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ACADEMIC REGULATIONS
B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2014-15)
and
B.Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2015-16)

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The following rules and regulations will be applicable for the batches of 4 year B.Tech degree admitted from the academic year 2014-15 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 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 a subjects like comprehensive Information Technology, with 2 hours / week 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 5 questions with internal choice are to be answered in 3hours duration of the examination.
		30	Mid - Examination of 120 Min. duration - Internal evaluation-20 marks. 5 questions - 1st question compulsory – having short answer questions, 3 descriptive type with internal choice are to be answered. Remaining 10 marks for Assignments, 3-5 in number will be given and each assignment will be evaluated for 10 marks and average considered.	**For I B Tech:** Three (03) mid exams, each for 20 marks are to be conducted. Two best performances to be considered. **Mid-I:** After first spell of instructions (I Unis). **Mid-II:** After second spell of instructions (II & III Units) **Mid-III:** After third spell of instructions (III & IV 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 (I & II Units). **Mid-II:**After second spell of instructions (III to V Units).

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
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 two best out of three tests and for semester one best out of two tests)
3	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)
4	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.		
5	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 best one to be considered. 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 as per following slab system
1st Slab : Less than 75% attendance but equal to or greater than 70% a normal condonation fee can be collected from the student.
2nd Slab :   Less than 70% but equal to or greater than 65%, double the condonation fee can be collected from the student.

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.

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.

7.2 For Lateral Entry Students (batches admitted from 2015-2016):

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

7.2.2 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.

7.2.3 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.

7.2.4 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.

7.2.5 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:

CREDIT POINT AVERAGE [CPA] $= \dfrac{1}{10} \dfrac{\sum_i C_i T_i}{\sum_i C_i}$

Where C_i = Credits earned for Course i in any semester/ year,

T_i = Total marks obtained for course i in any semester/year,

9.2 For the entire programme:

CUMULATIVE CREDIT POINT AVERAGE [CCPA] $= \dfrac{1}{10} \dfrac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

n -refers to the semester in which such courses were credited

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. Any legal issues are to be resolved in Rajampet Jurisdiction.

15. GENERAL:

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

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Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
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
4GC11	English	2	0	0	4	30	70	100
4GC12	Engineering Physics	2	0	0	4	30	70	100
4GC13	Engineering Chemistry	2	0	0	4	30	70	100
4GC14	Mathematics – I	3	1	0	6	30	70	100
4G112	Programming in C and Introduction to data structures	3	1	0	6	30	70	100
4G511	Engineering Mechanics	3	1	0	6	30	70	100
4G512	Engineering Graphics	1	1	6	10	30	70	100
4GC16**	Engineering Physics and Chemistry Lab	0	0	3	4	30	70	100
4GC17#	English Language and Communication Skills Lab	0	0	3	4	30	70	100
4G114	Programming in C and Introduction to data structures Lab	0	0	3	4	30	70	100
4G411	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 student attends the engineering physics and engineering chemistry lab in attend week i.e.3/2 per week. The end of the exam shall be conducted separately and the average of two exams will be recorded by the examiner

The student 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 2014
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
4GC31	Mathematics –II	4	0	4	30	70	100
4G538	Electrical and Mechanical Technology*	4	0	4	30	70	100
4G631	Strength of Materials-I	4	0	4	30	70	100
4G632	Surveying	4	0	4	30	70	100
4G633	Fluid Mechanics	4	0	4	30	70	100
4G634	Building materials and Construction	4	0	4	30	70	100
4GC35	Aptitude & reasoning skills	2	0	2	30	70	100
4G635	Surveying Lab I	0	3	2	30	70	100
4G636	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 2014
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
4GC42	Probability and Statistics	4	0	4	30	70	100
4GC43	Environmental Science	4	0	4	30	70	100
4G641	Strength of Materials-II	4	0	4	30	70	100
4G642	Hydraulics and Hydraulic Machinery	4	0	4	30	70	100
4G643	Structural Analysis I	4	0	4	30	70	100
4G644	Building Planning and Drawing	4	0	4	30	70	100
4G645	Fluid Mechanics and Hydraulic Machines Lab	0	3	2	30	70	100
4G646	Surveying Lab II	0	3	2	30	70	100
4G647	Seminar – I	0	2	2	100	00	100
Total		**24**	**8**	**30**	**340**	**560**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
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
4GA51	Managerial Economics and Financial Analysis	4	0	4	30	70	100
4G651	Structural Analysis II	4	0	4	30	70	100
4G652	Engineering Geology	4	0	4	30	70	100
4G653	Engineering Hydrology I	4	0	4	30	70	100
4G654	Environmental Engineering I	4	0	4	30	70	100
4G655	Design and Drawing of Reinforced Concrete Structures	4	0	4	30	70	100
4GC53	English for Competitive Examinations	2	0	2	30	70	100
4GC51	Advanced English Communication Skills Lab	0	3	2	30	70	100
4G656	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 2014
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
4G661	Engineering Hydrology II	4	0	4	30	70	100
4G662	Environmental Engineering II	4	0	4	30	70	100
4G663	Design and Drawing of Steel Structures	4	0	4	30	70	100
4G664	Geotechnical Engineering I	4	0	4	30	70	100
4G665	Transportation Engineering	4	0	4	30	70	100
4G666	Estimation and Quantity Surveying	4	0	4	30	70	100
4G667	Environmental Engineering Lab	0	3	2	30	70	100
4G668	Geotechnical Engineering Lab	0	3	2	30	70	100
4G669	Seminar – II	0	2	2	100	00	100
Total		**24**	**8**	**30**	**340**	**560**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
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
4G671	Geotechnical Engineering II	4	0	4	30	70	100
4G672	Finite Element Methods	4	0	4	30	70	100
4G673	Bridge Engineering	4	0	4	30	70	100
4G674	Concrete Technology	4	0	4	30	70	100
ELECTIVE –I							
4G675	Earthquake Resistant Design	4	0	4	30	70	100
4G676	Railway Docks and Harbor Engineering						
4G677	Traffic Engineering						
4G678	Construction Planning and Project Management						
ELECTIVE –II							
4G679	Industrial Waste and Waste Water manage	4	0	4	30	70	100
4G67A	Air Pollution and Control						
4G67B	Water Resources System Planning and Management						
4G67C	Construction Technology and Management						
4G67D	CAD lab for Civil Engineers	0	3	2	30	70	100
4G67E	Concrete and Highway Engineering Lab	0	2	2	30	70	100
4G67F	Comprehensive Civil Engineering	0	2	2	30	70	100
Total		**24**	**8**	**30**	**270**	**630**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
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
4G681	Design and Drawing of Irrigation Structures	4	0	4	30	70	100
4G682	Advanced Structural Engineering	4	0	4	30	70	100
ELECTIVE III							
4G683	Remote Sensing and GIS Applications	4	0	4	30	70	100
4G684	Ground Water Development and Management						
4G685	Ground Improvement Techniques						
4G686	Environmental Impact Assessment and management						
ELECTIVE IV							
4G687	Soil Dynamics and Machine Foundations	4	0	4	30	70	100
4G688	Advanced Structural Analysis						
4G689	Pre-stressed Concrete						
4G48B	Artificial Neural Networks						
4G68A	Seminar – III	0	2	2	100	00	100
4G68B	Project Work	0	12	12	30	70	100
Total		**16**	**14**	**30**	**320**	**280**	**600**

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year

(4GC11) ENGLISH

(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills
- To enhance the vocabulary of the students in English through the use of diversified authentic materials
- To equip the students with comprehension skills to study academic subjects with greater felicity
- To develop English communication skills of the students in formal and informal situations
- To enable the students absorb the human values expressed in literature

Textbooks Prescribed:

- The books prescribed serve as students' handbooks. The reader for detailed study comprises essays which are particularly relevant to engineering students. Texts from open sources are also included in the syllabus to make the teaching-learning process more interesting. Also, the literary texts from open sources will allow the student learn language from literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- 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.
- The teacher should focus on developing LSRW 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.

Unit I

Detailed Study: a) Technology with a Human Face, b) *Cabuliwallah* by Rabindranath Tagore

Non-detailed Study: G. D. Naidu

Grammar: Kinds of Verbs and their Use; Writing: Official Letters; Vocabulary: Synonyms and Antonyms, Prefixes and Suffixes, Idioms and Phrases

Unit II

Detailed Study: a) Climatic Change and Human Strategy, b) *If* by Rudyard Kipling

Non-detailed Study: Sudha Murthy

Grammar: Tenses; Writing: Letters of Application; Vocabulary: One-word Substitutes

Unit III

Detailed Study: a) Emerging Technologies: Solar Energy in Spain, b) *The Gift of Magi* by O. Henry

Non-detailed Study: Vijay Bhatkar

Grammar: Types of Sentences: Simple, Compound and Complex; Declarative, Interrogative, Imperative and Exclamatory; Writing: E-mails; Vocabulary: Commonly Confused Words

Unit IV

Detailed Study: Water: a) The Elixir of Life, b) *Night of the Scorpion* by Nissim Ezekiel

Non-detailed Study: Jagadis Chandra Bose

Grammar: Subject-verb Agreement; Writing: Official Reports, Technical Reports; Vocabulary: English Spelling, Commonly misspelt words

Unit V

Detailed Study: a) The Secret of Work, b) *The Zoo Story,* a One-act Play by Edward Albee

Non-detailed Study: Homi Jehangir Baba

Grammar: Active and Passive Voice; Writing: Note-making; Vocabulary: Connotations

For Detailed study: *Sure Outcomes* published by Orient Black Swan, Texts from Open Sources (Available on Web)

For Non-detailed study: *Trailblazers* published by Orient Black Swan

REFERENCES:

1. Technical Communication, Principles and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2011, 2nd edition
2. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
3. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.
4. English for Technical Communication, Aysha Viswamohan, Tata Mc-Graw Hill
5. English Grammar and Composition, David Green, Mc Millan India Ltd.
6. Murphy's English Grammar, Raymond Murphy, CAMBRIDGE
7. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
8. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
9. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji , Macmillan, 2009
10. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.

Course Outcomes:

CO1 The student will appreciate the significance of silent reading and comprehension

CO2 The student will demonstrate the ability to guess the contextual meaning of the words and grasp the overall message of the text to draw inferences

CO3 The student develops critical thinking and creative writing skills through exposure to literary texts

CO4 The student will understand the components of different forms of writing

CO5 The student will exhibit effective writing skills through his understanding of English Grammar

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year

(4G112) ENGINEERING PHYSICS

(Common to All Branches)

COURSE OBJECTIVS:

- The mission of the Engineering Physics course is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology.
- The Engineering Physics course educate the principles of optical science and engineering necessary to understand optical systems.
- The Crystallography, X-ray diffraction of crystals and crystal defects explains how basic structure modulate properties of materials.
- The principles of quantum mechanics and electron theory of metals gives an idea on basic development of energy in metals.
- The main objective of this course to provide basic understanding of different engineering materials (semiconductors, magnetic, superconducting and nano materials).

UNIT 1 PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics*:* Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients - Population inversion – Ruby laser - He-Ne laser – Semiconductor laser - Applications of lasers.

Fibre optics: Introduction– Construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Optical fiber communication system – Applications of optical fibers in communications, sensors and medicine.

UNIT II CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography*:* Introduction – Space lattice –Unit cell – Lattice parameters – Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC -

Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Laue and Powder methods – Defects in solids: point defects, line defects (qualitative) - screw and edge dislocation, burgers vector.

Ultrasonics*:* Introduction – Properties – Production of ultrasonics by piezoelectric method and detection – Applications in non-destructive testing.

UNIT III QUANTUM MECHANICS AND FREE ELECTRON THEORY:

Quantum Mechanics*:* Introduction to matter waves – de'Broglie hypothesis - Heisenberg's uncertainty principle - Schrodinger's time independent and time dependent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well - Eigen values and Eigen functions.

Free electron theory: Classical free electron theory –- Sources of electrical resistance – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Kronig - Penny model (qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT IV SEMICONDUCTORS AND MAGNETIC MATERIALS:

Semiconductors*:* Introduction – Intrinsic and extrinsic semiconductors – Drift & diffusion currents and Einstein's equation – Hall effect - Direct and indirect band gap semiconductors – Working principle of p-n junction diode, LED and photodiode.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

UNIT V SUPERCONDUCTIVITY AND NANOMATERIALS:

Superconductivity*:* Introduction –Properties of superconductors - Meissner effect – Type I and type II superconductors – Flux quantization – London penetration depth – BCS theory(qualitative) - ac and dc Josephson effects - Applications of superconductors.

Nanomaterials: Introduction - Significance of nanoscale –Basic principles of nano materials (Surface area and quantum confinement) – Physical properties: optical, thermal, mechanical and magnetic properties –Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing and thermal evaporation methods – Properties of Carbon nanotubes & CNT applications – Applications of nanomaterials.

Text Books:

1. Engineering physics – S. ManiNaidu, Pearson Education, I Edition, 2012.

2.Engineering Physics – V. Rajendran, MacGraw Hill Publishers, I Edition,2008.

3. Engineering physics –P.K.palanisamy, scietech publisher,Edition, 2013.

Reference Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers, III Edition, 2012.

2. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications , 2013

3. Engineering Physics – D.K.Battacharya and A.Bhaskaran,OxfordHeigher Education I Edition, 2010.

4. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012

5. Engineering Physics – D.K.Bhattacharya and A.Bhaskaran, Oxford University press

6. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.

7. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edition, 2013.

8. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.

9. Engineering Physics – Gaur and Gupta Dhanapati, RaiPublishers , 7th Edition, 1992.

10. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

Course Outcomes:

The student is able to

CO1   Understand basic principles of optics, optical engineering materials and incorporation of optics in engineering field.

CO2   Identify different types of crystal structures in materials and x-ray diffraction through crystals.

CO3   Know about importance of ultrasonic's in engineering field.

CO4   Analysis basic concepts of quantum mechanics and electron theory and consequences.

CO5   Explain about basic mechanism of different types of advanced materials used in engineering field.

CO6   Get brief idea about synthesis, properties and applications of nano materials.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech. I Year

(4G113) ENGINEERING CHEMISTRY

(Common to all branches)

Course Objectives:

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, analytical methods, engineering materials and water chemistry.

UNIT I: WATER TREATMENT

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity and chlorides in water, Water treatment for domestic purpose Disinfection- Chlorination.

Industrial Use of water: For steam generation, Boiler troubles: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water: Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate conditioning. External Treatment: Ion-Exchange process, Desalination of brackish water by Reverse Osmosis.

UNIT II: ELECTROCHEMISTRY

Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries) Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea.

Corrosion: Definition & Types (dry & wet Corrosions) concentration cell, galvanic corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion, Prevention: Anodic and Catholic protection, Electroplating & Electrolessplating

UNIT III: POLYMERS

Introduction to polymers, Polymerization process- types, Elastomers (rubbers), Natural Rubber, Compounding of Rubber, Synthetic Rubber: Preparation, properties and engineering applications of Buna-S & Buna-N rubbers. Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.

Conducting polymers: Mechanism, synthesis and applications of polyacetylene, polyaniline.

Inorganic Polymers: Basic Introduction, Silicones.

UNIT IV: FUEL TECHNOLOGY

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, its determination using bomb calorimeter, Numerical Problems. Solid Fuels-Coke: Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

UNIT V: CHEMISTRY OF ENGINEERING MATERIALS

Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification, properties and applications

Lubricants: Theory of lubrication, properties of lubricants and applications, Rocket Propellants: Classification, Characteristics of good propellant

Text Books:

1. Engineering Chemistry by K.N.Jayaveera, G.V.Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.
2. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.

Reference Books:

1. A Text Book of Enigneering Chemistry, Jain and Jain, DhanapathRai Publishing Company, New Delhi, 15th Edition, 2010.
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH, Publications India Pvt Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.AgarwalandAndra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
5. Text Book of Engineering Chemistry, Shashichawla, DhanapathRai Publications, New Delhi, 4th Edition, 2011.
6. Engineering Chemistry, K. Sesha Maheswaramma and MrudulaChugh, Pearson Education, First Edition, 2013.

Course outcomes:

The student is expected to:

CO1 Understand the electrochemical sources of energy

CO2 Understand industrially based polymers, various engineering materials.

CO3 Differentiate between hard and soft water.

CO4 Understand the disadvantages of using hard water domestically and industrially.

CO5 Select and apply suitable water treatment methods domestically and industrially.

CO6 Understand the manufacture of synthetic petrol.

CO7 Differentiate between thermoplastics and thermosetting plastics.

CO8 Understand the manufacture, setting and hardening of cement.

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B.Tech. I Year

(4G114) MATHEMATICS – I

(Common to all branches)

Course Objectives:

The course aims to provide the student with the ability

- To understand the Differential equations of first, second and higher orders with their applications.
- To apply this knowledge to evaluate the multiple integrals in real life situations.
- To apply the knowledge of Laplace transforms and vector calculus for engineering problems

UNIT I

Linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

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. Applications to oscillatory electrical circuits, Deflection of Beams, whirling of shafts.

UNIT II

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

UNIT III

Curve tracing – Cartesian, polar and parametric curves.

Multiple integral: –Double integral – Evaluation - Change of Variables - Change of order of integration- Area and volumes using double integral. Triple integral - Evaluation.

UNIT IV

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Second shifting theorem – Convolution theorem – Laplace transform of Periodic function - Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT V

Vector Calculus: Gradient – Divergence – Curl - Line integral - Area, Surface and volume integrals. **Vector integral theorems**: Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (without proofs) and their applications.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-42 Edition (2012)

REFERENCES:

1. Higher Engineering Mathematics, by Kreyszig
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand & Company.
4. A Text Book of Engineering Mathematics-1,E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

Course Outcomes:

Upon completion of the course, students will

CO1   Understand the various types of ordinary differential equations
CO2   Have the knowledge on functions of several variables.
CO3   Understand the concepts of curve tracing, applications of integration.
CO4   Have the knowledge of Laplace transforms and their inverse.
CO5   Learn about vector integral theorems.

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B.Tech. I Year

(4G113) PROGRAMMING IN C AND INTRODUCTION TO DATA STRUCTURES

(Common to CIVIL, EEE, ME & ECE)

Course Objectives:

- Introduction to computer peripherals, Software development.
- Describe when and how to use the stand C statement and to Write, Compile and Debug basic C programs using an IDE
- Write and debug programs using an IDE and the principles of designing structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using , Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, sorting and searching.

UNIT I: Introduction to Computers: Computer Systems, Computer Environments, Computer Languages, Creating and Running C programs, System Development-Algorithms, Flow Charts.

Introduction to C Language: Structure of a C Language program, Keywords, Identifiers, Types, typedef, enumerated Types variables, constants, input/output, simple example programs.

UNIT II

Operators and Expressions, precedence and associatively, Type Conversions, Bitwise Operators. C Program Statements, Selection and Decision making Statements-two way selection –if…else statements, multi way selection-switch statements. Loop Control Statements-concept of a loop, pretest and post test loops ,event and Counter Controlled loops, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, goto, sample programs.

ARRAYS: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Multidimensional Arrays.

Strings: String Basics, String Library Functions, Array of Strings.

UNIT III

Functions: Library Functions in C, User defined Functions,-declaration,

definition, calling of function , types of User defined functions, Parameter passing methods-pass by value, pass by reference, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Using Array Elements as Function Arguments.

Pointers - Introduction, Features of Pointers, Pointer Declaration and Definition, Void Pointers, pointers for inter function communication, Pointers to Pointers, Pointer Applications: arrays and pointers, pointer arithmetic, Dynamic Memory Allocation, Pointers to Functions, pointer to void and command line arguments.

UNIT IV

Structures – Definition, initialization, accessing structures, nested structures, array of structures, structures and functions. pointer and Structures. Unions. Sample programs

Files: Introduction Streams and File, Standard library input/output functions, formatted input/output functions, character input/output functions, Text verses binary Streams, Standard library functions for files. File examples.

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort, Searching- Linear and Binary Search Methods.

UNIT V

Data Structures: Overview of Data Structure. **Stack:** Representation of a Stack, Operation on a Stack, Implementation of a Stack using Arrays and Pointers, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Recursion.

Queues: Representation of Queue, Insertion, Deletion, Searching Operations, Circular Queues.

Text books:

1. C Programming and Data Structures. B.A Forouzan,R. F.Gilberg,Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill.

Reference books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

Course Outcomes:

CO1 Understand the importance of the software development process and System development tools.

CO2 Understand general principles of C programming language and able to write simple program in C. Able to develop programs based on arrays and functions.

CO3 Understand the purpose of pointers for parameter passing, referencing and dereferencing and understands the concepts of structures, unions and File management.

CO4 Understands what and how to design data structure programs using C programming language.

CO5 Understands how to solve applications like searching and sorting using C Programming language.

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B.Tech I Year

(4G511) ENGINEERING MECHANICS
(Common to CIVIL & ME)

Course Objective:

This course will serve as a basic course by introducing the concepts of basic mechanics which will help as a foundation to various courses.

UNIT I
INTRODUCTION TO ENGINEERING MECHANICS: Basic concepts - System of forces–Resultant of a force system, Moment of forces and its Application & Couples, Equilibrium system of forces, Free body diagrams
Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading and couple.

UNIT II
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 III
FRICTION: Types of friction– Static and Dynamic Frictions, laws of Friction– Limiting friction–Motion of bodies – Ladder friction-Wedge friction

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

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

KINETICS : Analysis as particles and Analysis as a Rigid Body in Translation –Equations of Plane Motion – Fixed axis of Rotation –D' Alembert's principle - Work Energy Method – Equation for Translation – Work – Energy application to Particle Motion. Virtual work (Elementary treatment).

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

Course Outcomes:

CO1 The students are capable of using the concepts of force, moment and its application.
CO2 The students are capable of drawing free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
CO3 Students are capable of finding centre of gravity, moment of inertia and polar moment of inertia including transfer methods and their applications.
CO4 The students are capable of understanding the motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion
CO5 The students are capable of applying the concepts of work, energy and particle motion

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B.Tech I Year

(4G512) ENGINEERING GRAPHICS
(Common to CIVIL & ME)

Course objectives:

- By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.
- This course develops the engineering imagination i.e., so essential to a successful design, By learning techniques of engineering drawing changes the way one things about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting.
- Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.

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 – General method
b)   i) Ellipse- oblong, arcs of circle, concentric circle methods.
    ii) Parabola – rectangle, tangent methods.
    iii) Rectangular hyperbola.
c) Cycloid, Epicycloids and Hypocycloid
d) Involutes.

PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections.

Projections of Point, Projections of lines inclined to one plane.

UNIT II- PROJECTION OF LINES INCLINED TO BOTH PLANES: Lines inclined to both planes, Finding True lengths & traces.

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

UNIT III – PROJECTIONS OF SOLIDS: Projections of Regular Solids – cylinder, cone, prism and pyramid - inclined to both planes – Auxiliary Views.

SECTION OF SOLIDS: Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone. True shapes of the sections.

UNIT IV–DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectioned parts.

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 V – 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 – Convertion of Orthographic views to Isometric views.

Text books:
1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub.

References:
1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, Venkata Reddy, B.S.Publishers.
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education

Course Outcomes:

CO1   Student gets knowledge on various drawing instruments and its usage.

CO2   Students capable to draw various curves like conic curves, cycloidal curves and involutes.

CO3   Student can understand about orthographic projection and able to draw points, lines, planes and solids according to orthographic projections.

CO4   Student able to draw, when the simple solids are sectioned and their developments of surfaces.

CO5   Student can imagine and construct the interpenetration of simple solids.

CO6   Student can convert and draw the given orthographic view to isometric view and vice versa.

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B.Tech I Year

(4GC16) ENGINEERING PHYSICS AND CHEMISTRY LAB

(Common to all branches)

PART A: ENGINEERING PHYSICS LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Determination of wavelengths of various colors of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Hall effect : Determination of mobility of charge carriers in semiconductor
13. B-H curve
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Determination of rigidity modulus –Torsional pendulum

References:

1. Engineering Physics Practicals – Dr. B. Srinivasa Rao V.K.V. Krishna K.S Rudramamba
2. Engineering Practical Physics – S.L Kakani& Shubra Kakani

PART B: ENGINEERING CHEMISTRY LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Estimation of iron (II) using Diphenylamine indicator (Dichrometry – Internal indicator method)
2. Estimation of Chloride ion using potassium Chromite indicator (Mohr's method)
3. Determination of total hardness of water by EDTA method
4. Conductometric titration of strong acid Vs strong base (Neutralization titration)
5. Determination of Copper by EDTA method
6. Estimation of Dissolved Oxygen by Winkler's method
7. Determination of Alkalinity of Water.
8. Estimation of Iron in Cement by Colorimetry.
9. Determination of Calorific Value of fuel by using Bomb Calorimeter
10. Determination of Viscosity of oils using Redwood Viscometer I
11. Determination of Eutectic temperature of binary system (urea-benzoic acid)
12. Determination of Viscosity of oils using Redwood Viscometer II
13. Determination of Copper by Iodometry
14. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
15. Determination of acidity of Water

References:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Chemistry Practical – Lab Manual by K.B.ChandraSekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.

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B.Tech. I Year
(4G117) ENGLISH LANGUAGE & 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.

Course Objectives:

- To train students to use language effectively in everyday conversations
- To enable a learner sharpen his public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the student learn better pronunciation through emphasis on word accent, intonation, and rhythm

SYLLABUS:

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

Introduction to the Sounds of English- Vowels, Diphthongs & Consonants

1. Introduction to Stress and Intonation
2. Situational Dialogues and Role-play
3. Telephone Skills
4. 'Just A Minute' (JAM)
5. Oral Presentations
6. Describing Objects / Situation / People
7. Information Transfer

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

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.

Suggested Software:

Sky Pronunciation Suite

Connected Speech from Clarity

Clarity Pronunciation Power – Part I

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

Course Outcomes:

CO1 The student will be able to express himself fluently in social and professional contexts

CO2 The student will enhance his skills to make a presentation confidently

CO3 The student will learn how to neutralize his accent

CO4 The student will be able to decipher information from graphics and describe it professionally

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B.Tech. I Year
(4G114) PROGRAMMING IN C AND DATA STRUCTURES LAB
(Common to CIVIL, EEE, ME & ECE)

Course 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: $1 + x + x^2 + x^3 + \ldots\ldots\ldots\ldots\ldots\ldots +x^n$

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 number 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 into 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 C programs that implement stack (its operations) using

     i) Arrays   ii) Pointers

Exercise 15

Write C programs that implement Queue (its operations) using

     i) Arrays   ii) Pointers

Exercise 16

Write C programs that implement Circular Queue (its operations) using

     i) Arrays   ii) Pointers

Exercise 17

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 18

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 19

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 20

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

Exercise 21

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

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech I Year

(4G411) ENGINEERING & I.T. WORKSHOP

(Common to all branches)

ENGINEERING WORKSHOP

Course 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 labor 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) from: 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 gauge G.I. sheet.

d. House-wiring– Two jobs (exercises) from: 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.

I.T. WORKSHOP
Course Objectives:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations.
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system.
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Preparing your Computer (5 weeks)
Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.
Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem

correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet (4 weeks)

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account. Draft syllabus, R13 regulations (UG)

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools (6 weeks)

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features

studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO Draft syllabus, R13 regulations (UG)
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

References:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

Reference books:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.

2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.

3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.

4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

Course Outcomes:

CO1   Disassemble and Assemble a Personal Computer and prepare the computer ready to use.

CO2   Prepare the Documents using Word processors

CO3   Prepare Slide presentations using the presentation tool

CO4   Interconnect two or more computers for information sharing

CO5   Access the Internet and Browse it to obtain the required information

CO6   Install single or dual operating systems on computer

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4GC31) MATHEMATICS – II
(Common to CIVIL & ME)

Course Objective:
- This course aims at providing the student with the concepts of Matrices, Numerical differentiation and Numerical integration, Numerical solution of ordinary differential equations, Fourier series, partial differential equations, complex variables and complex integrations which find the applications in engineering.
- Our emphasis will be more on the logical and problem solving development in the Numerical methods and its applications.

UNIT I
Rank – Echelon form Solution of Linear System of Homogenous and Non Homogeneous equations- Eigen values-Eigen vectors-properties, Cayley - Hamilton theorem-inverse and powers of a matrix by Cayley Hamilton theorem.

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

UNIT III
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 IV
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.
Partial differential equations: Formation of partial differential equations by eliminating arbitrary constants and functions--Method of separation of variables

UNIT V
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.

Complex integration: Cauchy's integral theorem-Cauchy's integral formula-Generalized integral formula (without proofs).

Text books:
1. Higher Engineering Mathematics, B. S. Grewal, 40thEdition, Khanna Publishers, New Delhi.
2. A text book of Mathematical Methods, E. Keshava Reddy, and G. Sankara Rao, I. K. International.

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

Course Outcomes:
CO1 The student becomes familiar with the application of Mathematical techniques like Fourier series.
CO2 The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, Partial differential equations and Numerical Methods.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G538) 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

Course Objective:
- In this course the different types of DC generators and motors, Transformers, 3 Phase AC
- Machines which are widely used in industry are covered and their performance aspects will be studied.

UNIT I
ELECTRICAL CIRCUITS & DC MACHINES:
Electric current,Potential Difference,Power,Energy,Ohm's law,Kirchoff's laws,RLC elements,Principle of Operation of DC Generator& Motor,Construction,Types-Applications.

UNIT II
AC MACHINES: Principle of operation of 1-ø Transformers, Losses,Efficiency, Regulation, Principle of operation of 3- ø Induction motor Expression for Torque, Torque- slips Characteristics, Operation of Alternators, Applications.

PART –B
MECHANICAL TECHNOLOGY

UNIT – III
WELDINGPROCESSES: 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.

UNIT – IV
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.

AIR COMPRESSORS AND EARTH MOVING MACHINERY: Working principles of air compressors – Reciprocating air compressor: single and multi stage compression.

UNIT - V
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.

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.

Course Outcome:

After the completion of the course, the student should be able

CO1   To predict the behaviour of electrical circuits.
CO2   To identify the type of electrical machine used for that particular application.
CO3   To identify various electronic devices and CRO parts.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G631) STRENGTH OF MATERIALS – I

Course Objective:
- The subject provides the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.

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,L Angle and Channel sections –Design of simple beam sections.
SHEAR STRESSES: Derivation of formula– Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T., L angle sections.

UNIT–I 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.
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– V
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.
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 L.S.Srinathetal., Macmillan India Ltd., Delhi.
6. Strength of Materials by BhaviKatti.

Course Outcome
CO1 The students would be able to understand the behavior of materials under different stress and strain conditions.

CO2 The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.

CO3 The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods.

CO4 The student would be able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.

CO5   The students would be able to perform ILD analysis of determinate beams and trusses.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G632) SURVEYING

Course Objective:
- To ensure that the student develops knowledge of the basic and conventional surveying instruments, principles behind them, working of the instruments, plotting of the area from the field measurements, determination of the area and the theory behind curves.
- To ensure that the student develops knowledge in the working of advanced instruments, setting out of curves from the field measurements and basic knowledge on remote sensing.

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.

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

UNIT – II

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.

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 .

UNIT – III

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 – IV

PLANE TABLE SURVEYING: Plane Table Survey: Components – Setting – Methods – Radiation– Traversing - Intersection and Resection

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

UNIT – V

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 methods, Introduction to EDM , basic concepts & total station .

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, 1stEdition, 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.

Course Outcomes
CO1 The students would be able to do temporary and permanent adjustments.
CO2 The students would be able to measure distances and angles.
CO3 The students would be able to orient and draw the various maps.
CO4 The students would be able to calculate areas and volumes of the earth work.
CO5 The student would be able to undertakevarious civil engineering surveys and convert the data into usable forms.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G633) FLUID MECHANICS

Course Objective:

CO1   This subject introduces the basic concepts of fluids, their behavioural properties, analyzing the fluid flows using primary equations. This subject further deals with various flow measuring devices and concepts of boundary layer flows.

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.

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 – II

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.

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 – III

CLOSEDCONDUITFLOW: 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 Reynolds's number – Moody's chart.

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

UNIT – IV

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 – V

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.

Course Outcomes

CO1 The students should be able to operate the equipment according to its working principles.

CO2 The students should be able to take the observations for evaluating equipment performance.

CO3 The students should be able to find out the hydraulic coefficients of equipments.

CO4 The students should be able to select the equipments as per requirements to solve practical problems.

CO5 The students should be able to analyse the experimental and theoretical performance of equipments.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G634) BUILDING MATERIALS AND CONSTRUCTION

Course Objective:

To give the students a basic idea about the construction materials, building components and to introduce component methodologies.

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 clam 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.

LIME & CEMENT : Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime, various ingredients of cement ,types of cement .

UNIT – III 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 - IV

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

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

UNIT –V

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.

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.

Course Outcomes

CO1 Student would have a basic knowledge about the planning of the residential as well as public building.

CO2 Student would have knowledge of preparation of the working drawing.

CO3 Student will be able to prepare of submission drawing according to the local bylaws.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4GC35) APTITUDE AND REASONING SKILLS
(Common to CE, ME and CSE)

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:

CO1 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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G635) SURVEYING LAB – I

Course Objective:

- To impart the practical knowledge in the field, it is essential to introduce in curriculum.
- Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

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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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – I Semester
(4G636) STRENGTH OF MATERIALS LAB

Course Objective:

The objective of the course is to make the student to understand the behaviour of materials under different types of loading for different types structures.

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE –II Semester
(4GC42) PROBABILITY AND STATISTICS
(Common to CE and ME)

Course Objective:
To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory

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

UNIT-III
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.
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 – IV

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 – V

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

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

Learning Outcome:

CO1 The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory and draw appropriate inferences

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4GC43) ENVIRONMENTAL SCIENCE
(Common to CE, ME and CSE)

Course Objective:
To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

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.

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.

Course outcomes:
- **CO1** The students would have knowledge of characteristics of water, drinking water standards and necessity of treatment.
- **CO2** The students would be able to understand the various unit operations and unit processes in water treatment and flow sheet of conventional municipal water treatment plant.
- **CO3** The students would be able to design various units of municipal conventional water treatment plant.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G641) STRENGTH OF MATERIALS – II

Course Objective:

   CO1   Study of the subject provides the understanding of principal stress, strains, springs, columns and structures.

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.

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– II

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.

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– III

 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– IV

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- V

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, concept shear center for high channel

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.

Course outcomes:

    CO1 The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.

    CO2 The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods.

    CO3 The student would be able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G642) HYDRAULICS & HYDRAULIC MACHINERY

Course Objective:

CO2   The main objective of this course is to deal with the concepts of flow through open channels and their applications and the principles of hydraulic machines and hydraulic models.

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.

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 – III

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 – IV

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.

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

UNIT – V

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.

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, NewDelhi, 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.

Course Outcomes
  CO3   The students should be able to understand and apply the basic concept of laminar flow of fluid, boundary layer and its types in solving the practical problems.
  CO4   The students should be able to understand the hydraulics of flow in smooth and rough pipe, concept of frictional resistance to flow, series, parallel &branched pipes flow looped network analysis using Hardy-Cross and water hammer pressure due to sudden closure of valve.
  CO5   The students should be able to apply the basic to analyze and apply of geometrical properties, critical flow, uniform flow, specific energy in open channel flow.

CO6 The students should be able to understand and apply the gradually varied flow in open channel flow.

CO7 The students should be able to understand and apply the rapidly varied flow in open channel flow.

CO8 The students should be able to understand and apply concept of hydraulic jump in open channel flow.

CO9 The students should be able to know the constructional details, heads and working principles of pumps

CO10 The students should be able to know the constructional details, heads and working principles of turbines.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G643) STRUCTURAL ANALYSIS - I

Course Objective:
To make the students to understand the principles of analysis of structures of static and moving loads by various methods.

UNIT– I
FIXED BEAMS – Introduction to statically indeterminate beams with U.D.load central point load, eccentric point load. Number of point loads and uniformly varying loads shear force and bending moment diagrams-Deflection of fixed beams effect of sinking of 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 differentmoment 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.
MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without settlement of supports.

UNIT–IV
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.
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.

UNIT-V
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.
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.

Course Outcomes

CO1 The students would be able to understand the behavior of materials under different stress and strain conditions.

CO2 The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.

CO3 The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods.

CO4 The student would be able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.

CO5 The students would be able to perform ILD analysis of determinate beams and trusses.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G644) BUILDING PLANNING & DRAWING

Course Objective:
This subject provides the knowledge of building by laws, registration, planning of various types of buildings different sign convention of various Civil Engineering Materials, Doors, windows, tiles of roof, drawing of building plans etc.

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.

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

UNIT – III
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 – IV
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.

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 – V
Given line diagram with specification to draw, plan, sections section and elevation. sloped and flat roof buildings

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.

Course Outcomes

CO1 Student would have a basic knowledge about the planning of the residential as well as public building.

CO2 Student would have knowledge of preparation of the working drawing.

CO3 Student will be able to prepare of submission drawing according to the local bylaws.

CO4 The students would be able to identify the basic principals of building.

CO5 The students would be able to know basic principal of free hand descriptive sketching to creative a realistic sketch of an object.

CO6 The students will able to generate the two dimensional orthographic view of a building.

CO7 The students will able to prepare working and submission drawing of a building.

CO8 The students will able to construct a two point perspective of given two dimensional orthographic view of object.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G645) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB
Course Objective:

CO6   The objective of the course is to make the students understand the fluid flow concepts and get familiarity with flow measuring devices.

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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
II Year B. Tech. CE – II Semester
(4G646) SURVEYING LAB – II

Course Objective:

CO7 To impart the practical knowledge in the field, it is essential to introduce in curriculum.

CO8 Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4GA51) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to CE, ECE and ME)

Course Objective:

This paper aims to equip the budding engineering student with an understanding of concepts and tools of economic analysis. The focus does not only on understand the concepts but apply them in real life by developing problem solving skills there exists a relationship between Managerial Economics and Accounting and same is dealt in the second part of the course. The focus here is on picking up the basics of Accounting such as Accounting Data and Financial Statements, which constitute the language of Business. The student is exposed and made familiar with journalisation, interpretation and use of Accounting Data.

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
   Truet and Truet, *Managerial Economics:Analysis, Problems and Cases*, Wiley.

Course Outcomes:

CO1 Provides a basic insight into seeking solutions for managerial problems.

CO2 The student can familiarized with Accounting Data and Financial Statements that can be useful for interpreting the financial information.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G651) STRUCTURAL ANALYSIS - II

Course Objective:
Indeterminate structures are subjected to different loading with different supported conditions; hence it is necessary to study the behaviour of the structures.

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.
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-II
SLOPE DEFLECTION METHOD:-Analysis of single bay, single storey, portal frame including side sway.
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 –III
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.
STIFFNESS METHOD: - Introduction, application to continuous beams including support settlements.

UNIT – V
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

Course Outcomes

CO1   Students will be able to understand the deflected shape of beams and frame and to learn their behavior.

CO2   Students will be able to identify the stress pattern from photo elastic approach.

CO3   Students will be able to understand the indeterminacy and learn to find the indeterminate reaction.

CO4   Students should observe the buckling shape of Column under various end conditions

ANNAMACHARYA INSTITUTE OF TECHNOLOGY SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G652) ENGINEERING GEOLOGY

Course Objective:
The objective of this is to give the basic knowledge of Geology that is required for construction of various Civil Engineering Structures. The syllabus includes the basics of Geology. Geological hazard‟s and gives a suitable picture on the Geological aspects that are to be considered for the planning and construction of major Civil Engineering projects.

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 ofweathering 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.

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 – IV
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 – V

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.

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.

Course Outcomes

CO1	The students would have the knowledge of principles of engineering geology.
CO2	The students would have the knowledge of properties of soil, various rocks and minerals
CO3	The students would be able to judge the suitability of sites for various civil engineering structures.
CO4	The students would exhibit the ability to use the knowledge of geological strata in the analysis and design the civil engineering structures.
CO5	The students would have the knowledge for deciding the suitability of water and soil conservation projects.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G653) ENGINEERING HYDROLOGY - I

Course Objective:

To study the concepts of

- Engineering Hydrology and its applications like Runoff estimation, estimation of design discharge and flood routing.
- Irrigation Engineering – Water utilization for Crop growth, canals and their designs.

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.

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

UNIT-III

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-IV

GROUND 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.

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

UNIT-V

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.

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.

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.

Course Outcomes

CO1 The students would demonstrate the capability to establish correlation between the various hydrological parameters.

CO2 The students would have the knowledge of measurements of various parameters and its importance in water resource management.

CO3 The students would be able to understand the hydrograph theory in the analysis of runoff and determination of design discharge for hydrological projects.

CO4 The students would be able to apply various statistical methods in hydrological data analysis.

CO5 The students would have the knowledge of importance of groundwater recharging and its techniques.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G654) ENVIROMENTAL ENGINEERING – I

Course Objective:
This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.

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

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 – II
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.

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 –III
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 – IV
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 – V

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.

Course Outcomes

CO1   The students would be able to briefly understand the causes, spread and   effects of air pollution .

CO2   The students would understand, in short, air sampling methods and air pollution control.

CO3   The students would have brief knowledge vehicular and noise pollution and its control.

CO4   The students would have broad idea regarding solid waste management e.g. sources, quantity, collection and transportation.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G655) DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES

Course Objective:
Structural elements are subjected to different loading to with stand the structures, for external loadingwe need to design the structures for its safety and serviceability.

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.
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 –II
BEAMS: Limit state design of singly reinforced, doubly reinforced, T and L beam sections.
SLABS: Design of one way slab - Two-way slab, continuous slab Using I S Coefficients.

UNIT –III
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 –IV
COLUMNS: Short and long columns – under axial loads, uni-axial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.
FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT –V

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.

Course Outcomes

CO1 Students would be able to understand the basic concepts of reinforced concrete analysis and design.

CO2 Students would be able to understand the behavior and various modes of failure of reinforced concrete members.

CO3 Students would be able to analyze and design various reinforced concrete members.

CO4 Students would be able to understand and analyze the effect of various support conditions on design of structures.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4GC53) ENGLISH FOR COMPETITIVE EXAMINATIONS
(Common to CE CSE ME and IT)

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*.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4GC51) 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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – I Semester
(4G656) 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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G661) ENGINEERING HYDROLOGY – II

Course Objective:

To study various head works canal structures and their design principles the subject also covers the river structures, their classifications, designs, etc.

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, reservoir yield, estimation of capacity of reservoir using mass curve.

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.

UNIT-II

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.

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

UNIT-III

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-IV

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

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

UNIT-V

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.

Course Outcomes

CO1 The students would demonstrate the capability to establish correlation between the various hydrological parameters.

CO2 The students would have the knowledge of measurements of various parameters and its importance in water resource management.

CO3 The students would be able to understand the hydrograph theory in the analysis of runoff and determination of design discharge for hydrological projects.

CO4 The students would be able to apply various statistical methods in hydrological data analysis.

CO5 The students would have the knowledge of importance of groundwater recharging and its techniques.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G662) ENVIRONMENTAL ENGINEERING – II

Course Objective:

This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.

UNIT – I

Air Pollution – sources of pollution – Classification – effects on human beings – Global effects of Air pollution–Air emission standards.Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emission.

UNIT –II

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

UNIT – III

Solid waste Management – sources, composition and properties of solid waste – 4 R's: reduce, reuse, recycle, recovery –collection and handling – separation and processing.Solid waste disposal methods – Land filling – Incineration – composting.

UNIT – IV

Hazardous Waste – Nuclear waste – Biomedical wastes – Chemical wastes – Effluent – Disposal and Control methods.Special Wastes/Pollutants of Concern – Plastic waste – e-waste – sources – classification – management – recycling and treatment . advance treatment fluorides, arsenic, adsorbtio, ionj-exchange

UNIT – V

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

Course Outcomes

CO1   The students would have a brief knowledge of solid waste processing, treatment and disposal including that of e-wastes.

CO2   The students would have knowledge of characteristics of water, drinking water standards and necessity of treatment.

CO3   The students would be able to understand the various unit operations and unit processes in water treatment and flow sheet of conventional municipal water treatment plant.

CO4   The students would be able to understand the various characteristics of wastewater and its significance in sewerage project.

CO5   The students would briefly know the methods of treatment and disposal of wastewater.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G663) DESIGN & DRAWING OF STEEL STRUCTURES

Course Objective:
To understand design specifications, loading and design procedures of different steel structures as per BIS specifications.

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

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

UNIT – V
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.
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.

Course Outcomes

CO1 Students would be able to explain the behavior and modes of failure of tension members and different connections.

CO2 Students would be able to analyze and design tension members, bolted connections, welded connections, compression members and beams.

CO3 Students would be able to critique and optimize various steel structures.

CO4 Students would be able to develop skills to analyze and design a structure while working in a team

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G664) GEOTECHNICAL ENGINEERING – I

Course Objective:
The objective of this course is to make the student to understand the behaviour of soil under different loads and different conditions. This is necessary because the safety of any structure depends on soil on which it is going to be constructed.

UNIT – I
INTRODUCTION: Soil formation – soil structure and clay mineralogy– Adsorbed water – Mass- volume relationship – Relative density.
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 –II
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 _III
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Wester gaard's theories for point loads and areas of different shapes – Newmark's influence chart.
UNIT – IV
COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction control.
CONSOLIDATION: stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation – Terzaghi's Theory.

UNIT – V
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.

Course Outcomes:
CO1 The students should be able to plan the Geotechnical exploration program for major civil engineering structure.
CO2 The students should be able to analyze the stability of slopes and solve the field problems.
CO3 The students should predict the earth pressure over the earth resisting structures and their Geotechnical design

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G665) TRANSPORTATION ENGINEERING

Course Objective:
It deal with different components of Transportation Engineering like highway, Railway &Airport Engineering. Emphasis is a Geometric Design of different elements in 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.
HIGHWAY GEOMETIC DESIGN: Importance of Geometric Design-Design controls and Criteria- 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 – II
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.
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 – III
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.
UNIT –IV
PAVEMENT DESIGN: Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement components – Design Factors – Flexible pavement

Design methods – G.I method, CBR Method, 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.

UNIT – V

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.

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

Course Outcomes

    CO1 Student should be conversant with various terminologies of Highway Engineering

    CO2 Students should have complete knowledge of Engineering Surveys, Planning Surveys and different objectives of Planning, so that he should be able to plan a new highway in a given region.

    CO3 Students should be able to design various geometric features of highways.

    CO4 Students should have general ideas about various design and construction practices in highway.

    CO5 Student should be conversant with various terminologies of Traffic Engineering.

    CO6 Students should be well aware of various safety features of highways.

    CO7 A technocrat with high moral values and character.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G666) ESTIMATION AND QUANTITY SURVEYING

Course Objective:
The objective of the course is to make the student to understand about estimation and valuations of different types of structures and their valuation as per standard schedule of rates.

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

UNIT – IV
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 – V

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.

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.

Course Outcomes

CO1 The students should be able to read the detailed drawings and then imagine the appropriate items involved in proposed work.

CO2 The students should be able to prepare preliminary estimate for administrative approval and to check financial feasibility of project.

CO3 The students should be able to understand the required quality of materials and workmanship, accordingly draft the detailed specifications of involved items in work.

CO4 The students should be able to analyze unit rate of items with the current local market rates of materials and labors, and work out the unit costs of items involved in the work.

CO5 The students should be able to apply the unit rates of items and net quantities to prepare the abstract sheet of estimate.

CO6 The students should be able to prepare contract documents, flot tender and select proper agency to actual execution of work. And students should be able to supervise the construction site, prepare running bills and final bill and maintain the accounts of works.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G667) ENVIRONMENTAL ENGINEERING LAB

Course Objective:

The laboratory provides knowledge of estimating various parameters like PH, Chlorides, Sulphates, Nitrates in water. For effective water treatment, the determination of optimum dosage of coagulantand chloride demand are also included. The estimation status of Industrial effluents will also be taught in the laboratory by estimating BOD and COD of effluent.

Experiments:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
III Year B. Tech. CE – II Semester
(4G668) GEOTECHNICAL ENGINEERING LAB

Course Objective:
To obtain the properties of soils by conducting experiments, it is necessary for students to understand the behavior of soil under various loads and conditions.

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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G671) GEOTECHNICAL ENGINEERING-II

Course Objective:
To use the principles of Soil mechanics to design the foundations, Earth retaining structures and slope stability safely and economically knowledge of the subject is essential.

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.
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-III
RETAINING WALLS: Types of retaining walls – stability of retaining walls.
SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi`s, Meyerhoff's and Skempton`s Methods.

UNIT-IV
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 –V
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.
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.

Course Outcomes:
- The students should be able to plan the Geotechnical exploration program for major civil engineering structure.
- The students should be able to analyze the stability of slopes and solve the field problems.
- The students should predict the earth pressure over the earth resisting structures and their Geotechnical design.
- The students should be able to understand various geotechnical designs and select type of shallow foundations.
- The students should be able to understand various geotechnical design their stability, and efficiency of deep foundations.
- The students should be able to evaluate the various techniques of ground improvement and apply them on field.

ANNAMACHARYA INSTIUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G672) FINITE ELEMENT METHODS IN CIVIL ENGINEERING
Course objective:

The subject should enable the students to learn the principles involved in discretization in finite element methods, forming of stiffness matrices and force vectors for simple elements, to know the various approaches followed in finite element analysis, usage of the various elements for discretization and to learn about shape functions. To learn the application of FEM in various structural problems incorporating temperature and boundary conditions and heat transfer problems.

UNIT –I

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

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 –II

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

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 –III

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

UNIT –IV

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-V

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.

Course outcomes:

CO1 An ability to understand introductory basic principles and approaches for solving FEM problems in different fields.and an ability to formulate FEM model for simple problems like one dimensional bar element.

CO2 An ability to understand and derive element matrices to find stresses in beams and trusses.

CO3 An ability to understand basic concepts of plane stress and plane strain, stiffness matrix of CST element and axi-symmetric elements.

CO4 An ability to write interpolation functions to higher order isoparametric elements and can solve the problems heat transfer problems using FEM and also to apply boundary conditions in realistic problems.

CO5 An ability to solve dynamic analysis problems.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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IV Year B. Tech. CE – I Semester
(4G673) BRIDGE ENGINEERING

Course Objective:

It deal with different types of Bridges like deck slab bridge, T – Beam Bridge etc and gives a good knowledge on different components of bridges.

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.

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

UNIT – II

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

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 – III

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.

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

UNIT – IV

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 V

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.

Course Outcomes

    CO1 Students would be able to understand the basic concepts of reinforced concrete analysis and design.

    CO2 Students would be able to understand the behavior and various modes of failure of reinforced concrete members.

    CO3 Students would be able to analyze and design various reinforced concrete members.

    CO4 Students would be able to understand and analyze the effect of various support conditions on design of structures.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G674) CONCRETE TECHNOLOGY

Course Objective:

Lot of advances is taking place in the concrete technology as par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technolog*y*.

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.

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 – II

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.

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 – III

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

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 – IV

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 –IS 10262 method

UNIT – V

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

Course Outcomes

CO1 The students should be able to check and recommend different constituent of concrete.

CO2 The students should be able to control method of manufacture of concrete.

CO3 The students should be able to test strength and quality of plastic and set concrete.

CO4 The students should have understanding of application admixture and its effect on properties of concrete.

CO5 The students should be able to understand the effect of process of manufacturing on different properties of concrete.

CO6 The students should be able to understand various environmental factors which affect durability of concrete, analyse cause of deterioration of concrete components and to suggest various preventive measures to it.

CO7 The students should be able to design mix of concrete according to availability of ingredients and design needs.

CO8 The students should be able to apply corrections to designed mix by degree of quality control and field corrections.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G675) EARTHQUAKE RESISTANT DESIGN
(ELECTIVE – I)

Course objective: The objective of this course is to teach the basic concepts of earthquake resistant design to a B.S. level Civil Engineer.

UNIT – I

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 – II

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 – III

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 – IV

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 – V

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.

Course outcomes:

CO1   Suggest possible causes for the movements of the plates,

CO2   Describe convergent, divergent, and transform types of plate boundaries,

CO3   Describe elastic rebound theory as it is related to seismic activity,

CO4   Distinguish between earthquake magnitude and earthquake damage (intensity),

CO5   Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G676) RAILWAYS, DOCKS & HARBOR ENGINEERING
(ELECTIVE –I)

Course Objectives

CO1 To know about the Planning using modern techniques such as GIS, GPS and remote sensing design, construction and maintenance of railway tracks.

CO2 To have knowledge in Airport planning and design with the prime focus on runway and taxiway geometrics.

CO3 To conversant with the definition, purpose, location and materials of coastal structures such as piers, breakwaters, wharves, jetties, quays and spring fenders.

CO4 To acquire knowledge on site investigation for location and planning of harbours

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.

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

UNIT- II

STATIONS AND YARDS: Introduction-purposes of a rail way station – selection of a site for arailway 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.

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

UNIT – III

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.

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 – IV

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 – V

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.

OUTCOMES:

CO1 On completing the course, the students will• have the ability to Plan and Design various civil Engineering aspects of Railways, Airports and Harbour.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G677) TRAFFIC ENGINEERING
(Elective – I)

Course Objective

To posses' knowledge about design of signals, intersections, solutions to various traffic problems

UNIT-I:

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

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-II

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

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

UNIT-III

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-IV

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.

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-V

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.

Course Outcomes

CO1 Student should be conversant with various terminologies of Highway Engineering

CO2 Students should have complete knowledge of Engineering Surveys, Planning Surveys and different objectives of Planning, so that he should be able to plan a new highway in a given region.

CO3 Students should be able to design various geometric features of highways.

CO4 Students should have general ideas about various design and construction practices in highway.

CO5 Student should be conversant with various terminologies of Traffic Engineering.

CO6 Students should be well aware of various safety features of highways.

CO7 A technocrat with high moral values and character.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G678) CONSTRUCTION PLANNING &PROJECT MANAGEMENT
(Elective – I)

Course Objectives
- **Specific** Be clear about what will be achieved
- **Measurable** Quantify results and measure when they have been achieved
- **Achievable** Ensure they *can* be achieved
- **Realistic** Can be attained with within project resources
- **Timed** Can be attained within a specified timescale.

UNIT – I
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 – II
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 – III
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 – IV
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.

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

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.

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.

Course Outcomes:

CO1 **Deliverables** - the tangible outputs like content, software, guidelines, etc

CO2 **Knowledge and experience** - the less tangible outputs that should be documented and shared with Jisc and the wider community

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G679) INDUSTRIAL WASTE ANDWASTEWATERMANAGEMENT
(ELECTIVE –II)

Course Description : This course will provide you with a detailed knowledge of the current practices in wastewater treatment in general with specific reference to industrial wastewater treatment and technologies. Water treatment processes typically in the final stage of treatment, commonly referred to as advanced wastewater treatment, to allow for water recycling and reuse will also be discussed. Emerging wastewater and water treatment processes will be covered in the context of water recycling. You will learn the principles, objectives and basic criteria for the selection of processes for wastewater treatment and/ or recycling with an attention to environmental sustainability and carbon footprint. You will have the opportunity to visit wastewater treatment plants and recognise how discharge options and end use affects process selection.

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.
Industrial waste water discharges into streams. Lakes and oceans and problems.

UNIT– III

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

Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methodsManufacturing Process and design origin of liquid waste from Suger Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT– V

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).

Learning Outcomes:

CO1   Discernment of knowledge development and research directions within the   engineering discipline.

CO2   Application of established engineering methods to complex engineering solving.

CO3   Application of systematic engineering synthesis and design processes.

CO4   In-depth understanding of specialist bodies of knowledge within the engineering discipline

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G67A) AIR POLLUTION AND CONTROL
(ELECTIVE –II)

Course Objectives

To know the characteristics and effects of air and noise pollution and the methods of controlling the same. The student is expected to know about source inventory and control mechanism.

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 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-II

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

UNIT– III

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomenaon Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-IV

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. General Methods of Control of NOx and Sox emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT– V

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.

Course Outcomes

CO1 The students would be able to briefly understand the causes, spread and effects of air pollution .

CO2 The students would understand, in short, air sampling methods and air pollution control.

CO3 The students would have brief knowledge vehicular and noise pollution and its control.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G67B) WATER RESOURCES SYSTEM PLANNING AND
MANAGEMENT
(ELECTIVE –II)

Course Objectives

To know the characteristics and effects of air and noise pollution and the methods of controlling the same. The student is expected to know about source inventory and control mechanism.

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

UNIT– III

Non-linear optimization techniques: Clerical of method optimization, Kuch-Tucleer, gradential based research techniques for simple unconstrained optimization.
Simulation: application of simulation techniques in water resources.

UNIT– IV

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

UNIT– V

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.

Course Outcomes

CO1 The students would be able to briefly understand the causes, spread and effects of air pollution .

CO2 The students would understand, in short, air sampling methods and air pollution control.

CO3 The students would have brief knowledge vehicular and noise pollution and its control.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G67C) CONSTRUCTION TECHNOLOGY AND PROJECT
MANAGEMENT
(ELECTIVE –II)

Objectives

The Construction Management Programs' Mission is to prepare students to enter the construction industry at the management level, possessing a broad-scope understanding of the techniques of construction project and company management

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.

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 II

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

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 III

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 IV

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 V

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.

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.

Course outcomes:

CO1	Students will learn basic design fundamentals and theory
CO2	Students will learn primary construction systems
CO3	Students will learn primary construction methods and materials
CO4	Students will learn to interpret construction graphics
CO5	Students will learn basic surveying skills

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G67D) CAD LAB FOR CIVIL ENGINEERS

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – I Semester
(4G67E) 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.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G681) DESIGN AND DRAWING OF IRRIGATION STRUCTURES

Course Objective:

To make the student more conversant with the design principles of design glacis wier, sluice tank,different notchs, important structures belongs to irrigation

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.

Courses outcomes:

CO1   Students will learn basic design fundamentals and theory
CO2   Students will learn primary construction systems
CO3   Students will learn primary construction methods and materials
CO4   Students will learn to interpret construction graphics
CO5   Students will learn basic irrigation skills

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IV Year B. Tech. CE – II Semester
(4G682) ADVANCED STRUCTURAL ENGINEERING

Course Objective:
To make the student more conversant with the design principles of multistoried buildings, roof system, foundation and other important structures.
        UNITS:
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 Longitudinal staircase

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.
Course Outcomes
    CO1 Students will be able to understand the deflected shape of beams and frame and to learn their behavior.
    CO2 Students will be able to identify the stress pattern from photo elastic approach.
    CO3 Students will be able to understand the indeterminacy and learn to find the indeterminate reaction.
    CO4 Students should observe the buckling shape of Column under various end conditions

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G683) REMOTE SENSING AND GIS APPLICATIONS
(ELECTIVE –III)

Course Objective

To posses knowledge of Remote Sensing techniques and its application in natural resource management and Civil Engineering.

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.

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 – III

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

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 – IV

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 – V

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.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.

Course Outcomes

CO1 Students will know about procedure of remote sensing
CO2 The topography of earth surface will be calculated
CO3 Gis application will be studied

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G684) GROUND WATER DEVELOPMENT AND MANAGEMENT
(ELECTIVE –III)

Course Objectives

To understand the distribution of ground water, evaluation of aquifer parameters, solving ground water equations. To study water methods, Ground water quality and development of ground water methods are dealt.

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.

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 – II

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.

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

UNIT – III

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 – IV

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 – V

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion

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.

Course Outcomes

CO1 The students would demonstrate the capability to establish correlation between the various hydrological parameters.

CO2 The students would have the knowledge of measurements of various parameters and its importance in water resource management.

CO3 The students would be able to understand the hydrograph theory in the analysis of runoff and determination of design discharge for hydrological projects.

CO4 The students would be able to apply various statistical methods in hydrological data analysis.

CO5 The students would have the knowledge of importance of groundwater recharging and its techniques.

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(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G685) GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE –III)

Course Objectives

Delegates will gain an understanding of the concepts behind a range of Ground Improvement Techniques, and be able to identify appropriate techniques for a range of ground and site conditions.

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.

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 – II

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.

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 – III

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

UNIT – IV

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

UNIT - V

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

Course Outcomes

CO1 Students will get an idea of compaction, explosives, vibro flotation, vibro replacement;

CO2 Students will come across groundwater lowering, preloading, electro-osmosis

CO3 Students will know about admixtures, grouting, freezing Students will get knowledge of Geosynthetics, reinforcements

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G686) ENVIRONMENTAL IMPACT ASSESSMENT AND
MANAGEMENT
(ELECTIVE –III)

objectives
- confirm that the conditions of project approval are implemented satisfactorily;
- verify that impacts are within predicted or permitted limits;
- take action to manage unanticipated impacts or other unforeseen changes;
- ensure that environmental benefits are maximised through good practice; and learn from experience in order to improve EIA process and practice.

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

UNIT – IV
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.

Post Audit activities, The Environmental pollution Act, The water Act, The Air (Prevention & Control of pollution Act.), Mota Act, Wild life Act.

UNIT-V

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

Learning Outcomes

CO1 appreciation of the contexts and role of EIA in environmental management;

CO2 understanding of the elements of EIA and the processes by which they are applied;

CO3 a critical appreciation of the strengths and limitations of EIA;

CO4 confidence to apply the framework of EIA to relevant situations.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G687) SOIL DYNAMICS AND MACHINE FOUNDATIONS
(ELECTIVE –IV)

Course objective:

The subject should enable the students to learn the principles involved in discretization in finite element methods, forming of stiffness matrices and force vectors for simple elements, to know the various approaches followed in finite element analysis, usage of the various elements for discretization and to learn about shape functions. To learn the application of FEM in various structural problems incorporating temperature and boundary conditions and heat transfer problems.

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

UNIT – II
Wave propagation: Elastic waves in Rods – Waves in elastic Half space.
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 – III
Machine Foundations: Types, Design criteria, permissible amplitudes and bearing pressure.Block foundation: Degrees of freedom - analysis under different modes of vibration

UNIT – IV
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.

Course outcomes:

CO1   An ability to understand introductory basic principles and approaches for solving FEM problems in different fields.

CO2   An ability to formulate FEM model for simple problems like one dimensional bar element.

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(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G688) ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE –IV)

Objectives:
- Take advantage of a strong technical education at the undergraduate level to embark on successful professional careers in industry or to continue with a graduate education in their area of specialization.
- Consistently and successfully apply fundamental Structural Engineering principles within their chosen engineering application area (such as Aerospace, Civil, Marine, and Mechanical).
- Apply broad multi-disciplinary skills necessary to accomplish professional objectives in a rapidly changing technological world.
- Understand the ethical issues pertaining to engineering, adopt industry standards of ethical behavior, and apply appropriate communication and collaboration skills essential for professional practice.

UNIT - I
Moment Distribution method: Application to the analysis of portal frames with inclined legs, gable frames
Strain energy method: Application to the analysis of continuous beams and simple portal frames.

UNIT - II
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.
Analysis of two hinged and three hinged arches using influence lines.

UNIT - III
Flexibility Method: Introduction to the structural analysis by flexibility concept using Matrix approach and application to continuous beams and plane trusses.
Stiffness method: Introduction to the structural analysis by stiffness concept using Matrix approach and application to continuous beams and plane trusses.

UNIT - IV
Analysis of portal fames by flexibility and stiffness methods. Drawing of bending moment diagram.

UNIT - V
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

Outcomes

CO1 Ability to design and conduct experiments, as well as being able to analyze and interpret data.

CO2 An ability to design a system, component, or process to meet desired needs.

CO3 An ability to function in multi-disciplinary teams.

CO4 An ability to identify, formulate, and solve engineering problems.

CO5 An understanding of professional and ethical responsibility.

CO6 An ability to communicate effectively with written, oral, and visual means.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester
(4G689) PRESTRESSED CONCRETE
(ELECTIVE –IV)

Course Objectives

To understand the principle of prestressing and design of prestressed elements.

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. IS 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 – II

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 – III

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – IV

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 – V

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.

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.

LEARNING OUTCOME

CO1   At the end of the course, the students will be able to understand the basic theories and the fundamental behaviour of prestressed concrete

CO2   apply the fundamental knowledge to the solution of practical problems.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
IV Year B. Tech. CE – II Semester

(4G48C) ARTIFICIAL NEURAL NETWORKS
(Common for CE and ME)
(ELECTIVE –IV)

COURSE OBJECTIVE:

- To study about basics of neural networks and the importance of present demand in outside.
- To understand the different layers of the feed forward neural networks like adaptive liner neuron etc.
- To study in detail about General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms

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 Back propagation (BP) Training, Summary of Back propagation 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.
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.

COURSE OUTCOMES:

On completion of this course, students should be able to

CO1	Understand how basics of neural networks
CO2	Use the different layers of neural networks in feed forward.