ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES
RAJAMPET - 516126
(AUTONOMOUS)

www.aitsrajampet.ac.in

DEPARTMENT OF CIVIL ENGINEERING
ACADEMIC REGULATIONS (R17)
AND
COURSE STRUCTURE & SYLLABI

For the students admitted to

B. Tech., Regular Four Year Degree Programme in CBCS
from the Academic Year 2017-18
and
Regulations & Course Structures for
B. Tech., Lateral Entry Scheme from the Academic Year 2018-19

B. Tech., CIVIL ENGINEERING

VISION AND MISSION OF THE INSTITUTION

Vision

We impart futuristic technical education and instill high patterns of discipline through our dedicated staff who set global standards, making our students technologically superior and ethically strong, who in turn shall improve the quality of life of the human race.

Mission

Our mission is to educate students from the local and rural areas, and from other states so that they become enlightened individuals, improving the living standards of their families, industry and society. We provide individual attention, world-class quality of Technical education and take care of character building.

VISION AND MISSION OF THE DEPARTMENT

Vision

The department of civil engineering strives to help its graduates to become technically sound and ethically strong engineers and to be recognized as one of the best civil engineering program's in the country through its pursuit of excellence in teaching, research and service activities, besides imparting basic knowledge.

Mission

- To impart training to the students in order to make themselves suitable for the changing technologies in civil engineering field.
- To provide an environment which inspires the students to enhance their analytical thinking and creativity to solve the problems of rural public and problems of the world related to civil engineering.
- To nurture leadership and team work in the students so as to make them good leaders, entrepreneurs and responsible citizens.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The following program educational objectives are consistent with the college and department missions. Graduates of our Civil Engineering program are expected within a four years of graduation to have:

PEO 1. To apply a broad, fundamental-based knowledge and up-to- date skills required in performing professional work in Civil Engineering and related disciplines.

PEO 2. To design the works pertaining to Civil Engineering, incorporating the use of design standards, realistic constraints and consideration of the economic, environmental, and social impact of the design.

PEO 3. To use modern computer software tools to solve Civil Engineering problems and explain and defend their solutions and communicate effectively using graphic, verbal and written techniques to all audiences and

PEO 4. To demonstrate their ability to deal effectively with ethical and professional issues, taking into account the broader societal implications of civil engineering.

PROGRAM OUTCOMES (POs) :

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Correlation levels 1, 2 and 3 as defined below:

1: Slightly (Low)

2: Moderate (Medium)

3: Substantial (High)

If there is no correlation, put "-"

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ACADEMIC REGULATIONS

B. Tech, Four Year Degree Programme with CBCS
(For the batches admitted from the academic year 2017-18)
and
B. Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2018-19)

The following rules and regulations will be applicable for the batches of Four year B.Tech. degree admitted from the academic year 2017-18 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 Andhra Pradesh 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, AP-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 Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh. Seats will be filled by the Convener, AP-ECET.

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

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

1. B.Tech. (Civil Engineering)
2. B.Tech. (Mechanical Engineering)
3. B.Tech. (Computer Science and Engineering)
4. B.Tech. (Electrical and Electronics Engineering)
5. B.Tech. (Electronics and Communication Engineering)

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

3. ACADEMIC YEAR:

The entire course of study is of four academic years and each year will have **TWO** Semesters (Total **EIGHT** Semesters). The minimum instruction days for each semester shall be 90.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

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

a) Language / Communication Skills
b) Humanities and Social Sciences : Environmental Science
c) Economics and Accounting
d) Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 20%)

a) Computer Literacy with Numerical Analysis
b) Mathematics
c) Physics
d) Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch) :(15 to 20%)

a) Engineering Drawing
b) Engineering and IT Workshop
c) Engineering Mechanics
d) Basic Mechanical Engineering
e) Electrical and Electronics Engineering
f) Basic Civil Engineering
g) Computer Programming

4.4 Compulsory Discipline Courses:(30 to 40%)

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 Professional subjects - Electives: (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 Open Electives: (5 to 10%)

Open subjects will be offered from other technical and / or emerging subject areas

4.7 Project Work, Seminar and /or Internship:(10-15%)

Project Work, Seminar and /or Internship in industry or elsewhere.

4.8 Mandatory Courses:

Environmental Studies, Technical English and professional communication & Soft Skills are included as subjects under mandatory courses but with credit weightage.

4.9 There shall be a subject like comprehensive civil Engineering with 2 hours per week introduced in final year first semester.

4.10 Every programme of study shall be designed to have 42-44 theory courses and **22- 28** laboratory/seminar/comprehensive courses.

4.11 Every programme has included foundation courses to the extent of 30%, programme core and programme elective subjects to the extent of 60%, open electives and mandatory courses to the tune of 10% approximately of the total credits.

4.12 Audit Courses (to be included in **I B. Tech. II Semester and III B.Tech. I Semester**):

Interested students who want to supplement their knowledge can opt for audit courses namely Gender sensitization, Professional Ethics/Stress Management & Advanced English Communication laboratory and can appear/Pass in Continuous Internal Evaluation and Semester End Examination of these courses, will be included in marks memo only when they pass.

4.13 Open Elective:

IV Year I Semester student has to necessarily select a subject from the list of open electives.

4.14 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.

	Semester Pattern	
	Period(s) / Week	Credit(s)
Theory	01	01
Practical	**03**	**02**
Comprehensive Course	**02**	**02**
Seminar	**–**	**01**
Final Year Project	12	08

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

6.1 Distribution of Marks:

S.No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
1	Theory	70	Semester-End Examination.	The question paper shall be of subjective type with **Five** questions with internal choice to be answered in 180 Minutes duration.

S.No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
		30	Mid-Examinations of 120 Minutes duration to be evaluated for 20marks. The question paper shall be of subjective type in which four questions with an internal choice are to be answered. Remaining 10 marks is for continuous evaluation which includes weekly/fortnightly class tests, homework assignments, problem solving, group discussions, quiz, seminar, mini-project and other means. The method of allotting these marks will be decided by the teacher dealing that subject in consultation with the Head of the Department. Teacher has to announce the evaluation method in the beginning of the semester.	**<u>Two</u>** MID - Examinations are to be conducted for 20 marks each in a semester. 80% weightage for better performance and 20% for other shall be considered. **MID-I:** After first spell of instructions(I & II-Units). **MID-II:** After second spell of instructions (III,IV&V-Units). The student who has missed both the Mid examinations will be permitted to appear for a substitute examination covering the total syllabus. This substitute examination will be given a weightage of 80%. This is to be conducted before the commencement of end semester exams, can be even outside the working hours, can be even two mid exams a day also.
2	Laboratory or Drawing	70	Semester - End Lab Examination	**For laboratory courses:** **180 minutes** duration – two examiners. For Drawing and /or Design: similar to theory examination.

S.No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
		30	**20 Marks** for Day to Day evaluation	Performance in laboratory experiments / Drawing practices
			10 Marks for Internal evaluation	Performance of one best out of two tests to be considered.
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) consisting of two/three faculty members allotted by Head of the Department.
4	Comprehensive Viva Voce	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 Marks for External evaluation	Semester-End Project Viva-Voce Examination by Committee as detailed under 6.2
			30 Marks for 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 II Semester.

6.3 Eligibility to appear for the 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 semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in 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

1stSlab: Less than 75% attendance but equal to or greater than 70% a normal condonation fee can be collected from the student.

2ndSlab: 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 any semester are not eligible to take their End Examination of that class and their registration for that semester 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 semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that 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.

6.4.1 Challenge valuation

Student can apply challenge valuation by paying stipulated fee. The photo copy of the answer booklet shall be given to the student on notified date.

- If the improvement is 15% of maximum marks or more, the new marks will be awarded to the student. Otherwise there will be no change in the old marks
- If the improvement is 15% of max marks or more 90% of the fee paid will be refunded to the student. If the student's status changes from fail to pass, 50% of fee will be refunded to the student. Otherwise the student will forfeit the amount which he/she paid.
- No challenge valuation for Laboratory Examination.

6.5 Improvement of Marks:

Students are permitted for improvement examinations once for a maximum of four subjects after completion of the study course but before applying for provisional certificate and consolidated marks memo after payment of prescribed fee.

6.6 Readmission of Students:

A student who has satisfied the minimum attendance requirement in any semester may repeat that semester, after obtaining written permission from the Principal and cancelling the previous record of attendance and academic performance (viz; internal evaluation and external evaluation marks) of the semester or year. This facility may be availed by any student at the maximum twice for a 4 year B. Tech., and only once by Lateral Entry student & PG student during the entire course of study.

6.7 Supplementary Examination:

a) 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.

b) In case of Seminars and Comprehensive Viva-Voce examinations, supplementary seminar / comprehensive Viva-Voce will be conducted along with the next batch of students if available. If the next batch of students is not available, a separate supplementary examination will be conducted.

6.8 Internship Programme:

The weightage of two credits given for an internship of three weeks duration and more, when a student undergoes internship / industrial training from the Specified Industries / Research Organizations / Universities. In such a case, the student has to submit a report on that internship which will be evaluated by a team of three faculty members

(decided by the HOD) of the department for those two credits. Student is given a chance to drop one seminar in place of a successful internship / industrial training.

6.9 Massive Open Online Course (MOOC):

MOOC is one of the courses introduced in IV year I semester. The list of subjects under MOOC will be intimated before commencement of class work.

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

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

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

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, drawing subject 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.

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

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 **50** credits from I year I and II-Semesters, II year I and II-Semesters examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he / she fulfill the academic requirements of securing a minimum of **74** credits from I year I and II-Semesters, 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**195**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 **195** credits as indicated in the course structure within **Eight** academic years from the year of admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

7.2 For Lateral Entry Students (batches admitted from 2018-2019):

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 **22** 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 **46** 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 **143** 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 **143** 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 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:

Credit Point Average [CPA] $=\frac{1}{10}\frac{\sum_i C_i T_i}{\sum_i C_i}$

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

T_i= Total marks obtained for course i in any semester.

9.2 For the entire programme:

Cumulative Credit Point Average [CCPA] $=\frac{1}{10}\frac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

Where *n*= the semester in which such courses were credited

9.3 Overall Performance:

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

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 **195/143 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:

12.1 A student is permitted to select one of the extracurricular / extension activities like NSS / Sports / Games / Cultural activities. A certificate in one of these activities is a must for the student to become eligible for the award of Provisional Certificate or Degree. It is resolved that a certificate of participation to the extent of 65% attendance is required for the students to become eligible for the award of degree.

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

13.AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet 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, there include "she", "her", "herself"

CURRICULUM STRUCTURE

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

Regulations: **R17** Programme Code: **G6**

I Year B. Tech., I Semester

Subject	Subject Name	Hours / Week			C
		L	T	P	
7GC11	Technical English & Professional Communication	4	1	0	4
7GC12	Engineering chemistry	3	1	0	3
7GC14	Engineering Mathematics-I	4	1	0	4
7G111	Problem solving techniques and C Programming	3	1	0	3
7G511	Engineering Graphics –I	2	0	5	4
7G512	Engineering Mechanics - Statics	3	1	0	3
7GC15	Engineering chemistry lab	--	--	3	2
7G112	Programming in C Lab	--	--	3	2
7G514	Engineering workshop	--	--	3	2
	Total	**19**	**5**	**14**	**27**

I Year B. Tech., II Semester

Subject	Subject Name	Hours / Week			C
		L	T	P	
7GC23	Engineering Physics	3	1	0	3
7GC24	Engineering Mathematics-II	4	1	0	4
7G121	Data Structures	3	1	0	3
7G521	Engineering Graphics –II	2	--	5	4
7G522	Engineering Mechanics - Dynamics	3	1	0	3
7GC26	Engineering Physics Lab	--	--	3	2
7G124	Programming in Data structures Lab	--	--	3	2
7GC27	ELCS Lab	--	--	4	2
7G123	IT Workshop			3	2
AUDIT COURSE	*Gender Sensitization	2	0	--	0
	Total	**17**	**4**	**18**	**25**

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

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DEPARTMENT OF CIVIL ENGINEERING

Regulations: **R17** Programme Code: **G6**

II Year B. Tech., I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7GC33	Aptitude and Reasoning Skills	--	2	--	1
7G631	Building Materials and Construction	3	1	0	3
7G632	Fluid Mechanics	3	1	0	3
7G633	Strength of Materials	3	1	0	3
7G634	Surveying	3	1	0	3
7G537	Electrical and Mechanical Technology	3	1	0	3
7GC32	Engineering Mathematics-III	3	1	0	3
7G635	Fluid Mechanics Lab	0	--	3	2
7G636	Strength of Materials Lab	0	--	3	2
7G637	Surveying Lab-I	0	--	3	2
	Sports and Extensional Activities	--	--	1	0
	Total	**18**	**08**	**10**	**24**

II Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7G641	Advanced Strength of Materials	3	1	0	3
7G642	Building Planning and Drawing	3	1	0	3
7GC41	Environmental Science	3	1	0	3
7G643	Hydraulics and Hydraulic Machinery	3	1	0	3
7GC42	Probability and Statistics	3	1	0	3
7G644	Structural Analysis-I	3	1	0	3
7G645	Auto CAD Lab	0	--	3	2
7G646	Hydraulics & Hydraulic Machinery Lab	0	--	3	2
7G647	Surveying Lab- II	0	--	3	2
7G648	Seminar – I	0	--	1	1
	Total	**18**	**06**	**10**	**25**

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

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B.Tech. I Year I Semester

(7GC11) Technical English and Professional Communication

(Common to all branches)

L	T	P
4	1	0

Course Objectives:

- To improve the language proficiency of the students in English with respect to accuracy and fluency
- To enable the students to acquire 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 to gain familiarity with the dynamics of communication, stumbling blocks in communication

UNIT I

Sure Outcomes: Technology with a Human Face

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

Technical Communication: Features; Distinction between General and Technical communication; Language as a tool of communication; Elements of Human Communication

UNIT II

Sure Outcomes: Climatic Change and Human Strategy

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

Levels of Communication: Intrapersonal; Interpersonal, Organizational, Mass communication

The Flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group)

UNIT III

Sure Outcomes: Emerging Technologies: Solar Energy in Spain

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

Non-verbal Communication: Kinesics; Proxemics; Paralinguistic features; Chronemics. Role of Body Language during Presentation, GD and Interview

UNIT IV

Sure Outcomes: Water: The Elixir of Life

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

Barriers to Communication: Definition of Noise; Classification of Barriers; overcoming barriers

Listening: Types of Listening; Traits of a Good Listener; Active vs. Passive Listening; Empathetic Listening

UNIT V

Sure Outcomes: The Secret of Work

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

The Models of Communication: Linear; Interactive; Transactional; Johari Window; Transactional Analysis

Communicative Styles: Assertive, Aggressive, Passive-aggressive, Submissive, Manipulative

Prescribed Textbooks:

1. *Sure Outcomes* published by Orient Black Swan (with CD)
2. *Technical Communication*, Principles and Practices, Meenakshi Raman and Sangeeta Sharma, 3rd Edition, Oxford University Press, 2015

The books prescribed serve as students' handbooks. The reader comprises essays which are particularly relevant to the needs of engineering students. 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 to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

References:

1. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji , Macmillan, 2009
2. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
3. English Grammar and Composition, David Grene, McMillan India Ltd.
4. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
5. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.

6. English for Technical Communication, AyshaViswamohan, Tata Mc-Graw Hill
7. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
8. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.

Course Outcomes:

- Students will increase their vocabulary through the study of word parts, use of context clues, idiomatic expressions, and practice with a dictionary
- Students will exhibit their ability to read, comprehend, organize, and retain written information
- Students will practice the unique qualities of technical writing style, such as sentence conciseness, clarity, accuracy, avoiding ambiguity, using direct order organization, readability, coherence and transitional devices
- Students exhibit effective writing skills and create effective documents in technical communication such as letters, reports and emails
- Students will understand the factors that influence the use of grammar and vocabulary in speech and writing
- Students shall develop professional communication skills, which are necessary for effective collaboration and cooperation with other students
- Students learn to effectively utilize his body language to communicate in his academic and professional career.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	1	3	-	3
CO2	-	-	-	-	-	-	-	-	1	3	-	3
CO3	-	-	-	-	-	-	-	-	-	2	-	3
CO4	-	-	-	-	-	-	-	-	-	3	-	3
CO5	-	-	-	-	-	-	-	-	-	3	-	2
CO6	-	-	-	-	-	-	-	-	3	3	-	1
CO7	-	-	-	-	-	-	-	-	1	2	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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DEPARTMENT OF CIVIL ENGINEERING

B.Tech. I Year I Semester

(7GC12) Engineering Chemistry
(Common to CSE, ME and CE)

L	T	P
3	1	0

Course Objectives:

- 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 course is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- 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.
- The student will understand 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 and alkalinity in water. Water treatment for domestic purpose. Disinfection - Definition, Kinds of disinfectants (Bleaching powder & Ozone) Break point chlorination.

Industrial Use of water, Boiler troubles-Priming and foaming, Scale & Sludge, Caustic Embrittlement and Boiler Corrosion.

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

UNIT II

ELECTROCHEMISTRY: Basic concepts-Nernst equation, Galvanic cell, Standard Reduction Potential (SRP), numerical calculations on EMF. Batteries: types of batteries, primary batteries-Dry cell, Secondary batteries-Ni-Cd, Lithium Ion Batteries. Fuels cells-Hydrogen-Oxygen fuel cell & Methanol-Oxygen fuel cell.

Conductometry-basic concepts, conductance, molar and equivalent conductance, measurement of conductance, Types of conductometric titrations-strong acid Vs. strong base, weak acid Vs. strong base, strong acid Vs. weak base and weak acid Vs. weak base.

CORROSION: Definition & Types - dry & wet Corrosions, Electrochemical theory of corrosion, concentration cell corrosion, galvanic corrosion, factors affecting the corrosion, Prevention: Anodic and Cathodic protection, Electroplating -Nickel, copper & Electrolessplating-Nickel.

UNIT III

POLYMERS: Introduction to polymers, Types of Polymerization: Addition, Condensation & Co-polymerization (without mechanism). Plastics-Thermoplastics and Thermosetting Plastics: Preparation, properties and applications of Bakelite, Nylon-6,6, PVC and PE.

Natural Rubber: Processing of natural rubber, vulcanization and compounding of rubber. Elastomers: Preparation, properties and Engineering applications of Buna-S, Buna-N and polyurethane rubbers.

Conducting polymers: Synthesis, mechanism & applications of Polyacetylene

Inorganic Polymers: Introduction, Silicones, Polyphosphazenes and poly dispersive Index

UNIT IV

FUEL TECHNOLOGY: Classification of Fuels, Calorific Value – Units, its determination using Bomb calorimeter, Numerical Problems on calorific value and Combustion Solid Fuels - Coke: Manufacture of Coke by Otto Hoffmann's by product oven.

Liquid Fuels: Petroleum: Refining of Petroleum, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Gasoline: Knocking, Octane Number. Diesel - Cetane number.

Gaseous Fuels: Origin, Production and uses of Natural gas, Water Gas and Biogas. Flue Gas analysis by Orsat's apparatus

UNIT V

CHEMISTRY OF ENGINEERING MATERIALS: Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis) Refractories: Definition, classification with suitable examples, properties - Refractoriness, RUL, Dimensional Stability, Porosity and Thermal spalling and Applications of refractory materials

Lubricants: Definition, classification, mechanism of lubrication and properties of lubricants - Viscosity, viscosity index, flash and fire point, cloud and pour point, mechanical strength, neutralizing number and Aniline point, applications of lubricants.

Prescribed Text Books:

1. Engineering Chemistry by K.N Jayaveera, G.V Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, 1st edition, 2013.
2. A Text Book of Engineering Chemistry, Jain and Jain, DhanapathRai Publishing Company, New Delhi, 17th Edition, 2013

Reference Books:

1. A Text book of Engineering Chemistry by S.S Dhara, S.S Umare, S. Chand Publications, New Delhi, 14th Edition, 2014.
2. Engineering Chemistry by K.B Chandra Sekhar, UN. Das and Sujatha Mishra, SCITECH, Publications India Pvt. Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- AshimaSrivastava and N.N. Jahnavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry, Shashichawla, DhanapathRai& Co Publications, New Delhi, 4th Edition, 2014.
5. Engineering Chemistry, K. Sesha Maheswaramma and Mrudula Chugh, Pearson Education, First Edition, 2013

Course Outcomes:

- The students will be able to understand the basic concepts of water analysis methods which help them in solving problems related to water treatment methods.
- The students will be able to understand the basic principles of conductometry, batteries & fuel cells, and extends the knowledge to solve problems of corrosion.
- The students will be able to synthesize and differentiate different types of polymers.
- The students will be able to derive or manufacture different types of fuels and elucidate their properties

- The students will be able to manufacture cement, understand the basic concepts of refractories, lubricants and elucidate their properties.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	-	2	-	-	-	-	-	-
CO2	3	2	1	-	-	1	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech., I Semester

(7GC14) Engineering Mathematics – I

(Common to CSE,CE&ME)

L	T	P
4	1	0

Course Objectives:

- The subject gives the knowledge about matrices and applications to solve linear equations.
- The course intends to provide an overview of Eigen values and Eigen vectors which occur in Physical and engineering problems.
- To understand the differential equations of first order with their applications.
- To provide an overview of differential equations of second and higher order with their applications
- To understand the concepts of mean value theorems and functions of several variables

UNIT I

Real Matrices: Types - definitions - Elementary transformations – Rank – Echelon form – Consistency-Solution of Linear System of Homogenous and Non Homogeneous equations.

Eigen Values & Eigen Vectors: Eigen Values, Eigen vectors – Properties, Cayley – Hamilton Theorem.

UNIT II

Diagonalization of matrix - Quadratic form: Reduction of quadratic form to canonical form - nature - Linear Transformation –Orthogonal Transformation.

Complex Matrices - Hermitian, Skew-Hermitian, Unitary matrices- Eigen Values, Eigen vectors – Properties.

UNIT III

Differential equations of first order and first degree: Linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT IV

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin*ax*/cos*ax*, polynomials in x, $e^{ax}\sin ax / e^{ax}\cos ax / e^{ax}x^n$, *xsin ax/x cosax*, method of variation of parameters. Applications to oscillatory electrical circuits.

UNIT V

Rolle's Theorem – Lagrange's Mean Value Theorem (without proof).Functions of several variables – Partial differentiation- Chain rule-Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

Prescribed Text Books:

Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna publishers, 2014.

Reference Books:

1. Advanced Engineering Mathematics, EriwinKreyszig, 9th edition, Wiley International edition.
2. Engineering Mathematics, H.K.Dass and Verma Rama, S. Chand, 2007.
3. Engineering Mathematics, Pal and Bhunia, First edition, Oxford University,2015.
4. Higher Engineering Mathematics, B.V. Ramana, Tata McGraw Hill Publishing Company limited, 2006.
5. Higher Engineering Mathematics, John Bird 7th Edition, Routledge-Taylor and Francis Group London, 2014.

Course Outcomes:

- Students will be able to apply this knowledge to solve linear equations.
- Student will understand the concept of modeling or translating a physical or any other.
- Students will be able to solve first order differential equations and their applications.
- Students will learn the usage of higher order differential equations that are applied to real world problems.
- Students will exhibit an ability to identify, formulates, and solve the problems on functions of several variables.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	3
CO2	3	2	-	-	-	-	-	-	-	-	-	3
CO3	3	-	2	-	-	-	-	-	-	-	-	3
CO4	3	-	2	-	-	-	-	-	-	-	-	2
CO5	3	3	-	-	-	-	-	-	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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I Year B. Tech., I Semester

(7G111) PROBLEM SOLVING TECHNIQUES AND C PROGRAMMING

(Common to ALL branches)

L	T	P
3	1	0

Course Objectives:

- Introduction to computer peripherals, Software development.
- Describe when and how to use the 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, Arrays and Strings

UNIT I

Introduction to Computer Problem Solving: Introduction to Computer Systems, Computer Environments, Computer Languages, Introduction to Problem Solving Aspect, Top- down Design, Implementation of Algorithms, Flow Charts, SDLC.

UNIT II

Introduction to C Language: Structure of a C Language program, Creating and Running C programs, Keywords, Identifiers, Data Types, typedef, enumerated Types variables, constants, input/output. Operators and Expressions, precedence and associatively, Type Conversions, Bitwise Operators. Example programs for each topic.

UNIT III

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, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, goto. Example programs for each topic.

UNIT IV

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

Strings: String Basics, String Library Functions, Array of Strings. Example programs for each topic.

UNIT V

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. Example programs for each topic.

Text Books:

1. C Programming and Data Structures. B. AForouzan, 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 McGraw Hill.
4. How to Solve it By Computer, R.G.Dromey,PHI.

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, YeswanthKanitkar, Ninth Edition, BPB Publication.

Course Outcomes:

After completion of the course student will be able to

- Understand the importance of the software development process and System development tools.
- Understand general principles of C programming language and able to write simple programs in C.
- Understand the conditional and iteration statements in C language and able to write simple programs.
- Able to develop the programs based on arrays and strings.
- Able to develop the programs based on user-defined functions and their principles.

Mapping of COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2	3	-	1	-	-	-	-	-	-
CO2	3	3	3	3	3	-	-	-	1	-	-	-
CO3	3	2	1	2	1	-	-	-	1	-	-	2
CO4	2	3	2	2	3	-	-	-	1	-	1	2
CO5	3	2	2	2	2	-	-	-	1	-	-	2

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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech. I Semester

(7G511) ENGINEERING GRAPHICS – I

(Common to CE andME)

L	T	P
2	0	5

Course Objectives:

- To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing in order to become professionally efficient.
- To introduce fundamental concepts of curves used in engineering, projection of points, lines and planes.
- To impart and inculcate proper understanding of the theory of projections.
- To understand and visualize geometrical curves, projections of lines and planes.

UNIT I

INTRODUCTION: Lettering – Geometrical constructions - Curves used in Engineering Practice: Conic Sections– General method only. Special methods: Ellipse – Oblong method, Arcs of circle method, concentric circles methods - Rectangle method and Tangent method for Parabola - Rectangular Hyperbola.

UNIT II

CYCLOIDAL CURVES: Cycloid, Epicycloid and Hypocycloid (treatment of simple problems) –Involutes – Square, Pentagon, Hexagon and Circle.

UNIT III

PROJECTIONS OF POINTS AND LINES: Projections of Points and Projections of Lines-inclined to one reference plane - inclined to both reference planes, finding the True lengths - Traces.

UNIT IV

PROJECTIONS OF PLANES: Projections of regular Plane surfaces inclined to one reference plane and both reference planes.

UNIT V

AUXILIARY PLANES: Projection of lines and planes using auxiliary planes.

Text books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub.

References:

1. Engineering Drawing and Graphics, Venugopal/ New age.
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education

Course Outcomes:

- Understands the concepts of Conic Sections.
- Understands the concept of Cycloidal Curves, Involutes and the application of industry standards.
- Students are capable to understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
- Students are capable to understand Orthographic Projections of Planes.
- Understands the Auxiliary Projections of Points, Lines and Planes.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO1	3	-	-	-	-	3	2	-	1	2	-	-
CO2	3	-	-	-	-	3	2	-	1	2	-	-
CO3	3	2	-	-	-	3	2	-	1	2	-	-
CO4	3	2	-	-	-	3	2	-	1	2	-	-
CO5	3	2	-	-	-	3	2	-	1	2	-	-

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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech. I Semester

(7G512) ENGINEERING MECHANICS-STATICS

(Common to CE and ME)

L	T	P
3	1	0

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.
- Develop an understanding of the principles of statics and the ability to analyze problems in a systematic and logical manner, including the ability to draw free-body diagrams. Ability to analyze the statics of trusses, frames and machines.

UNIT I

INTRODUCTION TO ENGINEERING MECHANICS: Basic concepts - System of forces–Resultant of a force system, Moment of forces and its Application & Couples, Spatial Forces-Components in space, Resultant Equilibrium of system forces, free body diagrams.

UNIT II

TYPES OF SUPPORTS: Support reactions for beams with different types of loading – concentrated, uniformly distributed load, uniformly varying loading and couple.

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 and impending motions–Cone of limiting friction– Motion of bodies – Wedge friction – Ladder 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 and Guldinus Centre of Gravity of Composite figures. (Simple problems only).

UNIT V

MOMENT OF INERTIA: 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)

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 kumarreddy – B.S. Publishers.
4. Engineering Mechanics, Bhavikatti and Rajasekharappa.

Reference Books:

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:

The students are able to

- Understand the concept of force, moment, couple and their applications.(I)
- Draw Free Body Diagram, understand and apply the conditions of equilibrium to find out unknown forces.(I)
- Determine reactions at the supports of beam for different types of loading.(II)
- Analyze the forces in the members of the frames/truss.
- Understand the concept of friction and its applications.
- Understand the concept of centroid and location of centroid of plane figures and material bodies.
- Understand moment of inertia, determining moment of inertia of plane figures and material bodies.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	X	-	-	-	-	-	-	-	-	-	-	-
CO2	X	-	-	-	-	-	-	-	-	-	-	-
CO3	X	-	-	-	-	-	-	-	-	-	-	-
CO4	X	X	-	-	-	-	-	-	-	-	-	-
CO5	X	X	-	-	-	-	-	-	-	-	-	-
CO6	X	-	-	-	-	-	-	-	-	-	-	-
CO7	X	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF CIVIL ENGINEERING

B.Tech. I Year I Semester

(7GC15) Engineering Chemistry Lab
(Common to CE and ME)

L	T	P
0	0	3

Course Objectives:

- The student will learn practical understanding of the redox reaction.
- The student will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
- The student will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

VOLUMETRIC ANALYSIS

Redox Titrations

1. Estimation of iron (II) using Diphenylamine indicator (Dichrometry – Internal indicator method)

Water analysis

2. Determination of total hardness of water by EDTA method
3. Estimation of calcium hardness using murexide indicator
4. Estimation of Dissolved Oxygen by Winkler's method
5. Determination of Alkalinity of Water.

Iodometry

6. Determination of Copper by Iodometry

INSTRUMENTATION

Colorimetry

7. Estimation of Iron in Cement by Colorimetry.

Conductometry

8. Conductometric titration of mixture of acids Vs strong base (Neutralization titration)
9. Determination of pH of various water samples.

Fuel analysis

10. Determination of Calorific Value of fuel by using Bomb Calorimeter

Lubricants

11. Determination of Viscosity of oils using Redwood Viscometer I
12. Determination of Viscosity of oils using Redwood Viscometer II
13. Determination of Flash and fire points of Lubricants

PREPARATION OF POLYMERS

14. Preparation of Bakelite
15. Preparation of Thiokol rubber

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

REFERENCE BOOKS:

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.

Course Outcomes:

- Students will understand the concept of redox systems
- Students will exhibit skills to handle the analytical methods with confidence
- Students will be able to acquire the operating principles and the reaction mechanisms of the instruments
- Students will be able apply his knowledge on the basic principles of batteries

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	2	2	-	3	-	-	-	-	-	-
CO2	-	3	-	2	-	3	-	-	-	-	-	-
CO3	3	-	-	2	-	2	-	-	-	-	-	-
CO4	2	-	-	2	-	2	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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I Year B. Tech., I Semester

(7G112) PROGRAMMING IN C LAB
(Common to CE and ME)

L	T	P
0	0	3

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/ TURBO C Compiler and Supporting Editors

Exercise l:

Minimum of 4 programs on Data types, Variables, Constants and Input and Output.

Exercise 2:

Minimum of 4 programs on each Operator, Expressions and Type Conversions.

Exercise 3:

Minimum of 4 programs on Conditional Statements [two way and multipath].

Exercise 4:

Minimum of 4 programs on each Loop Control Statements [for, while and do-While]

Exercise 5:

Minimum of 4 programs on Unconditioned JUMP Statements- break, continue, Goto.

Exercise 6:

Minimum of 4 programs on Declaring Arrays, Referencing Arrays, Array Subscripts. Using for loop for sequential Access.

Exercise 7:

Minimum of 4 programs on Multidimensional Arrays.

Exercise 8:

Minimum of 4 programs on String Basics, String Library Functions and Array of Strings.

Exercise 9:

Minimum of 4 programs on simple user defined functions, Parameter passing methods- pass by value, pass by reference.

Exercise 10:

Minimum of 4 programs on Storage classes- Auto, Register, Static and Extern

Exercise 11:

Minimum of 4 programs on Recursive Functions, Preprocessor commands.

Exercise 12:

Minimum of 4 programs on using Array Elements as Function Arguments.

Course Outcomes:

After Completion of the course student should able to

- Know concepts in problem solving
- To do programming in C language
- To write diversified solutions using C language

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	-	-	-	2	2	1	2
CO2	2	2	-	-	-	-	-	-	1	-	-	2
CO3	3	-	-	1	-	-	-	-	1	-	-	2

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

I Year B. Tech. I Semester

(7G514) ENGINEERING WORKSHOP

(Common to CE and ME)

L	T	P
0	0	3

Course Objective:

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, know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. **TRADES FOR EXERCISES:**
   A. **CARPENTRY SHOP**– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 50 x 50 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.

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, SaravanaPandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

Course outcomes:

- An ability to identify and apply suitable tools for manufacturing of components in workshop trades of Fitting, Carpentry, Foundry, Tin smithy, welding.
- An ability to identify and use hand tools for electrical wiring and give power supply to domestic installations.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	3	-
CO2	1	-	-	-	-	-	-	2	-	-	3	-

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

B.Tech. I Year II Semester

(7GC23) ENGINEERING PHYSICS

(Common to CE, CSE&ME)

L	T	P
3	1	0

Course Objectives:

- The mission of 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 educates the principles of optical science and Engineering necessary to understand optical systems.
- The crystallography, X-ray diffraction of crystals explain how basic structure modulates properties of materials.
- The principles of Quantum mechanics and Electron theory of metals give an idea on basic development of energy in metals.
- The main objective of this course is to provide basic understanding of different Engineering materials such as semiconductors, magnetic, superconductors and nano materials.

UNIT I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics: Interference (review)Interference in thin films by reflection – Newton's Rings –Fraunhofer diffraction and grating-spectrum.

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 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 – Inter planar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method of diffraction.

Ultrasonics: Introduction – Production of ultrasonics by piezoelectric method – Properties 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'sun certainty principle - Schrodinger's time independent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well.

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) – Classification of solids into conductors, semiconductors and insulators.

UNIT IV

SEMICONDUCTORS AND SUPERCONDUCTORS:

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.

Superconductors: Introduction –Properties of superconductors - Meissner effect – Type I and type II superconductors – Flux quantization – BCS theory(qualitative) -ac and dc Josephson effects- High T_c Superconductors - Applications of superconductors.

UNIT V

MAGNETIC MATERIALS AND NANOMATERIALS:

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.

***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 methods – structure and properties of CNT - Applications of nanomaterials.

Prescribed Text Books:

1. Engineering Physics –K. Thyagarajan, II Edition,MacGraw Hill Publishers, 2013.
2. Engineering physics –P.K.palanisamy, 2nd Edition,Scitech publisher, 2013.

Reference Books:

1. Engineering physics – S. ManiNaidu, I Edition,Pearson Education, 2012.
2. Engineering Physics – D K Pandey, S. Chaturvedi, I Edition,Cengage Learning, 2012.
3. Engineering Physics – Gaur and Gupta Dhanapati, 7thEdition,RaiPublishers , 1992.
4. Engineering Physics – M. Arumugam, II Edition, Anuradha Publications, 1997.
5. Text book of Nanoscience and Technology:B S Murthy, P.Shankar, Baldev Raj B BRath, James Murday, I Edition,University Press, 2012.
6. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edi 2013.

Course Outcomes:

- Students gain knowledge about basic concepts of optics, fiber optics, and lasers.
- Students will be able to identify different types of crystal structures that occur in materials and understand production and application of Ultrasonics.
- The student exhibits knowledge of the roots and founding principles of Quantum Mechanics and band theory of solids.
- Students develop an understanding of the basic principles underlying the semiconductor and superconductors.
- Students become familiar with the general properties of magnetic materials and nanomaterials.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech., II Semester

(7GC24)Engineering Mathematics II
(Common to all branches)

L	T	P
4	1	0

Course Objectives:

- To apply this knowledge to evaluate the Multiple Integrals in real life situations.
- To introduce the concepts of Laplace transforms.
- To apply the knowledge of Inverse Laplace transforms for engineering problems.
- To provide the concepts of vector differentiation and integration.
- To apply the knowledge of Green's theorem, Stroke's theorem and Gauss divergence theorem.

UNIT I

Curve Tracing – Cartesian and Polar curves

Multiple integrals: Double integral – Evaluation - Change of Variables - Change of order of integration- Triple integral - Evaluation.

UNIT II

Laplace transforms of standard functions– First shifting Theorem, Change of scale property, Multiplication by t^n , division by t, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions.

UNIT III

Inverse Laplace transforms – Convolution theorem. Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT IV

Vector Calculus: Scalar and vector point functions, Gradient, Divergence, Curl, Properties, Del applied twice to point functions, Line integral - Area, Surface and volume integrals.

UNIT V

Vector integral theorems: Green's theorem – Stroke's theorem- Gauss's Divergence Theorem (without proofs) and their applications.

Prescribed Text Book:

Higher Engineering Mathematics, B. S. Grewal, Khanna publishers-43rdEdition (2014)

Reference Books:

1. Advanced Engineering Mathematics, EriwinKreyszig, 9 th edition, Wiley International edition.
2. Engineering Mathematics, H.K.Dass and Verma Rama, S. Chand, 2007.
3. Engineering Mathematics, Pal and Bhunia, First edition, Oxford University, 2015.
5. Higher Engineering Mathematics, B.V. Ramana, Tata McGraw Hill Publishing Company Limited, 2006.
6. Higher Engineering Mathematics, John Bird 7th Edition, Routledge-Taylor and Francis Group London, 2014.

Course Outcomes:

- Student will understand the applications of Curve tracing and Multiple integration
- Student will exhibit the Knowledge of Laplace transforms.
- Student will exhibit the Knowledge of Inverse Laplace transforms and solve the ordinary differential equations with given initial boundary conditions in engineering subjects
- Student will be able to analyze the Vector differentiation and Integration in various domains.
- Student understands the applications of Vector Integral theorems.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	2
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	3

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

(7G121) DATA STRUCTURES
(Common to ALL branches)

L	T	P
3	1	0

Course Objectives:

- Structured programs when and how to use the appropriate statements available in the C language
- Implementation of C programs using Structures, Unions, Files and Pointers.
- Implementation of various types of searching and sorting techniques.
- Implementation of linear Data structures.
- Implementation of non-linear Data structures.

UNIT I

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 II

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

Files: Introduction to Streams and Files, 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 III

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.

UNIT IV

Linked List: Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

Doubly Linked List: Insertion, Deletion and Searching Operations.

Circular Linked List: Insertion, Deletion and Searching Operations.

UNIT V

Trees: Introduction to Trees, Binary Trees, creation of binary tree, Operations on Binary Tree. Introduction to Binary Search Tree, Operations on Binary Search Trees.

Graphs: Defining graph, basic terminology, graph representation.

Text Books:

1. C Programming and DataStructures. 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. Data Structures and Algorithms: Concepts, Techniques and ApplicationsG.A.V. Pai[UNIT-V]

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.

Course Outcomes:

1. Understand the purpose of pointers for parameter passing, referencing and dereferencing.
2. Understands the concepts of structures, unions, File management and how to solve the applications like searching and sorting using C programming language.
3. Understand what and how to design data structure programs of stacks and queues using C programming language.
4. Understand what and how to design data structure programs of different types of linked list.
5. Understand how to design the non-linear data structures of trees and graphs.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	1	-	-	-	-	-	-	1
CO2	2	1	-	-	1	-	-	1	2	1	-	1
CO3	2	-	-	-	1	-	-	-	1	1	-	1
CO4	2	2	1	1					2	1		2
CO5	2	1	1	1		1			2	1		2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech. II Semester

(7G521) ENGINEERING GRAPHICS – II

(Common to CE and ME)

L	T	P
2	0	5

Course Objectives:

- To impart and inculcate proper understanding of the theory of projections of solids and simple machine components.
- Able to visualize projections of solids with sectioning, isometric views and orthographic views.
- To prepare the student for future engineering positions.

UNIT I

PROJECTIONS OF SOLIDS: Projections of Regular Solids – Cylinder, Cone, Prism and Pyramid - inclined to one reference plane & both reference planes – Auxiliary Views.

UNIT II

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

UNIT III

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 Vssquare prism – Cylinder Vs Cone and Square prism Vs Square prism (Axis bisecting problems only).

UNIT IV

ISOMETRIC PROJECTIONS / VIEWS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids.

UNIT V

CONVERSION OF VIEWS: Conversion of Isometric views to Orthographic Views and Conversion of Orthographic views to Isometric views.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub.

Reference Books:

1. Engineering Drawing and Graphics, Venugopal/ New age.
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education.

Course Outcomes:

- Able to understand and analyze the Orthographic Projections of Solids.
- Able to apply sectional views for industrial engineering components.
- Students are capable to develop a sheet which meets the specifications of an object and can analyze the image of an intersected solids.
- Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Analyze a drawing and can efficiently communicate ideas graphically.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	2	-	3	3	-	-
CO2	3	-	-	-	-	-	2	-	3	3	-	-
CO3	3	2	-	-	-	-	2	-	3	3	-	-
CO4	3	2	-	-	-	-	2	-	3	3	-	-
CO5	3	2	-	-	-	-	2	-	3	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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DEPARTMENT OF CIVIL ENGINEERING

I Year B. Tech. II Semester

(7G522) ENGINEERING MECHANICS-DYNAMICS
(Common to CE and ME)

L	T	P
3	1	0

Course Objectives:

- This course will serve as a basic course by introducing the concepts of Basic mechanics which will help as a foundation to various courses.
- To teach the basic principles of particle and rigid body kinematics and kinetics. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.

UNIT I

KINEMATICS OF PARTICLES: Introduction, motion of particle, displacement, velocity and acceleration, Rectilinear motion, Rectilinear motion Along X-axis, Uniformly Accelerated motion, motion curves, rectilinear motion along vertical Y-axis

CURVILINEAR MOTION: introduction, rectangular coordinates, projectile motion, tangential and normal components of acceleration, radial and transverse components of acceleration.

UNIT II

KINEMATICS OF RIGID BODIES: Introduction, rotational motion about a fixed axis, rotational motion with constant angular acceleration, rotational motion with constant angular velocity, relationship between angular and linear motions, general plane motion.

UNIT III

KINETICS OF PARTICLES: Introduction, laws of motion, motion of bodies in rectangular coordinates, motion of connected bodies, D'alembert's principle, variable acceleration, tangential and normal components of acceleration, Virtual work method.

UNIT IV

WORK AND ENERGY: Introduction, work done by a force, work done by a variable force, work done in stretching a spring, power, energy, work done by internal forces, potential energy.

IMPULSE AND MOMENTUM: Introduction, impulsive force, impulse and momentum, non-impulsive force, impact of jet on plates or vanes.

UNIT V

KINETICS OF RIGID BODIES: Introduction, system of particles, translational motion of a system of particles, rotational motion of system of particles, kinetic equations of motion for a rigid body, work energy method.

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 kumarreddy – B.S. Publishers.
4. Engineering Mechanics, Bhavikatti and Rajasekharappa.

Reference Books:

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:

The students are able to

1. Understand basic kinematic concepts – displacement, velocity and acceleration.
2. Analyze rectilinear motion and curvilinear motion.
3. Understand the concepts of angular displacement, angular velocity and angular acceleration.
4. Analyze general plane motion of bodies.
5. Understand the applications of Newton's laws of motion, D-Alembert's principle.
6. Calculate tangential and normal component of acceleration.
7. Understand virtual work and its applications.
8. Understand work, energy and their applications.
9. Understand Impulse, momentum and their applications.
10. Write kinetic equation of motion of rigid body and apply work energy method for solving kinetics.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	X	-	-	-	-	-	-	-	-	-	-	-
CO2	X	-	-	-	-	-	-	-	-	-	-	-
CO3	X	-	-	-	-	-	-	-	-	-	-	-
CO4	X	X	-	-	-	-	-	-	-	-	-	-
CO5	X	-	-	-	-	-	-	-	-	-	-	-
CO6	X	-	-	-	-	-	-	-	-	-	-	-
CO7	X	-	-	-	-	-	-	-	-	-	-	-
CO8	X	-	-	-	-	-	-	-	-	-	-	-
CO9	X	-	-	-	-	-	-	-	-	-	-	-
CO10	X	X	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF CIVIL ENGINEERING

B.Tech. I Year II Semester

(7GC26) Engineering Physics Lab

(Common to CSE, ME& CE)

L	T	P
0	0	3

Course Objectives:

- The student will able to handle and understanding of different apparatus to perform experiments.
- The student will learn practical measurement of different physical quantities.
- The student will able to characterize the materials and their properties.
- The student allows learning practical experience of theory conceptual values.

LIST OF EXPERIMENTS

Any 10 of the following experiments have 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. Meldi's experiment: Determination of the frequency of tuning fork
10. Determination of particle size by using laser.
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 : Hysteresis loss.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Determination of rigidity modulus –Torsional pendulum

Manual cum Record:

Prepared by Engineering Physics Faculty Members of Annamacharya Institute of Technology and Sciences.

Reference Books:

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

C**ourse Outcomes:**

- Students will understand the characteristics and behavior of various materials
- Students will be able to understand the applications of optics using basic fundamentals of physics
- Students will exhibit an ability to use techniques and skills associated with modern engineering tools such as lasers and fiber optics
- Students will be able to measure properties of a semiconductor and magnetic materials.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	2	-	-	-	-	-	-	-
CO2	3	2	-	-	3	-	-	-	-	-	-	-
CO3	2	2	-	2	3	-	-	-	-	-	-	-
CO4	2	3	-	-	2	-	-	-	-	-	-	-

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

(7G124) PROGRAMMING IN DATA STRUCTURES LAB
(Common to CE, EEE, ECE and ME)

L	T	P
0	0	3

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/ TURBO C Compiler and Supporting Editors

Exercise 1 : Minimum of 3 Programs on pointer basics.

Exercise 2 : Minimum of 3 Programs on Pointers applications.

Exercise 3 : Minimum of 3 programs on structures and unions

Exercise 4 : Minimum of 3 programs on basic File operations.

Exercise 5 : Minimum of 3 programs on searching and sorting techniques.

Exercise 6 : Implementation of Stack and perform all Stack operations using
i) Arrays ii) Pointers

Exercise 7 : Implementation of Queue and perform all Queue operations using
i) Arrays ii) Pointers

Exercise 8 : Implement Circular Queue (its operations) using
i) Arrays ii) Pointers

Exercise 9 : Implementation of Single Linked List and its operations using
i) Arrays ii) Pointers

Exercise 10 : Implementation of Double Linked List and its operations using
i) Arrays ii) Pointers

Exercise 11 : Implementation of Circular Linked List and its operations using
i) Arrays ii) Pointers

Exercise 12 : C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Exercise 13 : Implement Binary Tree using Double Linked List and its operations.

Course Outcomes

- Student will be able to choose appropriate data structure as applied to specified problem definition.
- Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Students will be able to use linear and non-linear data structures like stacks, queues , linked list etc.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	1	-	1	-	-	2
CO2	3	2	2	2	-	-	-	-	-	2	-	3
CO3	2	2	2	2	-	-	-	-	2	2	-	3

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

B. Tech. I Year II Semester

(7GC27)English Language Communication Skills Lab
(Common to CE, ME, ECE & EEE)

L	T	P
0	0	4

Course Objectives:

- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To train students to use language effectively in everyday conversations
- To enable the students understand rudiments of public speaking skills and acquire presentation skills
- To equip the students with better pronunciation through emphasis on individual speech sounds, accent and intonation

SYLLABUS:

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

1. **Introduction to the Sounds of English- Vowels, Diphthongs & Consonants**
2. **Introduction to Stress and Intonation**
3. **Situational Dialogues**
4. **Telephone Skills**
5. **Describing Objects / Situation / People**
6. **Oral Presentations**
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

Clarity Pronunciation Power – Part I

Learning to Speak English - 4 CD

Course Outcomes:

- Students will learn about the significance of pronunciation, accent and intonation and will attempt to neutralize their accent
- Students will be able to express themselves in social and professional contexts fluently
- Students will be able to converse over phone confidently and clearly in English
- The student will be able to describe people, objects and situations using adjectives
- Students will enhance their public speaking skills and make technical presentations confidently
- Students will analyze and interpret data from graphs/pie charts.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	2	2	-	1
CO2	-	-	-	-	-	-	-	-	2	3	-	2
CO3	-	-	-	-	-	-	-	-	3	2	-	2
CO4	-	-	-	-	-	-	-	-	2	2	-	1
CO5	-	-	-	-	-	-	-	-	2	3	-	3
CO6	-	-	-	-	-	-	-	-	1	2	-	1

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

I Year B. Tech., II Semester

(7G123) I.T WORKSHOP

(Common to CE &ME)

L	T	P
0	0	3

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 by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Preparing your Computer

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

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.

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

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, hyper linking, 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
- 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

Reference books:

1. Introduction to Computers, Peter Norton, McGraw 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

Course Outcome:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	3	-	2	-	-	-	2	-	-	-
CO2	-	3	-	-	3	-	-	-	-	3	1	2
CO3	-	3	-	-	3	-	-	-	-	3	1	2
CO4	-	-	3	-	2	-	-	-	2	-	-	-
CO5	-	-		-		-	-	-	2	-	-	2
CO6	-	-	3	-		-	-	-	2	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
DEPARTMENT OF CIVIL ENGINEERING
(Audit Course)
GENDERSENSITIZATION
(Common to all Branches)

L	T	P
2	0	0

Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

UNIT I

UNDERSTANDING GENDER: Gender: Why should we study it? (Towards a world of Equals: Unit-1) Socialization: Making Women, Making Men (Towards a world of Equals: Unit-2) Introduction, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities. Just relationships: Being together as Equals (Towards a World of Equals: Unit-12) Mary Kom and other. Love and Acid just do not mix, Love Letters, Mothers and Fathers,

UNIT II

GENDER AND BIOLOGY: Missing Women: Sex Selection and its consequences (Towards a world of Equals: Unit-4) Declining Sex Ratio, Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit-10) Two or Many? Struggles with Discrimination. Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit-13)

UNIT III

GENDER AND LABOUR: House work: The Invisible Labour (Towards a World of Equals: Unit-3) "My Mother doesn't Work". "Share the Load". Women's Work: Its Politics and Economics (Towards a World of Equals: Unit-7) Fact and Fiction, Unrecognized and Unaccounted work

UNIT IV

ISSUES OF VIOLENCE: Sexual Harassment: Say No! (Towards a World of Equals: Unit-6) Sexual Harassment, not Eve-teasing-Coping with Everyday Harassment. Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8) Is Home a Safe Place? -When Women Unite [Film], Rebuilding Lives Thinking about Sexual Violence (Towards a World of Equals: Unit-11) Blaming the Victim-"I Fought for my Life".

UNIT V

GENDER STUDIES: Knowledge: Through the Lens of Gender (Towards a World ofEquals-Unit-5) Point of View. Gender and the Structure of Knowledge. Whose History? Questions for Historians and Others (Towards a World Equals: Unit-9) Reclaiming a Past. Writing other Histories.

PRESCRIBED TEXT BOOK:

"Towards a world of equals: A Bilingual Textbook on gender", A. Suneeta, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, VasudhaNagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Suise Tharu.

Note: Since it is interdisciplinary Course, Resource Person can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

Reference Books:

1. Sen, Amartya. "More than one Million Women are Missing." New York Review of Books 37.20(20 December1990).print "
2. Tripi Lahiri, Bythe Numbers: Where Indian Women Work, Women's Studies Journal(14 November2012) <http://blogs.wsj.com/Indiareal time/2012/11/14/by-the- numbers-where-Indian-Women-work/>
3. K. Satyanarayanaand Susie Tharu (Ed.) Steal Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2:Telugu and Kannada
4. Vimala. "vantillu (the kitchen)". Women writing in India: 600 BC to the present volumeII; The20thcentury. Ed. SusieTharuandK.Lalita. Delhi: Oxford university press, 1995, 599-601.
5. Shatrughna, veena etal. women's work and its impact on child health and nutrition, Hyderabad, national institute of nutrition, Indian council of medical research. 1993.
6. Gautam, Liela and GitaRamaswamy. "A 'Conversation' between a Daughter and a Mother". Broadsheet on contemporary Politics, special issue on sexuality and harassment; Gender politics on campus today, Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research center for women's Studies, 2014.

7. Abdulali Sohaila. “If ought for my life….and won”. Available on line at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
8. Virginia Woolf. A Room of one’s own. Oxford; Black swan. 1992.

Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a clear grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the text book will empower students to understand and respond to gender violence in a mature way.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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II B. Tech. I Semester

(7GC33) APTITUDE AND REASONING SKILLS

(Common to CE, ME & CSE)

L	T	P
0	2	0

Course Objectives

- To equip students with aptitude and reasoning skills in order to help them succeed in competitive exams.
- To help students improve their knowledge of quantitative and reasoning skills, which in turn helps them comprehend and solve various mathematical problems in professional life.

UNIT I

Quantitative Aptitude 1: Number Systems- HCF and LCM -Square Roots and Cube Roots-Averages-Problems on ages-Allegations-Percentages-Profit and loss - Mensuration-Area, Volume and Surface Areas- Permutation and Combination-Decimal Fractions-Simplification. (12 contact hours)

UNIT II

Reasoning 1: Directions-Blood Relations-Problems on Cubes-Series and Sequences- Odd man out- Coding and Decoding. (8 contact hours)

UNIT III

Quantitative Aptitude 2: Ratio and Proposition and variation-Inequalities-Time and Work-Time and Distance-Pipes and Cisterns -Simple interest and Compound-interest-Calendar-Clocks-True Discount, Banker's Discounts-Data Interpretation, Tabulation, Bar Graphs, Pie charts, Line Graphs (10 contact hours)

UNIT IV

Reasoning 2: Data Sufficiency-Logical deductions-Arrangements and Combinations-Groups and Teams-Puzzles. (7 contact hours)

Text Books:

1. R.S. Agarwal, Quantitative Aptitude, S. Chand Publishers, New Delhi, 2005.
2. R.S.Agarwal, Verbal and Non-Verbal Reasoning, S.Chand Publishers, New Delhi, 1998.
3. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers(OPB), New Delhi, 2005.

References:

1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
2. Sharon Weiner-Green, IrnK.Wolf, Barron's GRE, Galgotia Publications, New Delhi, 2006.
3. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.
4. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
5. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005

Course Outcomes:

1. The student will be able to apply the knowledge of general mathematical models discussed to solve a variety of problems pertaining to Quantitative functions.
2. The Student will be able to read between the lines and understand various mathematical and reasoning concepts, puzzles, charts and interpret their logic.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	-	-	-	-	-	-	-	-	-	2
2	2	-	-	-	-	3	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY SCIENCES::RAJAMPET

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II B. Tech. I Semester

(7G631) BUILDING MATERIALS AND CONSTRUCTION

L	T	P
3	1	0

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.

UNIT IV

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

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

UNIT V

BUILDING COMPONENTS: Lintels, Arches, and 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: Damp 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.
4. Building materials by R.S.Rangwala,Charotar publications

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

1. Student would have a basic knowledge about the planning of the residential as well as public building.
2. Student would have knowledge of preparation of the working drawing.
3. Student will be able to prepare of submission drawing according to the local bylaws.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	-	-	-	-	2
2	1	-	-	-	-	3	1	-	2	-	-	1
3	-	-	-	-	-	3	2	-	2	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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II B. TECH.I Semester

(7G632) FLUID MECHANICS

L	T	P
3	1	0

Course objective:

- To familiarize with the properties of fluids and the applications of fluid mechanics.
- To formulate and analyze the problems related to calculation of forces in fluid structure interaction.
- To understand the concept of fluid measurement, types of flows and dimensional analysis.

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-Buoyancy-Meta centric height-Conditions of equilibrium of a floating and submerged bodies.

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

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

MEASUREMENT OF FLOW: Pitot tube - Venturimeter and orifice meter – Orifices and mouthpieces - Rectangular, triangular and trapezoidal notches – 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.
4. S.K. Som and G. Biswas, Introduction to Fluid Machines, 2ndEdition, Tata McGraw-Hill Publishers Pvt. Ltd, 2010.

Course Outcomes:

At the end of the course, the student will be able to

1. State the newton's law of viscosity and explain the mechanics of fluids at rest and in motion by observing the fluid phenomena.
2. Compute the force of buoyancy and analyze the stability of a floating body.
3. Derive euler's equation of motion and deduce bernoulli's equation.
4. Examine energy losses & pressure drop in pipe transitions and Sketch energy gradient lines. Complex flow problems using dimensional analysis and develop rules for experiments with scale models.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	-	-	-	-	-	2	-	-	-	-	-
2.	3	2	-	-	-	-	2	-	-	-	-	-
3.	3	2	-	-	-	-	-	-	-	-	-	-
4.	3	3	1	-	-	-	-	-	-	-	-	-

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II B. Tech. I Semester

(7G633) STRENGTH OF MATERIALS

L	T	P
3	1	0

Course Objective:

- The subject provides the knowledge of simple stresses, 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 a beam.

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 & 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 & Chanel sections.

UNIT IV

DEFLECTION OF BEAMS 1: Bending in to 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 Outcomes:

1. The students would be able to understand the behavior of materials under different stress and strain conditions.
2. 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.
3. The student would be able to understand the simple bending theory, and also able to analyze the stress distribution in different beam sections like rectangular, circular, triangular, I, T,L and angle sections.

4. The student would be able to understand various methods to find out Deflection in beams and also able to determine slope in the beams.
5. The students would be able to understand the principal Stresses and Strains and also able to apply different theories of failures.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	3	-	-	3	-	-	-	-	-	-	-
2.	3	3	2	-	3	-	-	-	-	-	-	-
3.	3	3	3	2	3	-	-	-	-	-	-	-
4.	3	3	3	1	3	-	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-	-

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II B. Tech. I Semester

(7G634) SURVEYING

L	T	P
3	1	0

Course Objectives:

- 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 sections - 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 sub tense 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 & 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

1. The students would be able to do temporary and permanent adjustments.
2. The students would be able to measure distances and angles.
3. The students would be able to orient and draw the various maps.
4. The students would be able to calculate areas and volumes of the earth work.
5. The student would be able to undertake various civil engineering surveys and convert the data into usable forms.

Mapping of COs and POs:

Course Outcomes	Program Outcomes										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1.	3	3	-	-	3	-	-	-	-	-	-
2.	3	3	2	-	3	-	-	-	-	-	-
3.	3	3	3	2	3	-	-	-	-	-	-
4.	3	3	3	1	3	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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II B. Tech. I Semester

(7G537) ELECTRICAL & MECHANICAL TECHNOLOGY

L	T	P
3	1	0

Course Objectives:

- To impart knowledge on basic electrical circuits.
- Able to understand and analyzing the different DC and AC machines and their applications
- To understand the welding processes and working principles of welding equipment's.
- To understand the working principles of IC engines and air compressors.
- To understand the basic principles of air conditioning and methods of refrigeration.

In end examination minimum of two questions from each **Part-A & Part-B** should be chosen for answering **FIVE** questions. All questions carry equal marks.

Use separate booklets for Part-A & Part-B

PART –A
ELECTRICAL TECHNOLOGY

UNIT I

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

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

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 Outcomes:

Student will be able to,

1. Predict the behavior of electrical circuits.
2. Understand and analyze the different types of electrical machines used for that particular applications.
3. Understand the welding processes and working principles of different welding equipments.
4. Understand the working principles of IC engines and air compressors.
5. Understand the basic principles of air conditioning and methods of refrigeration.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	-	-	2	-	-	-	2	2	-	-
2	3	3	-	-	2	-	-	-	2	2	-	-
3	3	-	-	-	-	-	3	3	3	-	-	-
4	3	-	-	-	-	-	3	3	3	-	-	-
5	3	-	-	-	-	-	3	3	3	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech. I Semester

(7GC32) ENGINEERING MATHEMATICS –III

(Common to CE & ME)

L	T	P
3	1	0

Course objectives:

- The subject gives the knowledge about the solution of algebraic and transcendental equations and to solve differential equations by numerical methods.
- The course intends to provide an over view about interpolation, numerical differentiation and integration.
- The course explains the concept of curve fitting and partial differential equations.
- The course provides an opportunity to learn how to solve Fourier series and Fourier integral transforms in all engineering fields.

UNIT I

Solution of algebraic and Transcendental Equations-Bisection Method-Method of false Position-Newton-Raphson method.

Numerical solutions of ordinary differential Equations-Taylor's Series-Euler's methods–Runge-Kutta fourth order Method-Milne's predictor-corrector method. (Without proofs)

UNIT II

Interpolation - Introduction – Forward Differences – Backward Differences – Newton's forward and backward difference interpolation formulae – Lagrange's Interpolation formula.

Numerical Differentiation - Numerical Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT III

Curve fitting: Fitting a straight line-second degree parabola-Exponential curve –power curve by the method of least squares.

Partial differential equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions-solutions of linear equation–Nonlinear equation by Charpit's method-Method of separation of variables.

UNIT IV

Fourier series: Determination of Fourier coefficients-Fourier series of even and odd functions-Fourier series in an arbitrary interval-half range Fourier sine and cosine expansions.

UNIT V

Fourier Integrals and Fourier transforms: Fourier Integral theorem-Fourier Transforms-Fourier sine transform - Fourier Cosine Transform-Properties-Inverse Transforms -Finite Fourier sine and Cosine Transforms.

Text Books:

Higher Engineering Mathematics, B. S. Grewal, 42nd edition, Khanna Publishers, New Delhi.

References:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 8th edition, New Age International (Pvt) Limited.
2. A text book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
3. Mathematical Methods, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.

Course Outcomes:

Student will be able to

1. Apply the knowledge of numerical methods to solve algebraic, transcendental and ordinary differential equations.
2. Improve the ability of data analysis in numerical differentiation and integration with the help of interpolation.
3. Derive the equations of various curves by the method of least squares to assess the relation between them and to solve partial differential equations.
4. Derive Fourier series for the given periodic function in any arbitrary intervals.
5. Apply the knowledge of Fourier integrals and Fourier transforms to solve differential equations.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1.	3	-	-	-	3	-	-	-	-	-	-	2
2.	3	3	-	2	-	-	-	-	-	-	-	1
3.	3	-	-	3	2	-	-	-	-	-	-	2
4.	3	2	-	-	-	-	-	-	-	-	-	2
5.	3	2	-	-	2	-	-	-	-	-	-	3

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II B. Tech.. I Semester

(7G635) FLUID MECHANICS LAB

L T P
0 0 3

Course Objective:

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

LIST OF EXPERIMENTS

1. Calibration of venturimeter.
2. Calibration of orifice meter,
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Determination of coefficient of discharge for a mouth piece by variable head method.
5. Calibration of rectangular and triangular notch.
6. Calibration of triangular & trapezoidal weir.
7. Determination of coefficient of loss of head due to minor loss.
8. Determination of head loss due to major loss.
9. Verification of Bernoulis equation.
10. Reynolds experiment.

Course Outcomes

The students would be able to

1. Had solid foundation in fluid flow principles.
2. Analyse a variety of practical fluid flow devices and utilize fluid mechanics principles in design.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	2	-	-
2	3	3	2	-	3	-	-	1	-	2	-	2

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II B. Tech.. I Semester

(7G636) STRENGTH OF MATERIALS LAB

L T P
0 0 3

Course Objective:

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

LIST OF EXPERIMENTS

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

Course Outcomes

The students would be able to

1. Conduct tension, compression, torsion and shear tests on materials.
2. Determine hardness of metals & flexural strength of various beams.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	2	3	-
2	3	3	2	-	3	-	-	1	-	2	1	-

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II B. Tech. I Semester

(7G637) SURVEYING LAB – I

L T P
0 0 3

Course Objectives:

- 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. Fly leveling (differential leveling)
8. An exercise of L.S and C.S and plotting
9. Two exercises on contouring.
10. Study of Theodolite in detail - practice for measurement of horizontal and vertical angles.
11. Measurement of horizontal angles by method of repetition and reiteration.

Course Outcomes

The students would be able to

1. Calculate angles, distances and levels.
2. Identify data collection methods and prepare field notes.

Mapping of COs and POs:

Course Outcomes	Program Outcomes												
1	-	1	2	3	4	5	6	7	8	9	10	11	12
2	1	3	3	-	-	3	-	-	-	-	2	3	-
3	2	3	3	2	-	3	-	-	1	-	2	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech. II Semester

(7G641) ADVANCED STRENGTH OF MATERIALS

L	T	P
3	1	0

Course Objective:

- The main objective of this course is to deal with the concepts of stresses and strains in Thin and Thick cylinders, torsion, columns types, direct bending stresses and unsymmetrical bending.

UNIT I

THIN CYLINDERS: Thin 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– Assumptions made in the theory of pure torsion –Derivation of Torsion equations: $T/J = q/r = N\theta/L$–Torsional moment of resistance–Polar section modulus– Power transmitted by shafts –Combined bending and torsion and end thrust.

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

UNSYMMETRICAL BENDING: Introduction– 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 of shear center for high channel.

TextBooks:

3. A Textbook of Strength of materials by R. K. Bansal –Laxmi Publications (P) ltd., New Delhi.
4. Strength of Materials by S.S. Bhavikatti – Vikas Publishers
5. 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. Mechanics of Structures, by S.B.Junnarkar, Charotar PublishingHouse, Anand,Gujrat.

Course Outcomes:

1. The students would be able to understand the types of stresses and strains in Thin cylinders and Thick cylinders and also able to determine them.
2. The students would be able to understand the theory of torsion in shafts and also able to understand the springs and its types.
3. The students would be able to understand the types of columns, types of failures occur in the columns and also able to design the columns.
4. The students would be able to determine the stresses in retaining walls, dams and chimneys.
5. The students would be able to apply knowledge in unsymmetrical bending and also able to determine the stresses in beams due to unsymmetrical bending.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1.	3	3	-	-	3	-	-	-	-	-	-	2
2.	3	3	2	1	3	-	-	-	-	-	-	-
3.	3	3	3	1	3	-	-	-	-	-	-	-
4.	3	3	3	2	3	-	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-	-

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II B. Tech II Semester

(7G642) BUILDING PLANNING & DRAWING

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3 1 0

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 BYE LAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of 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 and Aluminum alloys etc., Earth, Rock, Timber and Marble. English bond& Flemish bond odd & even courses for one, one and half, two brick walls in thickness at the junction of a corner.

DOORS WINDOWS, VENTILATORS AND ROOFS: Panelled Door – glazed door –Half panelled and glazed door, glazed windows – panelled windows -Couple roof – Collar roof – Kind Post truss – Queen post truss.

UNIT V

Given line diagram with specification to draw, plan, section and elevation-sloped and flat roof buildings

Text Books:

1. Building Planning & Drawing by Dr N. Kumaraswamy and A.Kameswara Rao, Charitor Publications.
2. Planning and Designing and Scheduling- Gurucharan Singh and Jagadish Singh – Standard Publishers.
3. Planning and Designing of Buildings – Y.S.Sane

Reference Books:

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 drawing – M.G.Shah, C.M.Kale, S.Y.Patki

Course Outcomes

1. Student would have a basic knowledge about the planning of the residential as well as public building.
2. Student will be able to prepare of submission drawing according to the local bylaws.
3. The students would be able to know basic principal of free hand descriptive sketching to creative a realistic sketch of an object.
4. The students will able to construct a two point perspective of given two dimensional orthographic view of object.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	3	-	-	3	-	-	-	-	-	-	-
2.	3	3	2	1	3	-	-	-	-	-	-	-
3.	3	3	3	1	3	-	-	-	-	-	-	-
4.	3	3	3	2	3	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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II B. Tech II Semester

(7GC41) ENVIRONMENTAL SCIENCE

(Common to CE, ME and CSE)

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3	1	0

Course Objectives:

- To enable student to know about the importance of environment.
- To train the student to use different methods to conserve natural resources.
- To enable the student to learn about the concept of ecosystem and biodiversity and its conservation.
- To make student to study about different types of pollutions & understand the social issues and human population issues related to environment.

UNIT I

Introduction to Environment: Definition, Multidisciplinary nature of environmental studies, Scope & Importance of environmental studies, Need for public awareness, People in environment, Institutions in environment.

UNIT II

Renewable & Non-renewable natural resources:

Forest resources: Use, deforestation, dams & their effects on forest & tribal people, Water resources: Use, Water cycle, floods, drought, conflicts over water. Mineral resources: Use, environmental effects of extracting mineral resources.Food resources: Impacts of over grazing, traditional agriculture and modern agriculture Energy resources: Renewable and non – renewable energy resources, use of alternate energy resources Land resources: Land degradation, soil erosion, Role of an individual in the conservation of natural resources.

UNIT III

Ecosystems: Producers, consumers & decomposers, Food chains, food webs & ecological pyramids, Biogeo-chemical cycles-Oxygen cycle, Carbon cycle and Nitrogen cycle. Types, characteristic features, structure and function of the following ecosystems: (a) Forest ecosystems (b) Grass land ecosystems (c) Desert ecosystems (d) Aquatic ecosystems (lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation: Definition, Values of biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option value, Hot spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wild life, Conservation of biodiversity: In-situ & Ex-situ conservation

UNIT IV

Environmental Pollution: Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, nuclear hazards.

UNIT V

Social Issues and the Environment: Rain water harvesting, Environmental ethics: Issues & possible solutions, Global warming, Acid rain, Ozone layer depletion, Environment protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention & Control of Pollution) Act, Wildlife Protection & Forest Conservation Act.

Human Population and the Environment: Population explosion, Family Welfare Program, Environment & human health - Human Rights (in relation to environment) - Value Education (environmental values), HIV/AIDS, Field work-Visit to a local area to document environmental assets.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha, University Grants Commission, University press, New Delhi, 2004.
2. Perspectives in Environmental Studies, Anubha Kaushik and C.P. kaushik, Fifthedition, New Age International Publishers, 2016.

References:

1. Environmental Studies, Benny Joseph, Second edition, McGraw Hill Education (India) Private Limited, 2013.
2. Environmental Studies from Crisis to Cure, R. Rajagopalan, Oxford University Press.
3. Environmental studies: A Text Book for Undergraduates, Dr.K. Mukkanti, S. Chand and Company Ltd, 2010.
4. Ecology, Environmental Science and Conservation, J.S. Singh, S.P. Singh and S.R. Gupta, S. Chand and Company Ltd, 2014.
5. A textbook of Environmental Studies, Shashi Chawla, Tata McGraw Hill Education India, 2012.

Course Outcomes:

1. The student will understand the importance of environment.
2. The student develops critical thinking to conserve natural resources.
3. The student will understand the concept of ecosystem &biodiversity
4. The student knows different types of pollutions, sources, effects and measures.
5. The student will apply the knowledge to solve the social issues and human population issues related to environment.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3

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II B. Tech II Semester

(7G643) HYDRAULICS AND HYDRAULIC MACHINERY

L T P

3 1 0

Course Objective:

- The main objective of this course is to deal with the concepts of fluid flow patterns and learn to use boundary layer theory, flow through open channels and impact of jet on plane and curved vanes, applications &principles of hydraulic machines.

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 and 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.

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

1. The students should be able to understand and apply the basic concept of boundary layer and its types in solving the practical problems and also compute the drag and lift coefficients.
2. The students should be able to understand Uniform flows and Non Uniform flows in Open channels, design most economical sections like rectangular, circular sections etc., and also measure velocity through instruments in open channel.
3. To analyze the forces exerted by a jet of fluid on vanes of different shapes, either stationary or moving.
4. Study and understand the construction features and working principles of various types of hydraulic turbines.
5. Students are able to know the installation, working principles and characteristics of centrifugal pumps.
6. Students are able to know about hydroelectric power plant and estimation of hydro power potential.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3
6	-	-	-	-	-	-	-	-	2	-	-	-

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II B. Tech. II Semester

(7GC42) PROBABILITY AND STATISTICS

(Common to CE and ME)

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3	1	0

Course Objectives:

- The courses shall enable the students quantify the measure of uncertainty
- The course explains the concepts of probability distributions.
- The course elaborates on sampling distribution and estimation.
- The course provides the students with statistical techniques in testing the hypothesis.

UNIT I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem.

Random variables – Discrete and continuous – Distribution functions - mean and variance.

UNIT II

Binomial distribution –Poison distribution- Uniform distribution - Normal distribution. Fitting of Binomial distribution –Poison distribution.

UNIT III

Sampling distribution: Population and sample - Sampling distributions of means (σ known and unknown).

Estimation: Point estimation – interval estimation - one mean &one proportions for small samples –two means two proportions for large sample.

UNIT IV

Test of Hypothesis – Large samples: hypothesis concerning one and two means. Test of proportions (one and two).

Small samples: t- test.

UNIT V

$\chi 2$–Tests: goodness of fit, rxc contingency tables, F-test for two variances.

Text Books:

1. Fundamentals of Mathematical Statistics, S C Gupta and V K Kapoor, Sultan schand& sons.
2. A text book of Probability & Statistics, B. V. Ramana, Tata McGraw Hill.

References:

1. Environmental Studies, Benny Joseph, Second edition, McGraw Hill Education (India) Private Limited, 2013.
2. Environmental Studies from Crisis to Cure, R. Rajagopalan, Oxford University Press, 2015.
3. Environmental studies: A Text Book for Undergraduates, Dr.K. Mukkanti, S. Chand and Company Ltd, 2010.
4. Ecology, Environmental Science and Conservation, J.S. Singh, S.P. Singh and S.R. Gupta, S. Chand and Company Ltd, 2014.
5. A textbook of Environmental Studies, Shashi Chawla, Tata McGraw Hill Education India, 2012.

Course Outcomes:

1. The student will understand the importance of environment.
2. The student develops critical thinking to conserve natural resources.
3. The student will understand the concept of ecosystem and biodiversity and its conservation.
4. The student knows about different types of pollutions, their sources, effects and control measures.
5. The student will apply the knowledge to solve the social issues and human population issues related to environment.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G644) STRUCTURAL ANALYSIS – I

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Course Objectives:

- To make the students to understand types of structures and analysis methods and also to draw ILD's for different beams.

UNIT I

FIXED BEAMS – Introduction to statically indeterminate beams with U.D.L, central point load and 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-Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT III

SLOPE-DEFLECTION METHOD: Introduction, Derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without sinking of supports.

UNIT IV

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.L longer than the span, U.D.L shorter than the span.

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.L longer than the span, U.D.L shorter than the span, two point loads with fixed distance between them and several point loads.

UNIT V

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

1. The students would be able to determine the fixed end moments in Fixed beams and also able to draw the shear force and bending moment diagrams.
2. The students would be able to determine the fixed end moments in Continuous beams and also able to draw the shear force and bending moment diagrams.
3. The student would be able to apply knowledge on various methods of analyzing indeterminate structures.
4. The students would be able to perform ILD analysis of determinate beams and trusses and also able to apply knowledge on Moving loads..
5. The student would be able to apply knowledge strain energy theory and also able differ the determinate and indeterminate structures.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	-	-	-
2	3	3	2	-	3	-	-	-	-	-	-	3
3	3	3	2	2	3	-	-	-	-	-	-	-
4	3	3	2	2	3	-	-	-	-	-	-	-
5	3	3	2	1	3	-	-	-	-	-	-	1

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II B. Tech. II Semester

(7G645) AUTO CAD LAB

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Course Objective:

The objective of the course is to make the students must be able to visualize and graphically reproduce complex layouts to succeed in subsequent drafting and design courses.

LIST OF EXPERIMENTS

1. Introduction to Auto CAD
2. Practice exercise on Auto Cad software.
3. Development of plan/drawing by Block editing & drafting settings.
4. Drawing plan of a building in auto cad
   a) Plan of a building in auto cad.
   b) Plan of a multi storied building in auto cad.
5. Drawing Section and elevation of a single storied building in auto cad.
6. Drawing Section & elevation of a multistoried building
7. Detailing of building components like doors, windows, roof trusses.
8. Introduction to 3-D modeling.
9. Practice exercise on 3-D modeling of a building.
10. Practice exercise on 3-d modeling of types of stair cases.

Course Outcomes

The students would be able to

1. Understand conventional signs and symbols.
2. Draw the plans and sectional elevations of buildings.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	2	-	3	-	2	-
2	3	3	2	-	3	-	1	-	3	-	3	3

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II B. Tech II Semester

(7G646) HYDRAULICS AND HYDRAULIC MACHINERY LAB

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Course Objective:

- 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. Impact of jet on vanes.
2. Study of hydraulic jump.
3. Efficiency test on single-stage Centrifugal pump.
4. Efficiency test on Multi-stage Centrifugal pump
5. Efficiency test on Reciprocating pump.
6. Performance test on Pelton wheel turbine.
7. Performance test on Francis turbine.
8. Performance test on kaplan turbine.
9. Specific speed of Pelton wheel turbine

Course Outcomes

The students would be able to

1. Calculate the performance analysis in turbines & pumps.
2. Select the proper pump to optimize the pumping efficiency.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	1	-	2	-	3
2	3	3	2	-	3	-	-	1	-	2	-	-

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II B. Tech II Semester

(7G647) SURVEYING LAB – II

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Course Objectives:

- 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 EXPERIMENTS:

1. Trigonometric Leveling - Heights and distance problem.
2. Heights and distance using Principles of tacheometric surveying.
3. Curve setting.
4. Setting out works for buildings & pipe lines.
5. Gradient of road using Theodalite.
6. Determination of area using total station.
7. Traversing using total station.
8. Contouring using total station.
9. Determination of remote height using total station.
10. Stake-out using total station.
11. Difference in height between two inaccessible points using total station.

Course Outcomes

The students would be able to

1. Basic understanding of total station equipment.
2. Understand the working principles of surveying instruments.
3. Interpret survey data and compute areas and volumes.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	2	-	3	-	2	-
2	3	3	2	-	3	-	-	-	-	-	-	3
3	3	3	2	2	3	2	-	-	2	-	2	-