEERING CHEMISTRY LAB

1. Estimation of Hardness of Water by EDTA method.
2. Estimation of Copper by EDTA method.
3. Estimation of Ferrous ion by dichrometry.
4. Estimation of Copper, by Iodometry.
5. Estimation of dissolved oxygen by Winkler's method.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conductometric titration
7. Determination of eutectic composition and temperature of simple eutectic system (Urea-Benzoic acid).
8. Determination of viscosity of the oils through Redwood viscometer I & II
9. Determination of calorific value of fuel using Bomb calorimeter
10. Determination of Iron in Cement by colorimetric method.

TEXT BOOKS:

1. Dr. K.N.Jayaveera and K.B. Chandra Sekhar, *Chemistry-lab manual*. S.M. Enterprizes Ltd.
2. *Vogel's Book of Quantitative Inorganic Analysis*. ELBS Edition.

EQUIPMENT REQUIRED:

1. Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
2. Analytical balance (keroy) (15 Nos)
3. Calorimeter
4. Bomb Calorimeter
5. Redwood viscometer No. 1& No.2
6. Conductometer/ Conductivity bridge
7. Potentiometer
8. Wash bottles, test tube stands, burette stands
9. Gas cylinders with Bunsen burners
10. Chemicals: Hydrochloric acid, sodiumhydroxide, EDTA, EBT indicator, FSB-F indicator, methanol, Mohr's salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate, etc.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech I Year

(1GC17) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(Common to all branches)

The **Language Lab** focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

OBJECTIVES:
- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
- To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants
2. Introduction to Stress and Intonation
3. Situational Dialogues and Role-play
4. Telephone Skills
5. 'Just A Minute' (JAM)
6. Oral Presentations
7. Describing Objects / Situation / People
8. Information Transfer

Minimum Requirement:
The English Language Lab shall have two parts:
- The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
- The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:
i) P – IV Processor
      a) Speed – 2.8 GHZ
      b) RAM – 512 MB Minimum
      c) Hard Disk – 80 GB
ii) Headphones of High quality

Manual cum Record: Prepared by the Faculty Members of English of the college will be used by Students.

Suggested Software:
      Sky Pronunciation Suite
      Connected Speech from Clarity
      Clarity Pronunciation Power – Part I
      The Rosetta Stone English Library
      Mastering English in Vocabulary, Grammar, Spellings, Composition
      English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
      Dorling Kindersley - Series of Grammar, Punctuation, Composition etc.
      Language in Use, Foundation Books Pvt Ltd with CD
      Learning to Speak English - 4 CDs
      Microsoft Encarta with CD
      Cambridge Advanced Learners' English Dictionary with CD.
      Murphy's English Grammar, Cambridge with CD

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Daniel Jones, *English Pronouncing Dictionary with CD*. Current Edition.
2. R. K. Bansal and J. B. Harrison, *Spoken English*. Orient Longman 2006 Edn.
3. Krishna Mohan & NP Singh, *Speaking English Effectively*. Macmillan.
4. J. Sethi, Kamlesh, Sadanand & D.V. Jindal, *A Practical Course in English Pronunciation* (*with two Audio cassettes*). Prentice-Hall of India Pvt. Ltd., New Delhi.
5. Dr. Shalini Verma, *Body Language- Your Success Mantra.* S.Chand & Co, 2008.
6. *English Dictionary for Advanced Learners* (*with CD*). International edn. Macmillan 2009.
7. E.Sureshkumar, P.Sreehari, *A Handbook for Englsih language Laboratories.* Foundation Books, 2009.
8. *DELTA's key to the Next Generation TOEFL Test, 6 audio CDs*, New Age International Publishers, 2007.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech I year

(1G114) C PROGRAMMING AND DATA STRUCTURES LAB
(Common to EEE, ME& ECE)

Objectives:

   • To make the student learn a programming language.
   • To teach the student to write programs in C to solve the problems.
   • To introduce the student to simple linear data structures such as lists, stacks, queues.

   Recommended Systems/Software Requirements:
   • Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l.
   a) Write a C program to calculate Simple Interest by accepting principle amount, rate of interest and time.
   b) Write a C program to find the roots of a quadratic equation.
   c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 2.
   a) Write a C program to find the sum of individual digits of a positive integer.
   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
   c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 3.
   a) Write a C program to find the given number is Armstrong number or not.
       ($153 = 1^3 + 5^3 + 3^3$)
   b) Write a C program to find the given number is Strong number or not.
       (145 = 1!+4!+5!)
   c) Write a C program to generate all the Armstrong numbers between 1 and n, and Strong number between 1 and n where n is a value supplied by the user

Exercise 4.

a) Write a C program to calculate the following Sum:

$$Sum = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!}$$

b) Write a C program to read in two numbers, x and n, and then compute the sum of the geometric progression:

$$1 + x + x^2 + x^3 + \ldots\ldots\ldots\ldots\ldots.+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Find if any values of x are also illegal? If so, test for them too.

Exercise 5.

a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise 6.

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 7.

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices ii) Multiplication of Two Matrices

Exercise 8.

Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.
   iii) To solve Towers of Hanoi problem.

Exercise 9.

a) Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not

Exercise 10.

    a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

    b) Write a C program to count the lines, words and characters in a given text.

Exercise 11.

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

    i) Reading a complex number   ii) Writing a complex number

    iii) Addition of two complex numbers   iv) Multiplication of two complex numbers

               (Note: represent complex number using a structure.)

Exercise 12

    a) Write a C program which copies one file to another.

    b) Write a C program to reverse the first n characters in a file.

        (Note: The file name and n are specified on the command line.)

Exercise 13

    a) Write a C programme to display the contents of a file.

    b) Write a C programme to merge two files into a third file

       (i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise 14

Write a C program that uses functions to perform the following operations on singly linked list.:

          i) Creation   ii) Insertion iii) Deletion iv) Traversal

Exercise 16

Write C programs that implement stack (its operations) using

         i) Arrays   ii) Pointers

Exercise 17

Write C programs that implement Queue (its operations) using

         i) Arrays   ii) Pointers

Exercise 18

Write a C program that uses Stack operations to perform the following:

         i) Converting infix expression into postfix expression

         ii) Evaluating the postfix expression

Exercise 19

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

         i) Bubble sort   ii) Selection sort   iii) Insertion sort

Exercise 20

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

Exercise 21

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

Exercise 22

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

REFERENCE BOOKS

1. M.Cooper, *The Spirit of C: an introduction to modern programming.* Jaico Publishing House.
2. K.R. Venugopal and S.R. Prasad, *Mastering C*. TMH.
3. V. Rajaraman, *Computer Basics and C Programming*. PHI Publications.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
B.Tech I Year
(1G411) ENGINEERING & I.T. WORKSHOP
(Common to all branches)

ENGINEERING WORKSHOP
Objectives:
The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:
   a. **Carpentry shop**– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock.

   b. **Fitting shop**– Two joints (exercises): square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.

   c. **Sheet metal shop**– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet.

   d. **House-wiring**– Two jobs (exercises): wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.

   e. **Foundry**– Preparation of two moulds (exercises): for a single pattern and a double pattern.

   f. **Welding** – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:
   a. Plumbing
   b. Machine Shop
   c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCE BOOKS:

1. V. Ramesh Babu, *Engineering Work shop practice for JNTU*. VRB Publishers Pvt. Ltd., 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manual*. SciTech Publishers.
3. Jeyapoovan, Saravana Pandian, *Engineering Practices Lab Manual*. Vikas, 4th Ed.
4. GHF Nayler, *Dictionary of Mechanical Engineering*. Jaico Publishing House.

IT WORKSHOP

Objectives:

The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on a working PC (PIV or higher)to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and databases using the Microsoft suite of office tools and LaTeX. (It is recommended to use Microsoft office 2007 in place of MS Office 2003)

PC Hardware

Exercise 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 – Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 – Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 – Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

*Exercise 5 – Task 5:***Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

*Exercise 6 – Task 6:***Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS:

LaTeX and Word:

Exercise 7 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

*Task1:***UsingLaTeX and Word to create project certificate**. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task2: **Creating project** abstract features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task3: **Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Task4: **Creating a Feedback form** - Features to be covered- Forms, Text Fields, Inserting objects, Mail Merge in Word.

Excel

Exercise 8 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: **Creating a Scheduler** - **Features to be covered**:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task2: **Calculating GPA** - **Features to be covered**:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task3: **Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Exercise 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Exercise 10 - Task2: Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Access

Exercise11 – Task1: Help students in preparing database using Microsoft/ equivalent (FOSS) access tool. Topic covered during this week includes - Access Orientation, Using Templates, Layouts, Inserting data, Editing data, Inserting Tables, Working with menu objects, Renaming, deleting, modifying data and tables.

Internet & World Wide Web

Exercise 12 - Task 1: **Orientation& Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Exercise 13 - Task 2: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

REFERENCE BOOKS:

1. *Introduction to Information Technology*, ITL Education Solutions limited: Pearson Education.
2. Leslie Lamport, *LaTeX Companion.* PHI/Pearson.
3. Peter Norton, *Introduction to Computers.* McGraw Hill, 6th Ed.
4. Scott Muller, *Upgrading and Repairing, PC's*, Que Publishing, 18th Ed.
5. Vikas Gupta, *Comdex Information Technology course tool kit*. Wiley Dreamtech.
6. David Anfinson and Ken Quamme, *IT Essentials PC Hardware and Software Companion Guide.* CISCO Press, Pearson Education, 3rd Ed.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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II Year B. Tech. CE – I Semester

(1GC31) MATHEMATICS – II

UNIT I: Eigen values-Eigen vectors-properties, Cayley -Hamilton theorem-inverse and powers of a matrix by Cayley Hamilton theorem- Diagonalization of matrix- Calculation of powers of matrix.

UNIT II: Fourier series-Determination of Fourier coefficients-Fourier series-Even and Odd functions-Fourier series in an arbitrary interval-even and odd periodic continuation- Half –range Fourier sine and cosine expansions.

UNIT III
PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations by eliminating arbitrary constants and functions--Method of separation of variables-Solutions of one dimensional heat and wave equations-Laplace equation (three zero boundary conditions).

UNIT IV: Solution of algebraic and transcendental equations-Bisection method-Method of false position-Newton-Raphson method-Interpolation-Forward differences-Backward differences-Newton's forward and backward difference formulae – Lagrange's interpolation formula.

UNIT V: Numerical solutions of ordinary differential equations-Taylor's series-Euler's method-Picard's method- Runge-kutta fourth order method-Milne's predictor-corrector method (Without proofs).

UNIT VI Numerical Differentiation-Numerical integration-Trapezoidal Rule-Simpson's one third Rule-Simpson's 3/8th Rule (without proofs).

UNIT VII: Functions of complex variable –continuity-differentiability-Analyticity-Properties-Cauchy Riemann equations in Cartesian and polar co-ordinates (without proofs). Harmonic and conjugate harmonic functions-Milne-Thomson's method.

UNIT VIII
COMPLEX INTEGRATION: Cauchy's integral theorem-Cauchy's integral formula-Generalized integral formula (without proofs) - Power series: Expansion in Taylor's series & Laurent series (without proofs).

TEXT BOOKS:

1. B. S. Grewal, *Higher Engineering Mathematics*. Khanna Publishers, New Delhi, 40th Ed.
2. E. Keshava Reddy, and G. SankaraRao, *A text book of Mathematical Methods*. I. K. International.

REFERENCE BOOKS:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*. New Age International (Pvt) Limited, 8th Ed.
2. B. V. Ramana, *A text book of Engineering Mathematics*. Tata McGraw Hill.
3. T. K. V. Iyengar, B. Krishna Gandhi and Others, *Mathematics – II*. S. Chand & Company.
4. E. Keshav Reddy and Rukmangadachari, *Mathematics – III*. Pearson Education.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)

II Year B. Tech. CE – I Semester

(1G538) ELECTRICAL & MECHANICAL TECHNOLOGY
In end examination minimum of two questions from each **Part-A & Part-B** should be chosen for answering **FIVE** questions.
All questions carry equal marks.
Use separate booklets for Part-A & Part-B

PART –A
ELECTRICAL TECHNOLOGY

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

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

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

UNIT - IV
INSTRUMENTS: Basic Principles of indicating instruments – permanent magnet moving coil and moving iron instruments.

PART –B
MECHANICAL TECHNOLOGY

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

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

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

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

TEXT BOOKS
1. Electrical Technology by B.L.Thareja, S.Chand Publishers.
2. Introduction to Electrical Engineering - M.S Naidu and S. Kamakshaiah, Tata McGraw-Hill Publications Ltd., New Delhi, 2009.
3. Mechanical Technology by R.S. Khurmi.
4. Mechanical Technology by Kodandaraman C.P.
5. Construction Planning; Equipment and Methods – Peurifoy.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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II Year B. Tech. CE – I Semester

(1G631) STRENGTH OF MATERIALS – I

UNIT– I
SIMPLE STRESSES AND STRAINS:-Elasticity and plasticity –Types of stresses and strains – Hooke's law–stress –strain diagram for mild steel–Working
stress –Factor of safety –Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them–Bars of varying section – composite bars– Temperature stresses.
Strain energy –Resilience –Gradual, sudden, impact and shock loadings –simple applications.

UNIT– II
SHEAR FORCE AND BENDING MOMENT: Definition of beam–Types of beams– Concept of shear force and bending moment– S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these
loads– Point of contra flexure –Relation between S.F.,B.M and rate of loading at a section of abeam.

UNIT– III
FLEXURAL STRESSES: Theory of simple bending –Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ Neutral axis–Determination of bending stresses– section modulus of rectangular and circular sections(Solid and Hollow), I, T, Angle and Channel sections –Design of simple beam sections.

UNIT– IV
SHEAR STRESSES: Derivation of formula– Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT– V
DEFLECTION OF BEAMS 1: Bending into a circular arc– slope, deflection and radius of curvature –Differential equation for the elastic line of a beam – Double integration and Macaulay's methods

UNIT– VI
DEFLECTION OF BEAMS 2: Determination of slope and deflection for cantilever and simply supported beams subjected to point loads,-U.D.L. Uniformly varying load.-Mohr's theorems –Moment area method– application to simple cases including overhanging beams – deflections of popped cantilevers for simple loading cases .

UNIT– VII
PRINCIPAL STRESSES AND STRAINS: Introduction– Stresses on an inclined section of a bar under axial loading– compound stresses– Normal and tangential
stresses on an inclined plane for biaxial stresses– Two perpendicular normal stresses accompanied by a state of simple shear– Mohr's circle of stresses– Principal stresses and strains –Analytical and graphical solutions.

UNIT– VIII
THEORIES OF FAILURES: Introduction– Various Theories of failures like Maximum Principal stress theory– Maximum Principal strain theory–Maximum shear stress theory– Maximum strain energy theory –Maximum shear strain energy theory

TEXT BOOKS:
1. Mechanics of Materials – Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi publications
2. Strength of Materials by R. Subramaniyan, Oxford University Press.
3. Strength of materials by Dr, R. K.Bansal – Laxmi publications.

REFERENCES:
1. Mechanics of Solids, by Ferdinand Beer and others– Tata Mc. Grawhill Publications2000.
2. Strength of Materials by Schaum's outline series –Mc.Grawhillb International Editions.
3. Strength of Materials by S. Ramakrishna and R. Narayan– Dhanpat Rai Publications.
4. Strength of materials by R. K. Rajput, S. Chand & Co, New Delhi.
5. Strength of Materials by A. R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
6. Strength of Materials by L.S.Srinathetal., Macmillan India Ltd., Delhi.
7. Strength of Materials by BhaviKatti.

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II Year B. Tech. CE – I Semester

(1G632) SURVEYING

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

UNIT – II
COMPASS AND PLANE TABLE SURVEYING: Compass Survey: Types of compass – Bearings - Included angles– Declination - Dip and local attraction. Plane Table Survey: Components – Setting – Methods – Radiation– Traversing - Intersection and Resection.

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

UNIT – IV
COMPUTATION OF AREAS AND VOLUMES: Areas: Areas dividing into number of triangles - By offsets to a base line - By latitudes and departures (D.M.D. and D.P.D) – By coordinates - Areas from maps. Volumes : Volume from cross-section - Embankments and cutting for a level section and two level sections with and without transverse slopes - Determination of the capacity of reservoir - Volume of barrow pits - Spot levels from contours

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

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

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

UNIT – VIII
ELECTRONIC DISTANCE MEASUREMENT AND GIS: Electronic Distance Measurement: Basic concepts – Classification of electronic radiation - Basic principle of electronic distance measurement - Computing the distance from the phase differences - Total station- Instrumental errors in EDM.
Geographical Information System: Introduction to geodetic surveying - Global positioning system (GPS) - Introduction to geographic information system (GIS).

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

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

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II Year B. Tech. CE – I Semester

(1G633) FLUID MECHANICS

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

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

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

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

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

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

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

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

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

REFERENCES
1. R.K. Rajput, Fluid Mechanics and Hydraulic Machinery, 4th Edition, S. Chand Publishers, New Delhi, 2010.
2. J.F. Douglas, J.M. Gaserek and J.A. Swaffirld, Fluid Mechanics, 5thEdition, Longman, 2010.
3. A.K. Mohanty, Fluid Mechanics, 2ndEdition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.

S.K. Som and G. Biswas, Introduction to Fluid Machines, 2ndEdition,Tata McGraw-Hill Publishers Pvt. Ltd, 2010.

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II Year B. Tech. CE – I Semester

(1G634) BUILDING MATERIALS AND CONSTRUCTION

UNIT – I
STONES AND BRICKS:
Properties of building stones – relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks. Comparison between clamp burning and kiln burning.

UNIT-II
ROOFING MATERIALS
Characteristics of good tile – manufacturing methods, Types of tiles. Use of Materials like aluminium, gypsum, glass and bituminous materials – their quality.

UNIT – III
LIME AND CEMENT:
Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Various types of cement and their properties. Various file and laboratory tests for Cement. Various ingredients of Cement concrete and their importance – various tests for concrete.

UNIT-IV
WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber. Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics, steel, Aluminum.

UNIT - V
MASONARY :
Types of masonry, English and Flemish bonds , Rubble and Ashlar masonry, cavity and partition walls.

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

UNIT –VII

BUILDING COMPONENTS: Lintels, Arches, Vaults-stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

UNIT – VIII

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

TEXT BOOKS:
1. Building material by S K Duggal – New Age International Publishers; Second Edition
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
3. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

REFERENCES:
1. R.Chudly "Construction Technology "– Volumes I and II" 2nd Edition, Longman, UK, 1987.
2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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II Year B. Tech. CE – I Semester

(1GC35) SOFT SKILLS - I
(Common to CE, CSE and ME)

APTITUDE AND REASONING SKILLS

QUANTITATIVE APTITUDE:

- Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Propositions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, Quadratic Equations, Logarithms.

- HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and cisterns, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker's Discounts.

- Data Interpretation, Tabulation, Bar Graphs, Pie Charts, Line Graphs.

REASONING:

- Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

REFERENCE BOOKS:

1. Arun Sharma, *How to Prepare for Quantitative Aptitude*, TMH Publishers, New Delhi, 2003.
2. R.S. Agarwal, *Quantitative Aptitude*, S.Chand Publishers, New Delhi, 2005.
3. Sharon Weiner-Green, Ira K. Wolf, *Barron's GRE*, Galgotia Publications, New Delhi, 2006.
4. R.S Agarwal, *Verbal and Non-Verbal Reasoning*, S. Chand Publishers, New Delhi, 1998.
5. Shakuntala Devi, *Puzzles to Puzzle You*, Orient Paper Backs Publishers (OPB), New Delhi, 2005.
6. Shakuntala Devi, *More Puzzles*, OPB, New Delhi, 2006.
7. Ravi Narula, *Brain Teasers*, Jaico Publishing House, New Delhi, 2005.
8. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005.

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II Year B. Tech. CE – I Semester

(1G635) SURVEYING LAB – I

LIST OF EXERCISES:

1. Survey of an area by chain survey (closed traverse) & Plotting

2. Chaining across obstacles

3. Determination of distance between two inaccessible points with compass.

4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.

5. Radiation method, intersection methods by plane Table survey

6. Two point and three point problems in plane table survey

7. Traversing by plane table survey

8. Fly leveling (differential leveling)

9. An exercise of L.S and C.S and plotting

10. Two exercises on contouring.

11. Study of Theodolite in detail - practice for measurement of horizontal and vertical angles.

12. Measurement of horizontal angles bymethod of repetition and reiteration.

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II Year B. Tech. CE – I Semester

(1G636) STRENGTH OF MATERIALS LAB

LIST OF EXPERIMENTS

1. Tension test on mild steel / HYSD bar

2. Compression test on wood

3. Compression test on coiled spring

4. Tension test on coiled spring

5. Bending test on carriage spring

6. Brinell and Rockwell hardness tests

7. Charpy and Izod impact tests

8. Shear test on mild steel

9. Bending test on simply supported beam

10. Bending test on cantilever beam

11. Bending test on fixed beam

12. Bending test on continuous beam

13. Verification of Maxwell's reciprocal theorem

14. Torsion test on mild steel

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II Year B. Tech. CE –II Semester

(1GC42) PROBABILITY AND STATISTICS

UNIT - I
PROBAILITY MATHEMATICAL EXPECTATIONS: Introduction to Probability : Definition of random experiment, events and sample space – Definition of probability – Addition and multiplication theorems - Conditional probability – Baye's theorem – Simple problems on Baye's theorem.
Random Variable: Discrete and continuous random variables -Distribution function of random variable – Properties – Probability mass function - Probability density function – Mathematical expectation – Properties of mathematical expectations – Mean and variance.

UNIT - II
PROBABILITY DISTRIBUTIONS : Discrete Distributions : Binomial distribution – Mean and standard deviations of Binomial distribution – Poisson distribution – Mean and standard deviations of Poisson distribution – Applications. Continuous Probability Distributions: Uniform distribution – Exponential distribution – Normal distribution – Properties of normal distribution – Importance of normal distribution – Area properties of normal curve.

UNIT-III
CORRELATION AND REGRESSION:
Correlation: Definition - Measures of correlation – Correlation for bivariate distribution – Rank correlation coefficients.
Regression: Simple linear regression – Regression lines and properties.

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

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

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

UNIT – VII
STATISTICAL QUALITY CONTROL: Introduction – Advantages and limitations of statistical quality control – Control charts – Specification limits - , R, np and c charts.

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

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

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

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II Year B. Tech. CE – II Semester

(1GC43) ENVIRONMENTAL SCIENCE
(Common to CE, CSE and ME)

UNIT I
THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Definition, multidisciplinary nature, Scope &Importance- Need for public awareness -Global environmental crisis-People in Environment – Institutions in Environment.

UNIT II FOREST, WATER AND ENERGY RESOURCES:
Natural resources: definition .Renewable &non-renewable natural resources. Natural resources & their associated problems.
Forest resources: Use & over –exploitation- deforestation, case studies-Timber extraction –Mining-dams & their effects on forest & tribal people.
Water resources: Use and over utilization of surface and ground water -floods, drought- conflicts over water, dams – benefits & problems.
Energy resources: Growing energy needs- renewable and non – renewable energy resources- use of alternate energy resources, case studies.

UNIT III
MINERAL, FOOD & LAND RESOURCES:
Mineral resources: Use and exploitation, environmental effects of extracting & using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizer – pesticide problems, water – logging, salinity, case studies.
Land resources: Land as a resource, land degradation, man – induced landslides, soil erosion and desertification.
• Role of an individual in the conservation of natural resources.
• Equitable use of resources for sustainable life styles.

UNIT IV
ENVIRONMENTAL POLLUTION:
Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, Nuclear hazards - Pollution case studies- Role of an individual in prevention of pollution.
Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Disaster management: floods, drought, earthquake, cyclone and landslides.

UNIT V
ECOSYSTEMS: Concept of an ecosystem. Structure and functions of an ecosystem-Producers, consumers & decomposers - Food chains, food webs & ecological pyramids - Energy flow in the ecosystem - Cycling of nutrients (Bio geo chemical cycles) -Energy production - Ecosystem development & regulation -Ecological succession. Introduction, types, characteristic features, structure and functions of the following ecosystem: (a) Forest ecosystem (b) Grass land ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT VI
BIODIVERSITY & ITS CONSERVATION: Introduction, Definition: genetic, species and ecosystem diversity.
Value of Biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option values - Bio-geographical classification of India - Biodiversity at global, national and local levels - India as a mega – diversity nation- Hot spots of biodiversity.
Threats to Biodiversity: habitat loss, poaching of wild life, man-wild life conflicts - Endangered and endemic species of India.
Conservation of biodiversity: In –situ & Ex-situ conservation

UNIT VII
SOCIAL ISSUES & THE ENVIRONMENT: From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, watershed management - Resettlement and rehabilitation of people; its problems & concerns, case studies.
Environmental Ethics: Issues & possible solutions-Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents & holocaust, case studies - Wasteland reclamation - Consumerism & waste products - Environment protection Act - Air (Prevention & Control of Pollution) Act.-Water (Prevention & Control of Pollution) Act.-Wildlife Protection Act-Forest Conservation Act-Issues involved in enforcement of environmental legislation-Public awareness.

UNIT VIII

HUMAN POPULATION & ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Program - Environment & human health-Human Rights-Value Education - HIV/AIDS-Women & Child Welfare-Role of Information Technology in Environment and human health-Case studies.

TEXTBOOKS:

1. Erach Bharucha, *Text book of Environmental Studies for Undergraduate Courses* for University Grants Commission, University press.
2. R. Rajagopalan, *Environmental Studies* Oxford University Press.
3. Anubha Kaushik and C. P. Kaushik, *Perspectives In Environmental Studies*. New Age International Publishers.

REFERENCE BOOKS:

1. J. P. Sharma, *Comprehensive Environmental Studies*. Laxmi Publications.
2. Anindita Basak, *Environmental Studies*. Pearson education.
3. Benny Joseph, *Environmental Studies*. Mc. Graw Hill Publications.

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II Year B. Tech. CE – II Semester

(1G641) STRENGTH OF MATERIALS - II

UNIT– I
THIN CYLINDERS: Thin seamless cylindrical shells –Derivation of formula for longitudinal and circumferential stresses– hoop, longitudinal and Volumetric strains– changes in diameter, and volume of thin cylinders –Thin spherical shells.

UNIT– II
THICK CYLINDERS: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae– distribution of hoop and radial stresses across thickness– design of thick cylinders –compound cylinders–Necessary difference of radii for shrinkage– Thick spherical shells.

UNIT– III
TORSION OF CIRCULAR SHAFTS: Theory of pure torsion– Derivation of Torsion equations: $T/J = q/r = N\theta/L$– Assumptions made in the theory of pure torsion –Torsional moment of resistance–Polar section modulus– Power transmitted by shafts –Combined bending and torsion and end thrust–Design of shafts according to theories of failure.

UNIT– IV
SPRINGS: Introduction– Types of springs–deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel– Carriage or leaf springs.

UNIT– V
COLUMNS AND STRUTS: Introduction– Types of columns –Short, medium and long columns– Axially loaded compression members– Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions–Equivalent length of a column – slenderness ratio–Euler's critical stress –Limitations of Euler's theory– Rankine– Gordon formula –Long columns subjected to eccentric loading – Secant formula– Empirical formulae –Straight line formula –Prof. Perry's formula.

UNIT– VI
DIRECT AND BENDING STRESSES:
Stresses under the combined action of direct loading and B.M,. core of a section –determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT– VII
UNSYMETRICAL BENDING: Introduction– Centroidal principal axes of section–Graphical method for locating principal axes –Moments of inertia referred to any set of rectangular axes– Stresses in beams subjected to unsymmetrical bending –Principal axes– Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis Deflection of beams under unsymmetrical bending.

UNIT– VII
BEAMS CURVED INPLAN: Introduction– circular beams loaded uniformly and supported on symmetrically placed Columns –Semi-circular beam Simply-supported on three equally spaced supports.

UNIT- VIII
ANALYSIS OF PIN-JOINTED PLANE FRAMES: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply–supported trusses.-bymethod of joints, method of sections.

TEXT BOOKS:
1. A Textbook of Strength of materials by R. K. Bansal –Laxmi Publications (P) ltd., New Delhi.
2. Strength of Materials by S.S. Bhavikatti – Vikas Publishers
3. Strength of Materials by B.C.Punmia

REFERENCES:
1. Mechanics of Solids, by Ferdinand p Beer and others– Tata Mc.Grawhill Publications2000.
2. Strength of Materials by Schaum's outline series –Mc.Grawhill International Editions.
3. Strength of Materials by S.Ramakrishnaand R.Narayan– Dhanpat Rai publications.
4. Strength of materials by R.K.Rajput, S.Chand & Co, NewDelhi.
5. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah,NewDelhi.
6. Strength of Materials by L.S.Srinathetal., MacmillanIndiaLtd.,Delhi.
7. Mechanics of Structures, by S.B.Junnarkar, Charotar PublishingHouse, Anand,Gujrat.

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II Year B. Tech. CE – II Semester

(1G642) HYDRAULICS & HYDRAULIC MACHINERY

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

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

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

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

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

UNIT – VI

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

UNIT – VII

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

UNIT – VIII

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

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

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

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II Year B. Tech. CE – II Semester

(1G643) STRUCTURAL ANALYSIS - I

UNIT– I
FIXED BEAMS – Introduction to statically indeterminate beams with U.D.load central point load, eccentric point load. Number of point loads, uniformly varying load, couple and combination of loads shear force and bending moment diagrams-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT– II
CONTINUOUS BEAMS: Introduction-Clapeyron's theorem of three moments-Analyses of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different
moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-III
Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT-IV
MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without settlement of supports.

UNIT– V
ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, Bending moment and shear forces-Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT– VI
MOVING LOADS: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single Concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load- Focal length.

UNIT– VII
INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section single point load, U.D. load longer than the span, U.D. load shorter than the span-Influence lines for forces in members of Pratt and Warren trusses.

UNIT-VIII
INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis –Determination of static and kinematic indeterminacies–Solution of trusses with up to two degrees of internal and external indeterminacies–Castigliano's theorem.

TEXT BOOKS:
1. Analysis of Structures-VolI& Vol IIbyV.N.Vazirani& M.M.Ratwani, Khanna Publications, New Delhi.
2. Structural Analysis by V.D.PrasadGalgotiapublications,2nd Editions.
3. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
4. ComprehensiveStructuralAnalysis-Vol.I&2by Dr. R. Vaidyanathan & Dr.P.Perumal- Laxmi publications pvt.Ltd., New Delhi
5. Basic structural Analysis by C.S.Reddy, Tata Mcgrawhill, New Delhi

REFERENCES:
1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Gupta, Pandit& Gupta; Tat Mc.Graw– Hill Publishing Co. Ltd., New Delhi.
3. Theory of Structures by R.S. Khurmi, S. Chand Publishers
4. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, NewDelhi.
5. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, NewDelhi.

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II Year B. Tech. CE – II Semester

(1G644) BUILDING PLANNING & DRAWING

PART-A
UNIT – I
BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of bye buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT – II
RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III
PUBLIC BUILDINGS AND CPM: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV
PROJECT NETWORKING: Planning of construction projects – scheduling and monitoring Bar chart – CPM and PERT Network planning – computation of times and floats – their significance.

PART-B
UNIT – V
SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT - VI

DOORS WINDOWS, VENTILATORS AND ROOFS: Panalled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed ventilator-Couple roof – Collar roof – Kind Post truss – Queen post truss.

UNIT – VII
SLOPED AND FLAT ROOF BUILDINGS

UNIT – VIII

Given line diagram with specification to draw, plan, sections section and elevation.

TEXT BOOKS:
1. Building drawing – M.G.Shah, C.M.Kale, S.Y.Patki
2. Planning and Designing and Scheduling- Gurucharan Singh and Jagadish Singh – Standard Publishers.
3. Planning and Designing of Buildings – Y.s.Sane

REFERENCE:
1. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.
2. Building by laws bye state and Central Governments and Municipal corporations.
3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur
4. Building Planning & Drawing by Dr N. Kumaraswamy and A.Kameswara Rao, Charitor Publications.

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II Year B. Tech. CE – II Semester

(1G645) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

List of experiments:

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted rectangular notch and/or triangular notch
5. Determination of coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on Centrifugal pump.
12. Efficiency test on Reciprocating pump.

LIST OF EQUIPMENT:
1. Venturimeter set-up.
2. Orifice meter set up.
3. Small orifice set up.
4. External mouthpiece setup.
5. Rectangular and triangular notch setups.
6. Friction factor test set up.
7. Bernoulli's theorem set up.
8. Impact of jets.
9. Hydraulic jump test setup.
10. Pelton wheel and Francis turbines.
11. Centrifugal and reciprocating pumps.

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II Year B. Tech. CE – II Semester

(1G646) SURVEYING LAB – II

LIST OF EXPERIMENTS:

1. Trigonometric Leveling - Heights and distance problem (Two Exercises)

2. Heights and distance using Principles of tacheometric surveying (Two Exercises)

3. Curve setting – different methods. (Two Exercises)

4. Setting out works for buildings & pipe lines.

5. Determine of area using total station

6. Traversing using total station

7. Contouring using total station

8. Determination of remote height using total station

9. Stake-out using total station

10. Distance, gradient, Diff., height between two inaccessible points using total stations

11. Learning the use of GPS

12. Learning the use of DGPS

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III Year B. Tech. CE – I Semester

(1GA51) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to CE, ECE and ME)

UNIT I
INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics – Relationship with other functional areas (Accounting, Marketing, HR, Production and Operations) of decision making - Basic Economic Principles - Opportunity Cost, Incremental Concept, scarcity, Marginalism, Equi-marginalism, Time perspective, Discounting principle, Risk and Uncertainty.

UNIT II
DEMAND ANALYSIS: Meaning and types of demand – Determinants of demand - Law of Demand and its exceptions. Definition, types and measurement of elasticity of demand – Supply function and Elasticity of Supply - Demand Forecasting methods: Survey Methods - Consumers Survey Method, Sales force opinion method, experts opinion method - Statistical Methods: Trend Projection, Barometric, Regression, Simultaneous Equation method.

UNIT III
PRODUCTION AND COST ANALYSIS: Production Function, Cobb - Douglas Production function - Isoquants and Isocosts curves – MRTS - Least Cost Combination of Inputs - Laws of Returns, Internal and External Economies of Scale - Cost concepts, Determinants of cost, cost-output relationship in short run and Long run - Break-even Analysis (BEA): Objectives, Assumptions, Importance, Graphical representation, Limitations (Simple Numerical Problems).

UNIT IV
MARKET STRUCTURE AND PRICING METHODS: Competitive structure of markets – Perfect competition - Monopoly, Monopolistic and Oligopoly Markets - Price-output determination under perfect competition and monopoly in Long run and short run.
Pricing Methods: Cost Plus Pricing - Marginal Cost Pricing - Sealed Bid Pricing - Going Rate Pricing - Limit Pricing - Market Skimming Pricing - Penetration Pricing - Two-Part Pricing - Block Pricing - Bundling Pricing - Peak Load Pricing.

UNIT V
TYPES OF BUSINESS ORGANIZATIONS: Forms of Business Organizations – Need and role of public and private sector business organization - Types, Features, Merits and Demerits of public and private sector business organizations – Problems and remedies of public sector business organizations.

UNIT VI
CAPITAL AND CAPITAL BUDGETING: Capital and its significance - Types of Capital - Sources of Raising Capital – Features of Capital budgeting - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method, Profitability index and Internal rate of return method (Simple problems).

UNIT VII
FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

UNIT VIII
 FINANCIAL ANALYSIS THROUGH RATIOS: Financial Ratios and its significance - Liquidity Ratios: Current Ratio, quick ratio and Absolute quick ratio - Turnover Ratios: Inventory turnover ratio, Debtors Turnover ratio, Working Capital Turnover ratio, Creditors Turnover ratio, Fixed Assets Turnover ratio - Solvency Ratios: Debt- Equity ratio, Interest Coverage ratio and Debt to total funds ratio -Profitability ratios: Gross Profit Ratio, Net Profit ratio and Proprietary ratio.

TEXT BOOKS:
1. Mehta P.L., *Managerial Economics-Analysis, Problems, Cases*, S Chand and Sons, New Delhi, 2001.
2. Dwivedi, *Managerial Economics*, Vikas , 6th Ed.
3. S.N.Maheswari & S.K. Maheswari, *Financial Accounting*, Vikas.
4. M.E.Thukaram Rao., *Accounting for Managers*, New Age International Publishers.

REFERENCE BOOKS:
1. Varshney & Maheswari, *Managerial Economics,* Sultan Chand, 2003.
2. T.S. Reddy and Y.Hari Prasad Reddy, *Accounting and Financial Management*, Margham Publications.
3. Ambrish Gupta, *Financial Accounting for Management*, Pearson Education, New Delhi.
4. S. A. Siddiqui & A. S. Siddiqui, *Managerial Economics & Financial Analysis*, New age International Space Publications ess.
5. Narayanaswamy, *Financial Accounting—A Managerial Perspective*, PHI
    6. Truet and Truet, *Managerial Economics:Analysis, Problems and Cases*, Wiley.

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III Year B. Tech. CE – I Semester

(1G651) STRUCTURAL ANALYSIS - II

UNIT I
ARCHES: Three hinged arches, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

UNIT – II
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-III
SLOPE DEFLECTION METHOD:-Analysis of single bay, single storey, portal frame including side sway.

UNIT – IV
MOMENT DISTRIBUTION METHOD– Stiffness and carry over factors – Distribution factors – Analysis of single storey portal frames – including Sway - Substitute frame analysis by two cycle method.

UNIT – V
KANI`S METHOD:-
Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames with side sway by Kani's method.

UNI T – VI
FLEXIBILITY METHODS:- Flexibility methods, Introduction, application to continuous beams including support settlements.

UNIT – VII
STIFFNESS METHOD: - Introduction, application to continuous beams including support settlements.

UNIT – VIII

PLASTIC ANALYSIS: Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment –
Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:
1. Analysis of Structures – Vol. I & 2 by Bhavikatti, Vikas publications
2. Analysis of structures by Vazrani & Ratwani – Khanna Publications.
3. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi
4. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi
5. Structural Analysis by D.S.Prakasha Rao, Univ.Press, Delhi.
6. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

REFERENCES:
1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Theory of structures by Ramamuratam, jain book depot, New Delhi.
3. Structural analysis – Hibbler, 6th edition – Pearson publications.
   Structural analysis by R.S.Khurmi, S.Chand Publications, New Delhi.
4. Analysis Of Structures By Dev Das Menon – John wiley publications

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III Year B. Tech. CE – I Semester

(1G652) ENGINEERING GEOLOGY

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

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

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

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

UNIT – V
GROUNDWATER, EARTHQUAKE AND LANDSLIDES: Groundwater – Water table – Common types of groundwater – Springs – Cone of depression – Geological controls of groundwater movement – Groundwater exploration – Hydrological properties of rocks: porosity, permeability, storativity, specific yield and specific retention Earthquakes, their causes and effects - shield areas and seismic zones – Seismic waves - Richter scale - Precautions to be taken for building construction in seismic areas – Landslides, their causes and effect - Measures to be taken to prevent their occurrence.

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

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

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

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

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

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III Year B. Tech. CE – I Semester

(1G653) ENGINEERING HYDROLOGY - I

UNIT –I

INTRODUCTION:- Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of
rain gauges, computation of average rainfall over a basin, processing of rainfall data.

UNIT-II

ABSTRACTION FROM RAINFALL – I:- Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-III

ABSTRACTION FROM RAINFALL – II: - Runoff-components of runoff, factors affecting runoff, stream gauging, effective rainfall, separation of base flow.

UNIT-IV

HYDROGRAPHY:- Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph. Design Discharge, Computation of design discharge-rational formula, SCS method

UNIT-V

GROOUND WATER:- Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, radial flow to wells in confined and unconfined aquifers.

UNIT-VI

IRRIGATION-I: - Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water,
Indian agricultural soils, methods of improving soil fertility, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VII

IRRIGATION-II:- Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VIII

CANALS:- Classification of canals, design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, canallining.

TEXT BOOKS:
1. Engineering Hydrology by Jayarami Reddy, Laxmi publications pvt. Ltd., New Delhi
2. Irrigation and water power engineering by Punmia& Lal, Laxmi publications pvt. Ltd., New Delhi
3. Engineering Hydrology by K.Subramanya, The Tata Mcgraw Hill Company, New Delhi

REFERENCES:
1. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
2. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
3. Engineering Hydrology by c.s.p.ojha ,Oxford Pubilishers, New Delhi
4. Applied Hydrology by Ven Te Chow, David R.maidment and Larry W.Mays, The Tata Mcgraw Hill Edition, New Delhi.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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III Year B. Tech. CE – I Semester

(1G654) ENVIROMENTAL ENGINEERING – I

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

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

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

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

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

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

UNIT – VII

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

UNIT – VIII

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

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

REFERENCES
1. K.N. Duggal, Elements of Environmental Engineering, 1st Edition, S.Chand Publishers, New Delhi, 2010.
2. Nazih K. Shammas and Lawrence K. Wang, Fair, Geyer and Okun's Water and Waste Water Engineering: Water Supply and Wastewater Removal, 3rd Edition, John Wiley and Sons, New Delhi, 2011.
3. H.S. Peavy and D.R.Rowe, Environmental Engineering, 1st Edition,McGraw-Hill Publishing Company, New York, 1984.
4. B.C. Punmia, Ashok Jain and Arun Jain, Water Supply Engineering, 2nd Edition, Laxmi publications Pvt. Ltd., New Delhi, 2005.

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III Year B. Tech. CE – I Semester

(1G655) DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES

UNIT –I
INTRODUCTION: Introduction to Materials, Constituents of concrete, recommendation in IS 456 – 2000, grades of concrete, working stress method, design constants; singly reinforced beam.

UNIT –II
INTRODUCTION OF LIMIT STATE DESIGN: Concepts of limit state design – Comparison between two methods- Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of
Resistance

UNIT –III
BEAMS: Limit state design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – IV
SHEAR, TORSION AND BOND: Limit state design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, including detailing.

UNIT – V
COLUMNS: Short and long columns – under axial loads, uni-axial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

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

UNIT – VII
SLABS: Design of one way slab - Two-way slab, continuous slab Using I S Coefficients.

UNIT –VIII

SERVICEABILITY: Limit state design of serviceability for deflection, cracking and codal provision.

NOTE: All the designs to be taught in Limit State Method
Following plates should be prepared by the students.
1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way and continuous slabs

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS:
1. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
2. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers
3. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
4. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad
5. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
6. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
7. Design of concrete structures by J.N.Bandopadhyay –PHI Publications, New Delhi.
8. Relevant IS codes such as IS 456 – 2000 etc.

REFERENCES:

1. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
2. Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi
3. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi
4. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers
5. Design of concrete structures – Arthus H.Nilson,David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.

Codes/Tables: IS 456-2000 and IS-800 code books to be permitted into the examinations Hall.

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III Year B. Tech. CE – I Semester

(1GC53) SOFT SKILLS – II
(Common to CSE, IT and ME)

ENGLISH FOR COMPETITIVE EXAMINATIONS

CORRECT ENGLISH USAGE: Articles – Prepositions – Tenses – Voice – Error spotting and correcting – Sentence improvement.

VOCABULARY: Synonyms – Antonyms – Analogy – Confusable Words.

ENGLISH PROFICIENCY: One-word substitutions – Idioms and Phrases – Homonyms – Spellings.

LOGIC-BASED ENGLISH LANGUAGE: Rearrangement of jumbled words and jumbled sentences – word pairs – sentence completion.

COMPREHENSION ABILITY: Reading comprehension – Cloze tests.

REFERENCE BOOKS:

1. R. S. Agarwal, *Objective English*. S. Chand Publishers.
2. Hari Prasad, *Objective English for Competitive Exams*. TMH.
3. Collins Cobuild, *English Guides: Confusable Words*.

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III Year B. Tech. CE – I Semester

(1GC51) ADVANCED ENGLISH COMMUNCATION SKILLS LAB

RESUME PREPARATION

Structure, formats and styles – planning - defining career objective - projecting one's strengths and skills - creative self marketing–sample resumes - cover letter.

INTERVIEW SKILLS

Concept and process - pre-interview planning – preparation - body language - answering strategies – frequently asked questions

GROUP DISCUSSION

Communicating views and opinions – discussing – intervening – agreeing and disagreeing –asking for and giving clarification - substantiating - providing solution on any given topic across a cross-section of individuals - modulation of voice and clarity - body language – case study.

ORAL PRESENTATIONS (INDIVIDUAL)

Collection of data from various sources –planning, preparation and practice – attention gathering strategies -transition – handling questions from audience.

ORAL PRESENTATIONS (TEAM)

Appropriate use of visual aids – Using PowerPoint for presentation.

READING COMPREHENSION

Reading for facts – scanning – skimming - guessing meanings from context– speed reading.

LISTENING COMPREHENSION

Listening for understanding - responding relevantly.

MINIMUM REQUIREMENTS:

Advanced English Language Communication Skills Lab is conducted at two places:

- Computer-aided Language Lab with 60 computer machines, one teacher console, LAN facility and Language Learning software for self-study.
- Communication Skills Lab with movable chairs, a discussion room, Public Address System, a Television, a DVD Player, a camcorder, an LCD Projector and a computer machine.
- Manual cum Record, prepared by Faculty Members of English of the college will be used by students.

SUGGESTED SOFTWARE:

- It's your Job published by Clarity.
- Business Writing published by Clarity.
- Active Listening published by Clarity.
- Active Reading published by Clarity.
- Software published by Globerana.
- Cambridge Advanced Learner's Dictionary.
- Oxford Advanced Learner's Dictionary.

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III Year B. Tech. CE – I Semester

(1G656) ENGINEERING GEOLOGY LAB

LIST OF EXERCISES

1. Study of physical properties and identification of rock forming minerals.

2. Study of physical properties and identification of ore forming minerals.

3. Megascopic identification of common igneous rocks.

4. Megascopic identification of common sedimentary rocks.

5. Megascopic identification of common metamorphic rocks.

6. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.

7. Simple structural geology problems.

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III Year B. Tech. CE – II Semester

(1G661) ENGINEERING HYDROLOGY – II

UNIT-I

DAMS : Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-III

EARTH DAMS: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

UNIT-IV

SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.

UNIT-V

DIVERSION HEAD WORKS: Types of Diversion head works-diversion and torage head works, weirs and barrages, layout of diversion head works, Components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floorsusing Bligh's and Khosla's theory, exit gradient, functions of U/s and d/s sheet piles.

UNIT-VI

CANAL STRUCTURES I: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-VII

CANAL STRUCTURES II: canal regulation works, principles of design of distributory and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-VIII
CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:
1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers
4. Irrigation and Water Power Engineering by Punmiaand Lal, Laxmi Publications, New Delhi

REFERENCES:
1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
4. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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III Year B. Tech. CE – II Semester

(1G662) ENVIRONMENTAL ENGINEERING – II

UNIT – I
Air Pollution – sources of pollution – Classification – effects on human beings – Global effects of Air pollution–Air emission standards.

UNIT – II
Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emission.

UNIT –III
Basic Theories of Industrial Waste water treatment – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning– Nitrification and Denitrification – Removal of Phosphates–effluent standards.

UNIT – IV
Solid waste Management – sources, composition and properties of solid waste – 4 R's: reduce, reuse, recycle, recovery –collection and handling – separation and processing.

UNIT – V
Solid waste disposal methods – Land filling – Incineration – composting.

UNIT – VI
Hazardous Waste – Nuclear waste – Biomedical wastes – Chemical wastes – Effluent – Disposal and Control methods.

UNIT – VII
Special Wastes/Pollutants of Concern – Plastic waste – e-waste – sources – classification – management – recycling and treatment – Introduction to persistent organic pollutants and emerging pollutants

UNIT – VIII
Noise Pollution – effects of noise and control methods – Environmental Audit – ISO – 14000 –Environmental Protection Act –Air Act – Water Act

TEXT BOOKS:
1. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education.
2. Environmental Engineering and Management – Dr.Suresh K.Dhameja – S.K.Kartarai & Sons 2nd Edition 2005.
3. Environmental Pollution Control Engineering by C.S Rao

REFERENCES:
1. Physico – Chemical process for water quality control by Weber
2. Air Pollution and Control by MN Rao & H.N.Rao
3. Solid Waste Engineering by Paarne Vesilind, Willaiam, Cengage Publications,
   New Delhi.
4. Environmental Engineering by Peavy, Rowe and Tchobanoglous, Tata Mc Graw
   Hill publications
5. Central Pollution Control Board (http://cpcb.nic.in/) and Andhra Pradesh Pollution Control Board *http://www.appcb.ap.nic.in/main/index_flat1.php) Web sites

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III Year B. Tech. CE – II Semester

(1G663) DESIGN & DRAWING OF STEEL STRUCTURES

UNIT – I
WELDED CONNECTIONS: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections.

UNIT – II
BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT –III
TENSION AND COMPRESSION MEMBERS: General Design of members subjected to direct tension and bending – effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

UNIT – IV
DESIGN OF BUILT UP MEMBERS: - Design of Built up compression members – Design of lacings and battern. Design Principles of Eccentrically loaded columns splicing of columns.

UNIT – V
DESIGN OF COLUMN FOUNDATIONS: Design of slab base and gusseted bases. Column bases subjected to moment.

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

UNIT – VII
PLATE GIRDER: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates stiffeners – splicings and connections.

UNIT – VIII

GANTRY GIRDER: Gantry girder impact factors – longitudinal forces, Design of Gantry girders.

Note: The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of Compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base

Plate 5 Detailing of steel roof trusses including particulars at joints.

Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS

1. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad
2. Design of Steel Structures by Ramachandra. Vol – 1, Universities Press. Hyderabad
3. Steel Structures by Subramanyam.N, Oxford Higher Education, New Delhi
4. Limit State Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.
5. Design of Steel Structures by K.S.Sai Ram , Pearson Pubilishers.
6. Design of steel structures by Bhavikatti.

REFERENCES

1. Comprehensive Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
4. Design of Steel Structures by M.Raghupathi, TataMc. Graw-Hill
5. Design of Steel Structures by Edwin Gaylord, Charles Gaylord, James Stallmeyer, Tata Mc.Graw-Hill, New Delhi.

Codes/Tables:
IS Codes:
1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.
4) Railway Design Standards Code.
   and steel tables to be permitted into the examination hall.

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III Year B. Tech. CE – II Semester

(1G664) GEOTECHNICAL ENGINEERING – I

UNIT – I
INTRODUCTION: Soil formation – soil structure and clay mineralogy– Adsorbed water – Mass- volume relationship – Relative density.

UNIT – II
INDEX PROPERTIES OF SOILS: Moisture Content, Specific Gravity, Insitu density, Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT –III
PERMEABILITY: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting – laboratory determination of coefficient of permeability –Permeability of layered systems.

UNIT –IV
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – V
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Wester gaard's theories for point loads and areas of different shapes – Newmark's influence chart.

UNIT – VI
COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction control.

UNIT – VII
CONSOLIDATION: stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation – Terzaghi's Theory.

UNIT – VIII
SHEAR STRENGTH OF SOILS: Mohr – Coulomb Failure theories – Types of laboratory strength tests – strength testsbased on drainage conditions – Shear strength of sands – Critical Void Ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:
1. Basic and Applied Soil Mechanics by Gopal Ranjan& ASR Rao, New age International Pvt . Ltd, New Delhi
2. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
3. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
4. Geotechnical Engineering V.N.S.Murthy, CRC Press, Newyork, Special Indian Edition.

REFERENCES:
1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.
3. Geotechnical Engineering by Brije.M.Das, Cengage Publications, New Delhi.
4. Geotechnical Engineering by Purushotham Raj
5. Geotechnical Engineering by Manoj Dutta & GulatiS.K – Tata Mc.Grawhill Publishers New Delhi.

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III Year B. Tech. CE – II Semester

(1G665) TRANSPORTATION ENGINEERING

UNIT I
HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II
HIGHWAY GEOMETIC DESIGN: Importance of Geometric Design- Design controls andCriteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Superelevation and Extra
widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III
TRAFFIC ENGINEERING: Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relation - Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

UNIT – IV
TRAFFIC REGULATION AND MANAGEMENT: Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Specifications - Design of Traffic Signals –Webster Method – IRC Method – Numerical problems.

UNIT – V
INTERSECTION DESIGN: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives – Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – VI

PAVEMENT DESIGN: Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement components – Design Factors – Flexible pavement

Design methods – G.I method, CBR Method, Tri-axial method – Numerical examples – Design of Rigid pavements – Critical load positions - Westergaard's stress equations – computing Radius of Relative stiffness and equivalent radius of resisting section – stresses in rigid pavements – Design of Expansion and contraction joints in CC pavements. Design of Dowel bars and Tie bars.

UNIT – VII

INTRODUCTION TO AIR PORT ENGINEERING: Factors affecting airport site selection – Surveys for site selection – Aircraft characteristics and their influence on design elements – Planning of Terminal area – Typical Air port layouts.

UNIT – VIII

RUNWAY AND TAXIWAY DESIGN: Orientation of runway – Use of wind rose diagram – Runway length and corrections to be applied – Numerical examples for computation of runway length – Geometric elements of runway – Design standards and specifications – Geometric design of Taxiways – Standards and specifications – Runway lighting system.

TEXT BOOKS:
1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
3. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.
4. Airport Engineering by Rangwala, Charoter Publications, Anand.
5. A Text book of Transportation Engineering by S.P.Chandola, S.Chand Publications, New Delhi.

REFERENCES:
1. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition – 1997.
3. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers (1999).
4. Introduction to Transportation Engineering by James.H.Banks, Tata Mc.Grawhill Edition, New Delhi
5. Traffic and Highway Engineering Nicholas.J.Garber &Lester A.Hoel
6. High way engineering by Paul .H.Wright & Karen K.Dixon,wiley india limited

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III Year B. Tech. CE – II Semester

(1G666) ESTIMATION AND QUANTITY SURVEYING
UNIT – I
GENERAL ITEMS OF WORK IN BUILDING : Standard Units Principles of working out quantities for detailed and abstract estimates – Calculation of quantities of brick work, RCC, PCC, Plastering, whitewashing, colour washing and painting/varnishing for shops, rooms, residential building with flat and pitched roof –Approximate method of estimating.

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

UNIT – III
ROADS AND CANALS: Roads: Estimate of bituminous and cement concrete - Estimate of earthwork - Estimate of pitching of slopes - Estimate of earthwork of road from longitudinal sections - Estimate of earthwork in hill roads.
Canals: Earthwork in canals – Different cases – Estimate of earthwork in irrigation channels.

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

UNIT-V
REINFORCEMENT BAR SCHEDULE: Reinforcement bar bending and bar requirement schedules.

UNIT – VI

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

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

UNIT – VII

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

UNIT – VIII

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

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

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

III Year B. Tech. CE – II Semester

(1G667) ENVIRONMENTAL ENGINEERING LAB

1. Determination of Acidity and Alkalinity

2. Determination of Chlorides

3. Determination of Dissolved Oxygen

4. Estimation of Sulphates

5. Determination of pH and Estimation of Conductivity

6. Determination of Turbidity

7. Estimation of Hardness of water by EDTA Titration Method

8. Determination of Available Chlorine in Bleaching Powder, Residual Chlorine, Break Point Chlorination and Chlorine Demand.

9. Optimum Coagulant Dose by Jar Test Apparatus

Analysis of Wastewater Quality Parameters

1. Determination of Total solids, settelable solids, dissolved solids and volatile Solids.

2. Determination of DO and theoretical aspects of BOD

3. Determination of Ammonia–nitrogen and Nitrates.

4. Estimation of Phosphates

Text Book
1. Sawyer, N.C., and McCarty, P.L., "Chemistry for Environmental Engineering", 5th Edn. McGraw-Hill Book Co., New York., 1985.
Reference Book: "Standard Methods for the Examination of Water and Waste Water", APHA-AWWAWPCF, 25th Edn., Washington (D.C), 1995

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III Year B. Tech. CE – II Semester

(1G668) GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS
1.   Atterberg's Limits.
2.   Field density-core cutter and sand replacement method
3.   Grain size analysis
4.   Permeability of soil, constant and variable head test
5.   Compaction test
6.   CBR Test
7.   Consolidation test
8.   Unconfined compression test
9.   Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Any eight experiments may be completed.

LIST OF EQUIPMENT:
1.   Casagrande's liquid limit apparatus.
2.   Apparatus for plastic and Shrinkage limits
3.   Field Density apparatus for
     a) Core cutter method
     b) Sand Replacement method
4.   Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 0.15mm, and 0.075mm.
5   Hydrometer
6   Permeability Apparatus for
     a) Constant Head test
     b) Variable Head test
7.   Universal Auto compactor for I.S light and heavy compaction tests.
8   Apparatus for CBR test
9   Sampling tubes and sample extractors.
10   Tons loading frame with proving rings of 0.5tons and 5 tons capacity
11   One dimensional consolation test apparatus withall accessories.
12. Tri-axial cell with provision for accommodating38 mm dia specimens.
13. Box shear test apparatus
14. Laboratory vane shear apparatus.
15. Hot Air ovens (Range of Temperature 50-150^{0}C
16. Moisture cans – 2 dozens.

17. Electronic balances pf 500 g capacity with 0.01g least count and 5 kg capacity with least count of 1gm
18. Measuring Jars - 1000CC- 6 - 100CC- 4
19. Mercury - 500 g
20. Rammers - 2
    Crow bars – 2

TEXT BOOKS:
1. Soil Testing Lab Manual by K.V.S. Appa Rao & V.C.C.Rao, University Science Press , Laxmi Publication.
2. Soil Testing for Engineers by S.Mittal and J.P.Shukla, Kahna Publishers, New Delhi.
3. Relevant IS Codes.

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IV Year B. Tech. CE – I Semester

(1G671) GEOTECHNICAL ENGINEERING-II

UNIT – I
SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II
EARTH SLOPE STABILITY: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III
EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Rebhann's and Culmann's graphical method

UNIT-IV
RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – V
SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi`s, Meyerhoff's and Skempton`s Methods.

UNIT-VI
ALLOWABLE BEARING PRESSURE: Safe bearing pressure based on N-value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures – Settlement Analysis

UNIT –VII
PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT-VIII
WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:
1. Soil Mechanics and Foundation Engineering by Arora, Standard Publishers and Distributors, Delhi
2. Geotechnical Engineering by C.Venkataramaiah,
3. Foundation Engineering by V.N.S.Murthy, CRC Press, New Delhi.
4. Soil Mechanics and Foundations by – by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi

REFERENCES:
1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
2. Bowles, J.E., (1988) Foundation Analysis and Design– 4thEdition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran,Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy
6. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.

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IV Year B. Tech. CE – I Semester

(1G672) FINITE ELEMENT METHODS IN CIVIL ENGINEERING

UNIT –I
INTRODUCTION: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

UNIT –II
PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT –III
ONE DIMENSIONAL ELEMENTS: Stiffness matrix for bar element – shape functions for one dimensional elements – one dimensional problems.

UNIT –IV
TWO DIMENSIONAL ELEMENTS: Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT –V
GENERATION OF ELEMENT: Generation of element stiffness and nodal load matrices for 3-node triangular element and four noded rectangular elements.

UNIT –VI
ISOPARAMETRIC FORMULATION:
Concepts of, isoparametric elements for 2D analysis –formulation of CST element, 4 –Noded and 8-noded iso-parametric quadrilateral elements – Lagrangian and Serendipity elements.

UNIT-VII
AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4- noded iso-parametric axi-symmetric element.

UNIT-VIII
SOLUTION TECHNIQUES: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:
1. Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite Element methods for Engineers by U.S.Dixit, Cengage Publishers, New Delhi.
4. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
5. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers

REFERENCES:
1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi
3. Applied Fem by Rammurthy, I.K.International Publishers PVt. Ltd., New Delhi.
4. Fem by J.N.Reddy, Mcjraw, TMH Publications, New Delhi.

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IV Year B. Tech. CE – I Semester

(1G673) BRIDGE ENGINEERING

UNIT - I
INTRODUCTION: Importance of site investigation in Bridge design. Highway Bridge loading standards. Impact factor. Railway Bridge loading standards (B.G. ML Bridge) various loads in bridges.

UNIT - II
BOX CULVERT: General aspects. Design loads, Design of Box culvert subjected to RC class AA tracked vehicle only.

UNIT - III
DECK SLAB BRIDGE: Introduction – Effective width method of Analysis Design of deck Slab Bridge (Simply supported) subjected to class AA Tracked Vehicle only.

UNIT – IV
BEAM & SLAB BRIDGE (T-BEAM BRIDGE): General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT – V
PLATE GIRDER BRIDGE: Introduction – elements of a plate girder and their design. Design of a Deck type welded plate girder – Bridge of single line B.G.

UNIT – VI
COMPOSITE BRIDGES: Introduction – Advantages – Design of Composite Bridges consisting of RCC slabs over steel girders' including shear connectors

UNIT – VII
BRIDGE BEARINGS:
General features – Types of Bearings – Design principles of steel Rocker & Roller Bearings – Design of a steel Rocker Bearing – Design of Elastometric pad Bearing.

UNIT VIII

PIERS & ABUTMENTS: General features – Bed Block – Materials piers & Abutments Types of piers – Forces acting on piers – Stability analysis of piers – General features of Abutments – forces acting on abutments – Stability analysis of abutments – Types of wing walls – Approaches – Types of Bridge foundations (excluding Design).

TEXT BOOKS:
1. Bridge Engineering by Ponnu Swamy, TATA Mcgraw Hill Company, New Delhi.
2. Design of Bridges by N.Krishnam Raju, Oxford & IBH, Publishing Company Pvt.ltd., Delhi.
3. Design of Bridges Structure by T.R.Jagadish & M.A.Jayaram Prentice Hall of India Pvt., Delhi.
4. Design of Bridges Structure by D.J.Victor
5. Relevant – IRC & Railway bridge Codes.

REFERENCE:-
1. Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
2. Design of Steel structures by Ramachandra.
3. Design of R.C.C. structures B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.

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IV Year B. Tech. CE – I Semester

(1G674) CONCRETE TECHNOLOGY

UNIT I
CEMENTS & ADMIXTURES: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrated cement – Test`s on physical properties – Different grades of cement – Admixtures – Mineral and chemical admixtures.

UNIT – II
AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III
FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – IV
HARDENED CONCRETE : Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.

UNIT – V
TESTING OF HARDENED CONCRETE: Compression tests –Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – VI

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity –nDynamic modulus of elasticity Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – VII

MIX DESIGN : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – ACI method & IS 10262 method

UNIT – VIII

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C – Applications – Polymer concrete – Types of Polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete – SIFCON – Bacterial concrete(self healing concrete).

TEXT BOOKS:
1. Properties of Concrete by A.M.Neville – Pearson publication – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004
3. Concrete Technology by A.M.Neville – Pearson publication

REFERENCES:
1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Non-Destructive Test and Evaluation of materials by J.Prasad & C.G.K. Nair Tata Mcgraw hill Publishers, New Delhi

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IV Year B. Tech. CE – I Semester

(1G675) EARTHQUAKE RESISTANT DESIGN
(ELECTIVE – I)

UNIT – I
Introduction to Structural Dynamics: – Theory of vibrations – Lumped mass and continuous mass systems –Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – II
Multi-Degree of Freedom (MDOF) Systems: - Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – III
Earthquake Analysis: - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storied buildings – Use of response spectra.

UNIT – IV
Codal Design Provisions : - Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT – V
Earthquake Engineering : - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

UNIT – VI

Codal Detailing Provisions: - Review of the latest Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT – VII

Aseismic Planning : - Plan Configurations – Torsion Irregularities – Re-entrant corners – Non-parallel systems – Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities – Vertical Geometric Irregularity – Proximity of Adjacent Buildings.

UNIT – VIII

Shear walls: - Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

TEXT BOOKS:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

REFERENCES:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz.
IS Codes: IS: 1893, IS:4326 and IS:13920.

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IV Year B. Tech. CE – I Semester

(1G676) RAILWAYS, DOCKS & HARBOR ENGINEERING
(ELECTIVE –I)

UNIT – I
INTRODUCTION TO RAILWAY ENGINEERING: Permanent way components – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails-Theories related to creep – Adzing of Sleepers- Sleeper density.

UNIT – II
GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs.

UNIT- III
STATIONS AND YARDS: Introduction-purposes of a rail way station – selection of a site for a
railway station – types of railway station ,PLAT FORMS – Definition of a yard – types of yards – level crossing— signaling systems and inter locking – staff quarters – goods traffic at way side stations.

UNIT – IV
TUNNELLING: Definition – types of tunneling – Drainage in tunnels – ventilation of tunnels – lining of tunnels – underground railways – tube railways – maintenance of rail way tunnels.

UNIT – V
HISTORICAL DEVELOPMENT OF PORTS HARBOURS AND DOCKS: Introduction – Early Period of Travellers – Mediterranean Harbours – Cretan Harbours – Phasor Harbours Phoenician Harbours – Greek harbors – Roman Harbours – Eighteenth Centrury Harbours – Slipways and Dry Docks – Dredging Machines – Historical Development of Bombay Port.

UNIT – VI

HARBOURS , DOCKS AND BREAK WATER: Introduction – Natural Harbours – Artificial Harbours – Size of Harbours – Open Berths – Docks Shape of Docks and Basins – Design and Construction of Basin or Dock Walls – Dock Entrances and Entrance Locks – Classification of Breakwaters – Upright Wall Breakwater – Mound With Super structure Water Breaker – Mound Breakwaters.

UNIT – VII

JETTIES, LANDING STAGES AND WHARVES : Jetties – Piled and Open Jetties – Piled and Cylinder Jetties – Scrled Cylinder Jetties – Scrled Cylinders in Jetties – Spring Fenders – Dolphins – Floating Landing Stages – Wharves – Masonry or Mass Concrete Walls – Wall on Wells – Wall of precast block.

UNIT – VIII

DREDGING AND MAINTENANCE : Introduction – Types of Dredgers – Bucket or Ladder Dredger – Sand Pump or Hydraulic Dredger or Cutter Dredger – Grab Dredger – Rock Dredger – Dipper Dredger – Hopper Barge – Maintenance of Buildings – Protection of Timber Piles – Maintenance of Lock Gates and Caissans – Maintenance Fresh Water, Hydraulic and Electric Mains – soundings – Organization of Maintenance.

TEXT BOOKS:

1. Railway Engineering by Rangwala Chrotar Publisihing House, Anand.
2. Railway Engineering – A text book Transportation Engineering by S.P.Chandola, S. Chand and Co Ltd.
3. Docks and Harbour Engineering – Text book of Transport Engineering Vol.II by V.N. Vazirani and S.P. Chandola , Khanna Publishers, New Delhi.
4. Railway Engineering by Chandra and Agrawal, Oxford Publishers, New Delhi

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IV Year B. Tech. CE – I Semester

(1G677) TRAFFIC ENGINEERING
(Elective – I)

UNIT-I:
TRAFFIC CHARACTERISTICS: Basic characteristics of Traffic- Volume, Speed and Density- Relationship among Traffic parameters.

UNIT-II:
TRAFFIC MEASUREMENT: Traffic Volume Studies-Objectives- Types of Volume Studies –Concept of PCU- Data Collection and Presentation – Speed Studies – Types of Speeds- Objectives of Speed Studies- Methods of Conducting speed studies- Data collection and Presentation- Statistical Methods for Analysis of Speed Data.

UNIT-III:
HIGHWAY CAPACITY: Definition of Capacity – Importance of capacity – Factors affecting Capacity- Concept of Level of Service- Different Levels of Service- Concept of Service Volume- Peak Hour Factor.

UNIT-IV:
PARKING STUDIES: Types of parking facilities – On street and Off Street Parking Facilities- Parking Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking characteristics- Multi Story Car Parking Facility-Design standards.

UNIT-V:
TRAFFIC CONTROL & REGULATION: Traffic Problems in Urban areas- Importance of Traffic Control and regulation- Traffic Regulatory Measures- Channelization- Traffic Signals- Saturation Flow - Signal Design by Webster Method – Signal Phasing and Timing Diagrams.

UNIT-VI:
TRAFFIC & ENVIRONMENT: Detrimental effect of traffic on environment – Air Pollution – Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

UNIT-VII:
TRAFFIC SIGNS AND ROAD MARKINGS: Types of Traffic Signs-cautionary, Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings – Lane markings and Object markings- Standards and Specifications for Road Markings.

UNIT-VIII:
HIGHWAY SAFETY: Problem of Highway Safety – Types of Road accidents- Causes – Engineering Measures to reduce Accidents- Enforcement Measures – Educational Measures- Road Safety Audit- Principles of Road Safety Audit.

TEXT BOOK:
1. Traffic Engineering and Transportation planning – LK kadiyali – Khanna publishers.

REFERENCES:-
1 Transportation Engineering – An Introduction – C. J. Khisty, Prentice Hall
2. Principles of Transportation Engineering – Partha Chakroborthy, Animesh Das – Prentice Hall of India.
3. Fundamentals of Transportation Engineering - C.S. Papacostas, Prentice Hall(India).
4. Highway Engineering and Traffic Analysis-Mannering and Kilareski, John wiley Publications.

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IV Year B. Tech. CE – I Semester

(1G678) CONSTRUCTION PLANNING &PROJECT MANAGEMENT
(Elective – I)

UNIT – I
MASONRY AND FOUNDATIONS: Masonry: Types of masonry – English and Flemish bonds – Rubble and Ashlar masonry – Cavity walls – Partition walls.
Foundations: Foundations: Shallow foundations – Spread, combined, strap and mat footings.

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

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

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

UNIT – V
RESOURCE MANAGEMENT: Manpower: Resource smoothing – Resource leveling – Establishing workers productivity. Materials: Objectives of material management – Costs – Functions of material management departments – ABC classification of materials – Inventory of materials – Material procurement – Stores
management. Machinery : Classification of construction equipment – Earth moving equipment - Excavation equipment - Hauling equipment – Earth compaction equipment - Hoisting equipment - Concreting plant and equipment – Time and motion study – Selection of equipment – Task consideration – Cost consideration – Factors affecting the selection - Factors affecting cost owning and operating the equipment – Equipment maintenance.

UNIT – VI
PROJECT MANAGEMENT, BAR CHARTS AND MILESTONE CHARTS:

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

UNIT – VII
ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK:

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

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

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

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

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IV Year B. Tech. CE – I Semester

(1G679) INDUSTRIAL WASTE ANDWASTEWATERMANAGEMENT
(ELECTIVE –II)

UNIT– I
Quality requirements of boiler and cooling waters –Quality requirements of process water for Textiles– Food processing and Brewery Industries –Boiler and Cooling water treatment methods.

UNIT– II
Basic Theories of Industrial Waste water Management –Volume reduction Strength reduction– Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage–consequent problems.

UNIT– III
Industrial waste water discharges into streams. Lakes and oceans and problems.

UNIT– IV
Recirculation of Industrial Wastes–Use of Municipal Waste Water in Industries.

UNIT– V
Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT– VI
Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methods.

UNIT– VII
Manufacturing Process and design origin of liquid waste from Suger Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT– VIII
Common Effluent Treatment Plants– Advantages and Suitability, Limitations, Effluent Disposal Methods.

TEXT BOOK:

1. Waste Water Treatment by M.N.Rao and Dutta, Oxford& IBH, New Delhi.

REFERENCES:

1. Liquid waste of Industry by Newmerow.
2. Water and Waste Water technology by Mark J. Hammer and MarkJ. Hammer (Jr).

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IV Year B. Tech. CE – I Semester

(1G67A) AIR POLLUTION AND CONTROL
(ELECTIVE –II)

UNIT– I
Air Pollution –Definitions, Scope, Significance and Episodes, Air Pollutants–Classifications– Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution-stationary and mobile sources.

UNIT– II
Effects of Air pollutants on man, material and vegetation: Global effects of air pollution –Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-III
Thermodynamics and Kinetics of Air-pollution– Applications in the removal of gases like SO_x, NO_x, CO, HC etc., air-fuel ratio. Computation and control of products of combustion.

UNIT– IV
Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomenaon Air Quality-wind rose diagrams.

UNIT-V
Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-VI
Control of particulates– Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's –Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT– VII
General Methods of Control of NO_x and SO_x emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT– VIII
Air Quality Management –Monitoring of SPM, SO; NO and CO Emission

Standards.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao– Tata Mc.GrawHillCompany.
2. Air pollution by Wark and Warner.- Harper & Row, NewYork.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S.Publications.

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IV Year B. Tech. CE – I Semester

(1G67B) WATER RESOURCES SYSTEM PLANNING AND MANAGEMENT
(ELECTIVE –II)

UNIT– I
Introduction: concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT– II
Linear programming –I: Formulation Linear programming models, graphical method, simplex method, application of linear programming in water resources.

UNIT– III
Linear programming –II: Revised simplex method, duality in linear programming, sensitivity and past optimality analysis.

UNIT– IV
S Dynamics programming: Belman's of principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic for resource allocation.

UNIT– V
Non-linear optimization techniques: Clerical of method optimization, Kuch-Tucleer, gradential based research techniques for simple unconstrained optimization.

UNIT– VI
Simulation: application of simulation techniques in water resources.

UNIT– VII
Water –resources economics: Principles of Economics analysis benefit cost analysis socioeconomic intuitional and pricing of water resources.

UNIT– VIII
Water resources management: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

TEXT BOOKS:
1. Water Resources System Analysis–Vedula & Mujumdar– Tata Mc.Graw Hill Company Ltd. 2005.
2. Water Resources Economics - James & Lee. Oxford Publishers2005.

REFERENCES:
1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.

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IV Year B. Tech. CE – I Semester

(1G67C) CONSTRUCTION TECHNOLOGY AND PROJECT
MANAGEMENT
(ELECTIVE –II)

UNIT I
FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY:
Definitions and Discussion – Construction Activities – Construction Processes - Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction– Construction Documents – Construction Records – Quality – Safety– Codes and Regulations.

UNIT II
PREPARATORY WORK AND IMPLEMENTATION
Site layout – Infrastructure Development – Construction Methods – Construction Materials – Deployment of Construction Equipment – Prefabrication in Construction – False work and Temporary Works.

UNIT III
3. EARTHWORK : Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trench less (No-dig) Technology – Grading – Dredging.

UNIT IV
EXCAVATION BY BLASTING : Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting.

UNIT V
PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS: Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT net work problems.

UNIT VI
ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK:
Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure –Hierarchies – Illustrative examples – Problems.

UNIT VII
PERT:TIME ESTIMATES & TIME COMPUTATIONS : Introduction – Uncertainties : Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution – Expected time Problems -Earliest expected time – Formulation for T_E - Latest allowable occurrence time – Formulation for T_L - Combined tabular computations for T_E and T_L problems.

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

TEXT BOOKS:
1. Construction Technology by Subir K.Sarkar and Subhajit Saraswati – Oxford Higher Education- Univ. Press, Delhi.
2. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.
3. Construction project management by Jha ,Pearson publications, New Delhi.

REFERENCES:
1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Operations research by P.Sankar Iyer,TMH Pubilications,New Delhi.
3. Operations research by N.Ramanathan,TMH Pubilications,New Delhi.
4. Total Project management, the Indian context- by :P.K.JOY- Mac Millan Publishers India Limited.

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IV Year B. Tech. CE – I Semester

(1G67D) CAD LAB FOR CIVIL ENGINEERS

CAD:
SOFTWARE:
   1. STAAD PRO or Equivalent

EXCERCISIES:

   1. Builiding Drawings: One Exercise

   2. R.C.C Drawings: One Exercise

   3. Bridge Drawings : One Exercise

   4. Steel Drawings : One Exercise

   5. 2-D Frame Analysis and Design

   6. Steel Tabular Truss Analysis and Design

   7. 3-D Frame Analysis and Design

   8. Retaining Wall Analysis and Design

   9. Simple tower Analysis and Design

   10. One Way Slab Analysis & Design

   11. Two Way Slab Analysis & Design

   12. Column Analysis & Design

TEXT BOOK:

   1. Builiding planning & Drawings by DR.N. Kumara Swamy

   2. R.C.C Drawings by Krishna murthy

   3. Computer Aided Design Lab Manual by Dr.M.N.Sesha Prakash And Dr.C.S.Suresh

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IV Year B. Tech. CE – I Semester

(1G67E) CONCRETE AND HIGHWAY ENGINEERING LAB

I   ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II   BITUMINOUS MATERIALS:
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III   CEMENT AND CONCRETES :TESTS ON CEMENTS :
1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:
1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval's Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Penskey – Morten's apparatus
11. Vicat's apparatus
12. Specific gravity bottle.
13. Lechatlier's apparatus.
14. Slump and compaction factor setups
15. Longitudinal compresso meter and 16. Rebound hammer, Pulse velocity machine.

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IV Year B. Tech. CE – II Semester

(1G681) DESIGN AND DRAWING OF IRRIGATION STRUCTURES

Design and drawing of the following irrigation structures

1. Sloping glacis weir.
2. Tank sluice with tower head
3. Type III Syphon aqueduct.
4. Surplus weir.
5. Trapezoidal notch fall.
6. Canal regulator.

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS:
1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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IV Year B. Tech. CE – II Semester

(1G682) ADVANCED STRUCTURAL ENGINEERING

1. Design of a flat slab (Interior panel only)
2. Design of concrete bunkers of circular shape – (excluding staging) – Introduction to silos
3. Design of concrete chimney
4. Design of Intz water tank excluding staging
5. Design of circular and rectangular water tank resting on the ground
6. Design of cantilever and counter forte retaining wall with horizontal back fill
7. Design of grid floor
8. (A) Design of slab less tread – riser stair case.
   (B) Design of Cinema balcony

TEXT BOOKS :-

1. Advanced R.C.C by Krishnam Raju, CBS Publishers & distributors, New Delhi.
2. Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ.Press , New Delhi
3. R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi
4. Advanced RCC by Varghese, PHI Publications, New Delhi.
5. Design of RCC structures by M.L.Gambhir P.H.I. Publications, New Delhi.

Reference Books:-
1. R.C.C Designs by Sushil kumar , standard publishing house.
2. Fundamentals of RCC by N.C.Sinha and S.K.Roy, S.Chand Publications, New Delhi.

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IV Year B. Tech. CE – II Semester

(1G683) REMOTE SENSING AND GIS APPLICATIONS
(ELECTIVE –III)

UNIT – I
Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT – II
Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT – III
Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – IV
Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT – V
Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – VI
GIS Spatial Analysis: Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – VII

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring,
Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael
A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU KAKINADA 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.

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IV Year B. Tech. CE – II Semester

(1G684) GROUND WATER DEVELOPMENT AND MANAGEMENT
(ELECTIVE –III)

UNIT – I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT – II

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

UNIT – III

Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

UNIT – IV

Analysis of Pumping Test Data – II: Unsteady flow towards well – Non equilibrium equations – Thesis solution – Jocob and Chow's simplifications, Leak aquifers.

UNIT – V

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetric applications along with case Studies in Subsurface Investigation.

UNIT – VI

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – VII
Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion
.
UNIT – VIII
Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:
1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

REFERENCES:
1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater Syatem Planning & Managemnet – R.Willes & W.W.G.Yeh, Prentice Hall.
3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers.

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IV Year B. Tech. CE – II Semester

(1G685) GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE –III)

UNIT – I

DEWATERING: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells- foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis.

UNIT –II

GROUTING: Objectives of grouting- grouts and their properties-grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT – III

DENSIFICATION METHODS IN GRANULAR SOILS:- In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT – IV

DENSIFICATION METHODS IN COHESIVE SOILS:– In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – V

STABILISATION: Methods of stabilization-mechanical-cement- lime bituminous- chemical stabilization with calcium chloride, sodium silicate and gypsum.

UNIT – VI

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – VII
GEOSYNTHETICS : Geo textiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT - VIII
EXPANSIVE SOILS: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:
1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Dr.P.Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi / University science press, New Delhi

REFERENCES:
1. Moseley M.P. (1993) Ground Improvement, Blackie Academicand Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, USA

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IV Year B. Tech. CE – II Semester

(1G686) ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT
(ELECTIVE –III)

UNIT – I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives.

UNIT-IV

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – V

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT – VI

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-VII

Post Audit activities, The Environmental pollution Act, The water Act, The Air

(Prevention & Control of pollution Act.), Mota Act, Wild life Act.

UNIT-VIII
Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:
1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:
1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania & Sons Publication., New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

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IV Year B. Tech. CE – II Semester

(1G687) SOIL DYNAMICS AND MACHINE FOUNDATIONS
(ELECTIVE –IV)

UNIT – 1
Theory of vibrations: Basic definitions- free and forced vibrations with and without damping for single degree freedom system- Resonance and its effect – magnification – Logarithmic decrement – Transmissibility.

UNIT – II
Natural frequency of foundation – Soil system: Barkan's and IS methods – pressure bulb concept – Pauw's Analogy.

UNIT – III
Wave propagation: Elastic waves in Rods – Waves in elastic Half space.

UNIT – IV
Dynamic Soil Properties: Field and Laboratory methods of determination – Uphole, down hole and cross hole methods – Cyclic plate load test – Block vibration test – Determination of Damping factor.

UNIT – V
Machine Foundations: Types, Design criteria, permissible amplitudes and bearing pressure.

UNIT – VI
Block foundation: Degrees of freedom - analysis under different modes of vibration

UNIT – VII
Analysis of Two Degree freedom systems under free and forced vibrations - Principles of Design of Foundations for reciprocating and impact machines as per IS code.

Unit – VIII Vibration Isolation: Types and methods – Isolating materials and their properties

TEXT BOOKS:

1) Handbook of Machine Foundations by P.Srinivasulu and G.V.Vaidyanathan, TMH publications
2) Soil Dynamics by Shamsher Prakash

REFERENCES:
1) Dynamics of Bases and Foundations by Barken, McGraw Hill Publishing Co.,New York
2) Vibration of Soils and Foundations by Richart, Hall and Woods, Prentice Hall, eaglewood Cliffs, New Jersy, USA.

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IV Year B. Tech. CE – II Semester

(1G688) ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE –IV)

UNIT - I
Moment Distribution method: Application to the analysis of portal frames with inclined legs, gable frames

UNIT – II
Strain energy method: Application to the analysis of continuous beams and simple portal frames.

UNIT - III
Influence lines: Influence line diagrams for Reaction, Shearing force and Bending moment in case of determinate beams and Influence line diagrams for member forces in determinate trusses – application of influence line diagrams.

UNIT - IV
Analysis of two hinged and three hinged arches using influence lines.

UNIT - V
Flexibility Method: Introduction to the structural analysis by flexibility concept using Matrix approach and application to continuous beams and plane trusses.

UNIT - VI
Stiffness method: Introduction to the structural analysis by stiffness concept using Matrix approach and application to continuous beams and plane trusses.

UNIT - VII
Analysis of portal fames by flexibility and stiffness methods. Drawing of bending moment diagram.

UNIT - VIII
Plastic Analysis: Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:
1. Matrix methods of Structural Analysis by Pandit and Gupta – TMH
2. Analysis of structures Vol. I & II by Vazrani and Ratwani. Khanna publications.
3. Comprehensive Structural Analysis Vol.1 & 2 by Dr. Vaidyanathan and Dr. P.Perumal - by Laxmi, publications Pvt. Ltd., New Delhi.

REFERENCES:
1. Structural Analysis by D.S.Prakash Rao - Sagar books
2. Structural Analysis Vol. I & II by Bhavi Katti Vikas Publications.
3. Matrix structural analysis by T.N.Gayl; Tata Mc.Graw Hill Company

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IV Year B. Tech. CE – II Semester

(1G689) PRESTRESSED CONCRETE
(ELECTIVE –IV)

UNIT – I
INTRODUCTION: Historic development – General principles of pre-stressing pre-tensioning and post tensioning –Advantages and limitations of pre-stressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

UNIT – II
I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – III
LOSSES OF PRESTRESS: Loss of pre-stress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT – IV
Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V
DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

UNIT – VI
ANALYSIS OF END BLOCKS: by Guyon's method and Mugnel method, Anchorage zone stresses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

UNIT – VII
Composite section: Introduction – Analysis of stress – Differential shrinkage –

General designs considerations.

UNIT – VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – factors influencing deflections – short term deflections of un-cracked members' prediction of long term deflections.

TEXT BOOKS:

1. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:

1. Prestressed Concrete by Ramamrutham; Dhanpat rai Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

Codes: BIS code on prestressed concrete, IS 1343.

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IV Year B. Tech. CE – II Semester

(1G48B) NEURAL NETWORKS AND FUZZY LOGIC

(ELECTIVE –IV)

UNIT I
INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Introduction, Biological Neuron, Model of Artificial, Neural network architectures , Characteristics of neural networks , McCulloch-Pitts Model, Types of neuron activation functions learning methods(supervised, unsupervised, Reinforcement), Historical Developments, Applications of Neural Networks.

UNIT II
SINGLE LAYER FEED FORWARD NEURAL NETWORKS: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

UNIT III
MULTILAYER FEED FORWARD NEURAL NETWORKS: Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT IV
ASSOCIATIVE MEMORIES: Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem.

UNIT V
HOPFIELD NETWORKS: Architecture, Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network.
Adaptive Resonance Theory: Introduction, ART1, ART2, Applications

UNIT VI
CLASSICAL & FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VII
FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT VIII
APPLICATIONS: Neural network applications: Process identification, control, fault diagnosis and load forecasting.
Fuzzy Logic Applications: Fuzzy logic control and Fuzzy classification.

TEXT BOOK:

1. Rajasekharan and Rai, *Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications*. PHI Publication.
2. S. N. Sivanandam, S. Sumathi, S. N. Deepa, *Introduction to Neural Networks using MATLAB 6.0*. TMH, 2006.

REFERENCE BOOKS:

1. James A Freeman and Davis Skapura, *Neural Networks*. Pearson Education, 2002.
2. Simon Hakins, *Neural Networks.* Pearson Education
3. C.Eliasmith and CH.Anderson, *Neural Engineering.* PHI.