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

www.aitsrajampet.ac.in

DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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., ELECTRONICS AND COMMUNICATION 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

To offer educational experiences that makes the students globally competent, socially responsible and bring in answers to ever-ebbing problems in the field of Electronics & Communication Engineering.

Mission

To offer high quality premier education in the field of Electronics & Communication Engineering and to prepare students for professional career and higher studies. To promote excellence in technical research, collaborative activities and positive contributions to society.

PROGRAM EDUCATIONAL OBJECTIVES:

The B.Tech. Electronics & Communication Engineering graduates will be able to:

1. Work efficiently as Communication Engineers, including supportive and leadership roles on Multidisciplinary teams
2. Communicate effectively, recognize and incorporate societal needs and constraints in their professional endeavors, and practice their profession with high regard to legal and ethical responsibilities,
3. Engage in life-long learning, such as graduate study, to remain current in their profession and be leaders in our technological society.

PROGRAM OUTCOMES are:

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **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.

PO3. **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.

PO4. **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.

PO5. **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.

PO6. **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.

PO7. **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.

PO8.**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9.**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10.**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

PO11.**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

PO12.**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.

Index

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.

4 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.

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

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

6 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.

7 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 Electronics and Communications 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. II 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.

8 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

9 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.
		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.	**Two** 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.

S.No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
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.
		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.

6.4.2 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.

6.5 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.

6.6 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.

6.7 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.

6.8 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".

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CURRICULUM STRUCTURE

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Regulations**:R17** Programme Code: **G3**

I Year B. Tech., I Semester

Subject Code	**Subject Name**	Hours / Week			C
		L	T	P	
7GC11	Technical English and Professional communication	4	1	0	4
7GC13	Engineering Physics	3	1	0	3
7GC14	Engineering Mathematics-I	4	1	0	4
7G111	Problem solving techniques and C Programming	3	1	0	3
7G311	Fundamentals of Electrical & Electronics Engineering	4	1	0	4
7GC16	Engineering Physics Lab	--	--	3	2
7G112	Programming in C Lab	--	--	3	2
7G312	Fundamentals of Electrical & Electronics Engineering Lab	--	--	3	2
7G515	Engineering and IT Workshop	--	--	3	2
	Total	**18**	**5**	**12**	**26**

I Year B. Tech., II Semester

Subject Code	**Subject Name**	Hours / Week			C
		L	T	P	
7GC22	Engineering Chemistry	3	1	0	3
7GC24	Engineering Mathematics-II	4	1	0	4
7G121	Data Structures	3	1	0	3
7G321	Electronic Devices and Circuits	4	1	0	4
7G523	Geometrical Drawing	2		5	4
7GC27	ELCS Lab	--	--	4	2
7GC25	Engineering Chemistry Lab	--	--	3	2
7G124	Programming in Data Structures Lab	--	--	3	2
7G322	Electronic Devices and Circuits Lab	--	--	3	2
	Audit Course- Gender Sensitization	2	--	--	--
	Total	**18**	**4**	**18**	**26**

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

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Regulations: **R17** Programme Code: **G3**

II Year B.Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7GC32	Engineering Mathematics-III	4	1	-	4
7GC31	Environmental Science	2	1	-	2
7G234	Electrical Circuits &Technology	3	1	-	3
7G331	Electronic Circuits	3	1	-	3
7G332	Digital Design	3	1	-	3
7G333	Signals and systems	3	1	-	3
7G337	Seminar – I	-	2	-	1
7G335	Electronic Circuits Lab	-	-	3	2
7G336	Basic Simulation lab	-	-	3	2
7G236	Electrical Circuits & Technology Lab	-	-	3	2
	Student Extension Activities	--	--	1	0
Total		**18**	**8**	**10**	**25**

II Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7GA41	Managerial Economics and Financial Analysis	3	-	-	3
7GC43	Complex Variables and Special Functions	3	1	-	3
7G341	Random Variables and Random Processes	3	1	-	3
7G342	Pulse and Digital Circuits	3	1	-	3
7G343	Analog Communication	3	1	-	3
7G344	Field Theory and Transmission Lines	3	1	-	3
7GC44	Aptitude and Reasoning Skills	-	2	-	1
7G346	Pulse Circuits Lab	-	-	3	2
7G347	Analog Communication Lab	-	-	3	2
7G348	Digital Design Lab	-	-	3	2
	Student Extension Activities	-	-	1	-
Total		**18**	**7**	**10**	**25**

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

B.Tech. I Year I Semester

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B.Tech. I Year I Semester

(7GC11) TECHNICAL ENGLISH AND PROFESSIONAL COMMUNICATION
(Common to all Branches)

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.

Text Books:

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.

Reference Books:

1. Developing Communication Skills, 2/e. by Krishna Mohan & Meera Banerji , Macmillan, 2009
2. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
3. English Grammar and Composition, David Grene, Mc Millan 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, Aysha Viswamohan, 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 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
- The student will learn to effectively utilize his body language to communicate in his academic and professional career.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

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B.Tech. I Year I Semester

(7GC13) ENGINEERING PHYSICS
(Common to ECE and EEE)

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 explains 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 nanomaterials.

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.

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

Ultrasonic: Introduction – Production of ultrasonic 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's uncertainty 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, anti-ferro 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.

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 WITH PROGRAM OUTCOMES

	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
(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year I Semester

(7GC14) ENGINEERING MATHEMATICS – I
(Common to all branches)

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 and complex matrices: 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.

Text Book:

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 WITH PROGRAM OUTCOMES

	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
(AN AUTONOMOUS INSTITUTION)

I Year B. Tech., I Semester

(7G111)PROBLEM SOLVING TECHNIQUES AND C PROGRAMMING

(Common to ALL branches)

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, Pointers, Arrays and Strings
- Implementation of C applications for data structures, Sorting and Searching.

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. AnandaRao, 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 COURSE OUTCOMES WITH PROGRAM OUTCOMES

	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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year I Semester

(7G311) FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

(**Common to EEE and ECE**)

Course Objectives:

The Course aims to provide the students with the ability

- To learn the basic fundamentals of circuit components, circuit laws and network theorems.
- To understand the concepts of semiconductor diode and its applications.
- To understand the basic concepts of Bipolar Junction transistor.

UNIT I

CIRCUIT ELEMENTS: - Sources: Voltage and Current Sources, Resistors-Types- resistance color coding-potentiometer-types, Capacitors-types-uses of capacitors, Inductors-types, Ohm's Law-R, L, C Voltage, Current, Power & Energy, Multimeter, CRO, Function Generator.

UNIT II

NETWORK THEOREMS (D.C. Excitation only):- Ohm's law, Kirchhoff laws-network reduction techniques-series, parallel, series parallel circuits-source transformations. Thevenin's Theorem- Norton's Theorem-Superposition Theorem-maximum power transfer theorem.

UNIT III

SEMICONDUCTOR DIODEs : Energy Band Diagram of Semiconductors(Intrinsic & Extrinsic), PN Diode, Drift & Diffusion currents, V-I Characteristics of PN Junction Diode (Ideal, Simplified and Piece-wise, Practical), Temperature Dependency, Transition and Diffusion Capacitances, Breakdown Mechanisms in semiconductor diodes, Zener diode characteristics & Zener diode acts as a regulator.

UNIT IV

DIODE APPLICATIONS: Half Wave and Full Wave Rectifiers – General Filter Considerations – Capacitor Filter – RC Filter, Choke Filter, LC Filter, π-Filter.

UNIT V

INTRODUCTION OF BJT: Transistor constructions – types. Transistor operation in CB, CE and CC configurations and their Characteristics.

Text Books:

1. "Electronic Devices and Circuits" David A Bell, Fifth Edition, 2008, Oxford University Press.
2. "Circuits & Network Analysis & Synthesis", Sudhakar. A & Shyam mohan S Palli, 4th Edition, Tata McGraw Hill, 2010.
3. Engineering basics: Electrical, Electronics and computer Engineering" , T.Thyagarajan, New Age International, 2007
4. Electronic devices and circuits by G K.Mithal.

Reference Books:

1. "Electronic Devices and Circuits" J. Millman and Halkias, 1991 edition, 2008, TMH.
2. "Electronic Devices and Circuit Theory" Robert L.Boylestad and Louis Nashelsky, 9th edition, PHI.
3. "Electronic Principles" Albert Malvino, David J Bates, MGH, SIE 2007.
4. "Micro Electronic Circuits" Sedra and Smith, Oxford University Press.

Course Outcomes:

Upon completion of the course students will

- Analyze the basic concept of Electrical circuits
- Solve Electrical and Electronics circuits for voltage, current and power using Network theorems
- Analyze the concepts of semiconductor diodes.
- Know the application of diodes
- Analyze the concepts of Bi-polar Junction Transistor

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year I Semester

(7GC16) ENGINEERING PHYSICS LAB
(Common to ECE and EEE)

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 WITH PROGRAM OUTCOMES

	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

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year I Semester

(7G312) FUNDAMENTALS OF ELECTRICAL &ELECTRONICS ENGINEERING LAB

(Common to EEE & ECE)

Course Objectives:

The Course aims to provide the students with the ability

- To determine the characteristics of semiconductor diode.
- To perform various rectifier circuits in practical approach.
- To perform input and output characteristics of BJT for various configurations.

Perform the following Experiments

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes, BJTs.
2. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO
3. Verification of Kirchhoff's Voltage and Current Law
4. Forward and Reverse Bias Characteristics of PN junction Diode.
5. V-I Characteristics of Zener Diode
6. Half Wave Rectifier with and without filter.
7. Full Wave (Center trapped) Rectifier with and without filter.
8. Full Wave (Bridge) Rectifier with and without filter.
9. Zener Diode as a Voltage Regulator
10. Input and Output Characteristics of Transistor CB Characteristics.
11. Input and Output Characteristics of Transistor CE Characteristics.
12. Input and Output Characteristics of Transistor CC Characteristics.

Course Outcomes:

Upon completion of the course students will be

- Able to determine the parameters like cut-in voltage , resistances and breakdown voltage of semiconductor diode
- Able to design DC power supply circuits using rectifiers and filters
- Able to choose the desired configuration for specified applications.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

ANNAMACHARYAINSTITUTE OF TECHNOLOGY & SCIENCES:: RAJAMPET

(AN AUTONOMOUS INSTITUTION)

I Year B.Tech. I Semester

(7G515) ENGINEERING & IT WORKSHOP

(Common to EEE, CSE, IT, ECE)

Course Objectives for Engineering Workshop:

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

Course Objectives for IT Workshop:

- 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.

Engineering Workshop:

1. **TRADES FOR EXERCISES:**
   - **1.1 Carpentry shop**– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
   - **1.2 Sheet metal shop**– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.
   - **1.3 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.

2. **TRADES FOR DEMONSTRATION:**
   a. Plumbing
   b. Fitting

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.

IT Workshop:

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, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

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

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- 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, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining& Repairing PCs", Bigelows, TMH

Course outcomes for Engineering Workshop:

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

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

Course outcomes for IT Workshop:

- 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 WITH PROGRAM OUTCOMES

	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			

B.Tech. I Year II Semester

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

B.Tech. I Year II Semester

(7GC22) ENGINEERING CHEMISTRY
(Common to ECE and EEE)

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 conductometric titration, 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 & Electroless plating-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.

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. SeshaMaheswaramma and MrudulaChugh, 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/ 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 WITH PROGRAM OUTCOMES

	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											

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year II Semester

(7GC24) ENGINEERING MATHEMATICS II
(Common to all branches)

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 concept 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.

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.
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:

- 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 WITH PROGRAM OUTCOMES

	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)

Course Objectives:

- Structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, sorting and searching.

Unit– I

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.AForouzan,R. F.Gilberg,Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
3. Data Structures and Algorithms: Concepts, Techniques and ApplicationsG.A.V. Pai.

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:

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

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

	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

(AN AUTONOMOUS INSTITUTION)

I Year B. Tech. II Semester

(7G321) ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE & ECE)

Course Objectives:

The Course aims to provide the students with the ability

- To understand the concepts of biasing and stabilization in BJT.
- To understand the concepts of FET, MOSFET and their biasing techniques.
- To analyze the parameters like band width, gain and impedances for single and multistage amplifier circuits.
- To understand the working principles of special purpose electronic devices.

UNIT I

BIASING & STABILITY: Overview of BJT Configurations, Transistor Amplifying Action – Load Line Analysis of AC & DC – Operating Point. Types of Biasing: Fixed Bias – Emitter Bias – Emitter Feedback Bias - Collector to Base bias – Voltage Divider Bias. Bias Stability: Need for Stabilization – Stabilization Factors (s,S',S'') – Stability Factors for Voltage Divider Bias - Thermal Stability and Thermal Runaway – Heat Sinks**.**

UNIT II

FIELD EFFECT TRANSISTORS & ITS BIASING: - Construction of JFETs – Transfer Characteristics – FET Biasing: Fixed Bias Configuration – Self Bias Configuration – Voltage Divider Biasing – Construction and Characteristics of MOSFETs – Depletion type MOSFETs – Enhancement type MOSFETs – Biasing in MOSFETs.

UNIT III

SINGLE STAGE AMPLIFIERS: Single Stage Transistor Amplifier-How Transistor Amplifies- Graphical Demonstration of Transistor Amplifier-Practical Circuit of Transistor Amplifier-Phase Reversal- D.C. and A.C. Equivalent Circuits- Load line Analysis- A.C. emitter resistance-Formula for A.C. emitter resistance-Voltage gain in terms of A.C. emitter Resistance-Voltage gain-Classification of Amplifiers-Amplifier equivalent circuit-Equivalent circuit with signal source-Input impedance of and amplifier.

UNIT IV

FET AMPLIFIERS: Small signal model of JFET and MOSFET – Common source and common Drain amplifiers using FET**.**

UNIT V

SPECIAL PURPOSE ELECTRONIC DEVICES: Varactor Diode, Tunnel Diode, LED, PIN Diode, Schottky Diode, SCR, UJT, Photodiode, Phototransistor.

Text Books:

1. "Electronic Devices and Circuits" David A Bell, Fifth Edition, 2008, Oxford University Press.
2. "Electronic Devices and Circuits" J. Millman and Halkias, 1991 edition, 2008, TMH.

Reference Books:

1. "Electronic Devices and Circuit Theory" Robert L.Boylestad and Louis Nashelsky, 9th edition, PHI.
2. "Principles of Electronics", V.K.Mehta, S.Chand Publications 2004
3. "Integrated Electronics, Analog and Digital Circuits and Systems" J. Millman and Halkias, TMH.
4. "Micro Electronic Circuits" Sedra and Smith, Oxford University Press.

Course Outcomes:

Upon completion of the course students will

- Analyze the basic concept of Electrical circuits
- Solve Electrical and Electronics circuits for voltage, current and power using Network theorems
- Analyze the concepts of semiconductor diodes.
- Know the application of diodes
- Analyze the concepts of Bi-polar Junction Transistor

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

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

B.Tech. I Year II Semester

(7G523) GEOMETRICAL DRAWING

(Common to EEE, ECE)

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,
- To impart and inculcate proper understanding of the theory of projections, projection of points, lines, planes and solids.
- To improve the visualization skills of the student.
- To prepare the student for future engineering positions.

UNIT I

INTRODUCTION: Lettering –Geometrical constructions - Construction of polygons by General method

CONICS: Ellipse, Parabola and Hyperbola (General method only).

Special Methods: Ellipse - Concentric Circles method, Oblong method & Arcsof Circles method - Drawing tangent& normal to the conics.

CYCLOIDAL CURVES: Cycloid, Epi-cycloid, Hypo-cycloid (simple problems) - Drawing tangent & normal to the cycloidal curves.

UNIT II

PROJECTIONS OF POINTS & LINES:

Projections of points - Projections of lines inclined to one reference plane, Projections of lines inclined to both reference planes.

UNIT III

PROJECTIONS OF PLANES: Projection of planes inclined to one reference plane - and inclined to both the reference planes.

UNIT IV

PROJECTIONS OF SOLIDS: Cylinder, Cone, Prism and Pyramid - Axis Inclined to one reference plane, Axis inclined to both the reference planes.

UNIT V –

ISOMETRIC PROJECTIONS: Projections of Lines, Planes and Simple Solids – Prism, Pyramid, Cylinder and Cone in simple positions only.

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

Text Book:

1. Engineering Drawing by N.D.Bhatt

Reference Books:

1. Engineering Graphics by K.L. Narayana& P. Kannayya
2. Engineering Drawing and graphics by Venugopal/ New age
3. Engineering Drawing by Johle / TMI

Course Outcomes:

- Students will be able to know and understand the conventions and the methods of Geometrical Drawing with proper dimensions and annotations for two-dimensional engineering drawings.
- Able to understand the application of industry standards and techniques applied in Geometrical Drawing.
- Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views.
- Can employ 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Students will be able to improve their visualization skills, analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET

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B. Tech. I Year II Semester

(7GC27) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB (CE, ME, ECE, EEE)

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 CDs

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 WITH PROGRAM OUTCOMES

	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

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B.Tech. I Year II Semester

(7GC25) ENGINEERING CHEMISTRY LAB
(Common to ECE and EEE)

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 WITH PROGRAM OUTCOMES

	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., II Semester

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

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 WITH PROGRAM OUTCOMES

	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

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B.Tech. I Year II Semester

(7G322) ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to ECE & EEE)

Course Objectives:

The Course aims to provide the student with the ability

- To determine characteristics of JFET, MOSFET, SCR and UJT.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Perform the following Experiments:

1. Identification, Specifications and Testing of Active Devices, Low power JFETs, MOSFETs, Photodiode, Phototransistor, LEDs, SCR and UJT.
2. JFET Characteristics.
3. MOSFET Characteristics
4. Frequency response of CE Amplifier.
5. Frequency response of CB Amplifier.
6. Frequency response of CC Amplifier.
7. Frequency response of Common Source FET Amplifier.
8. V-I Characteristics of LED.
9. SCR Characteristics.
10. UJT Characteristics.
11. Photodiode and Phototransistor Characteristics
12. Soldering Practice.

Course Outcomes:

Upon completion of the course students

- Able to gain the knowledge and practical usage of JFET, MOSFET and some special electronic devices.
- Able to design the amplifier circuits under given requirements.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

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

GENDER SENSITIZATION
(Audit Course)

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)MaryKom and other. Love and Acid just do not mix, Love Letters, Mothers and Fathers,

UNIT II:

GENDER ANDBIOLOGY:

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 ANDLABOUR:

Housework: The invisible labour (Towards a world of Equals: Unit-3) "My Mother doesn't Work". "Share the Loads". 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 is 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.

Text Book: "Towards a world of equals: A Bilingual Textbook on gender", A. Suneeta, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, VasudhaNagaraj, AsmaRasheed, GoguShyamala, DeepaSreenivas and SuiseTharu.

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. "Morethan oneMillion Women aremissing." New York ReviewofBooks 37.20(20 December1990).print
2. TripiLahiri, BytheNumbers: 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 AreSprouting: NewDalit Writing From SouthIndia,Dossier 2:Telugu and Kannada
4. Vimala. "vantillu (the kitchen)". Women writingin India: 600 BC to the present volumeII; The20thcentury. Ed. SusieTharuand K.Lalita. Delhi: Oxford universitypress, 1995, 599-601.
5. Shatrughna, veenaetal. women's workand its impact on child health and nutrition, Hyderabad, national instituteof nutrition,Indian council of medical research. 1993.
6. Gautam,LielaandGita Ramaswamy. "A'Conversation' between aDaughter and aMother". Broadsheet on contemporaryPolitics, special issueon sexualityand harassment; Gender politics on campus today, Ed. MadhumeetaSinha and AsmaRasheed. Hyderabad: AnveshiResearch center forwomen's Studies, 2014.
7. AbdulaliSohaila. "Ifought for mylife….and won". Available onlineat: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
8. VirginiaWoolf. ARoom 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.

B.Tech. II Year I Semester

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES:: RAJAMPET
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II B.Tech. I Semester

7GC32 - ENGINEERING MATHEMATICS-III
(Common to all Branches)

L	T	P
4	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											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
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

7GC31 - ENVIRONMENTAL SCIENCE
(Common to EEE and ECE)

L T P
2 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.
- To enable the student to 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, Bio-geochemical 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 Act, 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, Fifth edition, 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, 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:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
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. I Semester

7G234 - ELECTRICAL CIRCUITS & TECHNOLOGY

L	T	P
3	1	0

Course Objectives:

- To impart the knowledge about the basic concepts of circuit analysis and Transient Response.
- To inculcate the understanding about AC circuits and resonance.
- To understand the concepts of two port networks.
- To understand the working of various Electrical Machines.

UNIT I

BASIC ELECTRICAL CIRCUITS: Network Reduction Techniques, Star &Delta transformations, Source Transformation, Nodal & Mesh Analysis, Super Node & Super Mesh Concepts - Problems.

TRANSIENT ANALYSIS: Transient Response of RL, RC & RLC Series Circuits for DC Excitation using differential equation approach.

UNIT II

FUNDAMENTALS OF AC CIRCUITS & RESONANCE: Advantages of AC Supply, Types of Wave Forms, Importance of Sinusoidal Wave Forms, Cycle, Time Period, Frequency & Amplitude, Determination of Average & RMS Value, Form Factor & Peak Factor for different Alternating Wave Form.

RESONANCE: Resonant frequency, Band Width & Q-Factor for Series and Parallel RLC Network only.

UNIT III

TWO PORT NETWORKS: Impedance, Admittance, Hybrid, Transmission (ABCD) Parameters, Conversion of one Parameter to another Parameter, Conditions for Reciprocity & Symmetry, Inter connection of Two Port Networks in Series, Parallel and Cascaded Configurations, Problems.

UNIT IV

D.C MACHINES:

DC Generator: Constructional Features, Principle of operation, EMF Equation, Types, Magnetization Characteristics, Applications.

DC Motor: Principle of operation, Back EMF, Torque Equation, Characteristics of DC Shunt Motor, Losses & Efficiency, Testing - Brake Test & Swinburne's Test - Speed control of DC shunt Motor, Applications.

UNIT V

AC MACHINES

Single Phase Transformer*:* Principle of operation, Types, Constructional Features, EMF equation, Losses, Efficiency & Regulation, OC & SC Tests and Pre-Determination of Efficiency & Regulation.

Three Phase Induction Motor: Principle of operation, Torque equation, Torque-slip characteristics, Brake test on three phase induction motor.

Text Books:

1. *Network Analysis* by A. Sudhakar & Shyam Mohan S.Pillai, Tata Mc Graw Hill, 3rd Edition, New Delhi, 2009.
2. A. Chakrabarti. *Circuit Theory*. 6th edition, Dhanpat Rai & Co, New Delhi, 2014.
3. *A Text book of Electrical Technology* by B.L.Theraja & A.K.Theraja, Vol-II, S.Chand & Company, New Delhi, 2010.

References:

1. *Introduction to Electrical Engineering* by M.S. Naidu & S. Kamakshaiah, Tata Mc Graw Hill, New Delhi, 2008.
2. *Basic Electrical Engineering* by T.K. Nagasarkar & M.S. Sukhija, Oxford University Press, New Delhi, 2005.

Course Outcomes:

1. Analyze the Basic concepts of Electrical Circuits and Transient Phenomenon.
2. Analyze the concepts of 1-Φ AC circuits and Resonance.
3. Analyze the phenomenon of two port networks.
4. Able to understand the construction, working and testing of DC-Machines and their applications
5. Able to know principle of operation and calculate the Efficiency and Regulation of transformer.
6. Able to understand the principle and characteristics of three phase induction motor.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	3	3									2	3
2	3	2	3								2	2
3	3	2	2	2	1							
4	3		3	2			2		2		2	
5	2	2										
6	2	2										

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II B.Tech. I Semester

7G331 - ELECTRONIC CIRCUITS

L	T	P
3	1	0

Course Objectives:

The course aims to provide the student with the ability

- To analyze and design the transistor amplifiers, feedback and tuned amplifiers.
- To design oscillators.

UNIT I

SMALL SIGNAL ANALYSIS OF AMPLIFIERS:- Small Signal model of BJT – h-parameter model of BJT – Analysis of CB, CE and CC configurations using h-parameters – simplified hybrid model – miller's theorem – dual of miller's theorem – Analysis of Cascaded Transistor Amplifiers, RC Coupled amplifier, Frequency response of RC Coupled, Direct coupled and Transformer coupled amplifiers.

UNIT II

BJT Frequency Response: General frequency considerations, Low and high frequency response of BJT amplifier, Effect of coupling and Bypass capacitors, Hybrid- π transistor model and its Parameters, CE short circuit current gain, Current gain with resistive load, Gain Bandwidth product.

UNIT III

Feedback Amplifiers: concept of Feedback, Classification of feedback amplifiers, Transfer Gain with feedback, General characteristics of negative feedback amplifiers. Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components (Topologies).

UNIT IV

Oscillators: Condition for oscillations. Oscillator Types, Frequency and amplitude stability of oscillators, generalized analysis of LC oscillators-Hartley and Colpitts oscillators, RC-phase shift, Wien Bridge and Crystal Oscillators.

UNIT V

Large Signal and Small Signal Single Tuned Amplifiers:

Direct coupled and Transformer Coupled Class A power Amplifiers, Efficiency of Class A power amplifier, Class B Push-pull and Complementary Symmetry power Amplifiers, phase inverter, Max Power dissipation per Transistor. Introduction to tuned amplifiers, Q-Factor, Analysis of Small Signal Single Tuned Amplifier–Capacitive coupled.

Text Books:

1. J. Millman and C.C. Halkias- Integrated Electronics, Mc Graw-Hill, 1972.
2. Robert T. Paynter- Introductory Electronic Devices and Circuits, Pearson Education, 7th Edition.

References:

1. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits Theory, Pearson/Prentice Hall, 9th Edition, 2006.
2. Donald A. Neumann- Electronic Circuit Analysis and Design, Mc Graw Hill.

Course Outcomes:

Upon completion of the course, student can

1. Analyze the single stage and multistage amplifiers using h-parameter model at low frequencies.
2. Understand the concept and analysis of BJT amplifier circuits at High frequencies using Hybrid- π model.
3. Design the feedback amplifiers and oscillators.
4. Design and analyze large signal and tuned amplifiers.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	2	2			2		1			1	
2	2	2	2			2		1			1	
3	2	2	2			2		1			1	
4	2	2	1			2		1			1	

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II B.Tech. I Semester

7G332 - DIGITAL DESIGN

L	T	P
3	1	0

Course Objectives:

The course aims to provide the student with the ability

- To get the knowledge on Number Systems and codes.
- To gain the knowledge on Boolean algebra.
- To acquire the knowledge of various circuits in Digital design.

UNIT I

NUMBERSYSTEMS, CODES & BOOLEAN ALGEBRA: Philosophy of number systems – r, (r-1)'s complement, representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

Boolean algebra: Fundamental postulates of Boolean algebra, Basic theorems and properties, digital logic gates, properties of XOR gate, universal gates.

UNIT II

SWITCHING FUNCTIONS AND THEIR MINIMIZATION: Switching Functions-Canonical and Standard forms, algebraic simplification using Boolean theorems, two level & Multilevel Realization of Boolean Functions using Universal Gates.

Minimization: K-Map methods, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicants chart, simplification rules.

UNIT III

COMBINATIONAL LOGIC DESIGN & PROGRAMMABLE

LOGIC DEVICES: Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adder, carry Look Ahead adder, Magnitude comparator, Encoder, Decoder, Multiplexer, De-Multiplexer, Code converters.

PLD's: ROM, PROM, PLA, PAL, and Realization of Switching functions using PLD's. Comparison between PLA, PAL, ROM.

UNIT IV

SEQUENTIAL CIRCUITS: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic flip-flops, Triggering and excitation tables, flip flop conversions, Steps in synchronous sequential circuit design, Design of modulo-N Synchronous counters – up/down counter, ring counter, Johnson counter, Design of modulo-N Asynchronous counter.

UNIT V

FSM MINIMIZATION AND ASM CHARTS: Finite state machine-capabilities and limitations, Mealy and Moore models and their conversions-Sequence detector, Serial binary adder. Minimization of completely specified sequential machines-Partition techniques. Salient features of the ASM chart, Simple examples**.**

Text Books:

1. Morris Mano, *Digital Design*. Prentice Hall India, 3rd Ed.
2. ZVI Kohavi and Niraj K. Jha Switching & Finite Automata theory. Tata McGraw Hill, 3 rd Ed.

References:

1. Charles H. Roth, Fundamentals of Logic Design. Thomson Publications, 2004, 5th Ed.
2. Fletcher, An Engineering Approach to Digital Design. Prentice Hall India.
3. Anand Kumar, Switching Theory and Logic Design. Prentice Hall India, 2008.

Course Outcomes:

Upon completion of the course, students can

1. Understand different number systems conversions & Binary codes
2. Simplify Boolean functions & realize them using digital logic gates.
3. design various combinational & sequential circuits
4. Understand the Minimization techniques of Finite State Machine & the elements of ASM chart.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2		2		2			1			2	
2	2	2	2			1		1			2	
3	2	2	2			1		1			2	
4	2	2	2			1		1			2	

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II B.Tech. I Semester

7G333 - SIGNALS AND SYSTEMS

L	T	P
3	1	0

Course Objectives:

The course aims to provide the student with the ability

- To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
- To acquire practical knowledge on various transform techniques in the analysis of signals and systems.
- To acquire the knowledge of LTI Systems and Sampling Concepts.
- To study the various convolution in communication systems

UNIT I

INTRODUCTION TO SIGNALS AND SYSTEMS: Continuous time Signal and Discrete time Signals, Elementary Continuous and Discrete time signals, Basic Operations on Signals, Classification of Signals, Concept of Systems, Representation of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Fourier spectrum, Gibbs Phenomenon, properties of Fourier series.

UNIT II

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of standard signals, properties of Fourier transforms, Fourier transform of periodic signals, Introduction to Hilbert Transform.

UNIT III

LTI SYSTEMS AND SAMPLING: LTI systems, Properties & Transfer function, Filter Characteristics, Distortion less Transmission through a system, signal and system bandwidth, Ideal filter characteristics, Causality and Paley-Wiener Criterion, Relationship between Bandwidth and Rise Time.

Sampling theorem – Graphical and analytical proof for Band Limited Signals, effect of under sampling – Aliasing Sampling Techniques, data Reconstruction, Sampling of Band pass signals

UNIT IV

CONVOLUTION AND CORRELATION:

Convolution: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms.

Correlation: Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation

UNIT V

LAPLACE TRANSFORMS AND Z–TRANSFORMS: Laplace Transforms- Introduction, Region of Convergence, L.T's of some commonly used signals, Properties, Inverse Laplace Transforms.

Z-Transforms- Relation between DTFT and Z-Transform, Region of Convergence, Z-transforms of common sequences, Properties, Inverse Z-Transform.

Text Books:

1. B.P. Lathi- Signals, Systems & Communications – BS Publications, 2003.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab- Signals and Systems – PHI, 2nd Edition.

References:

Simon Haykin and Van Veen,Wiley- Signals & Systems – 2nd Edition.

Course Outcomes:

Upon completion of the course, students can

1. Understand signal representation methods and operation on signals.
2. Have the knowledge to obtain Fourier series and Fourier Transforms
3. Learn LTI Systems and Sampling Concepts.
4. Understand the convolution and correlation of signals.
5. Understand different transforms (Laplace & Z) and their responses with different types of signals.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	1										
2	3	3		3								
3				3	1							
4	3											
5	3	3	1									

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II B.Tech. I Semester

7G335 - ELECTRONIC CIRCUITS LAB

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Course Objectives:

- Aims to make students be able to design electronic circuits.
- To understand the Analysis of transistor based amplifiers.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of Oscillators.

Design and Simulation* of following experiments and also verify in Hardware Laboratory (minimum 6 of the following):

1. Common Emitter amplifier
2. Common Source FET amplifier
3. Two Stage RC- Coupled Amplifier
4. Feedback amplifier (Current Series & Voltage Series).
5. RC Phase Shift Oscillator
6. Wien Bridge Oscillator
7. Hartley/ Colpitts Oscillator.
8. Class A/B Power Amplifier
9. Series Voltage Regulator
10. Shunt Voltage Regulator

*** Multisim OR PSPICE OR Equivalent Simulation Software.**

Course Outcomes: Upon completion of the course, students will

1. Have the ability to analyse and design single and multistage amplifiers.
2. Determine the efficiencies of power amplifiers.
3. Design different types of Oscillators.
4. Be able to analyse all the circuits using simulation software and Hardware.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	3	2			1					2	
2	2	3	2			1					2	
3	2	2	2			1					2	
4	2	3				1					2	

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II B.Tech. I Semester

(7G336) BASIC SIMULATION LAB

L T P
0 0 3

***Write Programs and Simulate using MATLAB/SCI LAB/Any Equivalent Software of the following Experiments.**

Course Objectives:

- To analyse the characteristics of various signals and systems using simulation software's.
- To enable the students to know about different transforms with respective waveform generations
- To acquire the knowledge of systems and sampling through simulations.
- To study the convolution and correlation concepts with the help of experimentation

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as UNIT impulse, UNIT step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Observations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal/ sequence and real & imaginary parts of signal.
5. Gibbs phenomenon.
6. Finding the Fourier transform Phase spectrum.
7. Sampling theorem verification.
8. Verification of linearity and time invariance properties of a discrete system.
9. Computation of UNIT sample, UNIT step and sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
10. Convolution between signals and sequences.
11. Autocorrelation and cross correlation between signals and sequences.
12. Verification of winer-khinchine relations
13. Waveform synthesis using Laplace Transform
14. Locating the zeros & poles and plotting the pole Z-plane for the given transfer function.

Course Outcomes:

Upon the completion of course the students will be able

1. To understand fundamentals of Signals & systems and operations through simulation.
2. To understand the transforms on various signals practically
3. To acquire knowledge on the Systems and sampling concepts
4. To have the knowledge of Convolution and Correlation theories with the help of Laboratory simulations

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	3	3	1		1							
2		3		3								
3	3	3										
4		3			3							

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II B.Tech. I Semester

7G236 - ELECTRICAL CIRCUITS & TECHNOLOGY LAB

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Course Objectives:

- To conduct testing and experimental procedure on DC Machines.
- To find the performance Characteristics of three Phase induction motor.
- To test the single phase transformer for performance estimation.
- To analyze the operational characteristics of electrical machines under different loading conditions.
- To analyze various electrical circuit theorems.

ANY TEN EXPERIMENTS FROM THE FOLLOWING:

PART - A:

1. Verification of Superposition & Reciprocity Theorems.
2. Verification of Thevenin's & Norton's Equivalent Theorems.
3. Verification of Maximum Power Transfer Theorem for DC Excitation.
4. Series & Parallel Resonance - Determination of Resonant frequency, Bandwidth & Q-factor.
5. Two Port Network Parameters – Z, Y Parameters.
6. Time response of First Order RL & RC network for Periodic Non-Sinusoidal inputs - Determination of Time Constant & Steady State Error.

PART - B:

1. Magnetization Characteristics of D.C Shunt Generator. Determination of Critical Field Resistance & Critical Speed.
2. Brake Test on D.C Shunt Motor. Determination of Performance Characteristics.
3. Swinburne's Test on D.C Shunt Machine (Pre-determination of Efficiency of a given D.C Shunt machine working as Motor & Generator).
4. O.C & S.C Tests on 1-Φ Transformer (Pre-determination of Efficiency & Regulation at given P.F & Determination of Equivalent Circuit).
5. Speed Control of D.C Shunt Motor by Armature control & Field Control Methods.
6. Brake Test on Three Phase Induction Motor. Determination of Performance Characteristics.

Course Outcomes:

1. Ability to conduct testing and experimental procedure on DC Machines.
2. Ability to find the performance Characteristics of three Phase induction motor.
3. Ability to test the single phase transformer to know the performance.
4. The capability to analyze the operation characteristics of electrical machines under different loading conditions.
5. Able to analyze different electrical circuit theorems.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	1		3		2				2			
2	1		3		2							
3	1		3		2							
4	1		3		2							
5	2		3		2							2

B.Tech. II Year I Semester

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

7GA41 - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

L T P
3 0 0

Course Objectives:

- The course aims to provide a view of managerial problems.
- The course aims to provide the accounting and financial concepts

UNIT I

Introduction to Managerial Economics Managerial Economics: Meaning and Nature, Definition, Scope, relationship with other areas.

Demand Analysis: Definition and types of Demand, Demand Determinants, Law of Demand and its exceptions, Measurement and Significance of Elasticity of Demand, Demand forecasting methods.

UNIT II

Production and Cost Analysis Production – Theories of the firm, Production Function, Cobb-Douglas Production function, Isoquants and ISO costs, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Determinants of cost, cost-output relationship in short run and Long run.

Break-even Analysis (BEA) - Objectives, Assumptions, Importance, Graphical representation, Limitations, simple numerical problems.

UNIT III

Market Structure and forms of Business Organizations Markets: Perfect, Monopoly, Monopolistic and Oligopoly Markets. Price-output determination in perfect competition and monopoly in long run and short run.

Forms of Business Organizations: Definition, Forms of Business Organizations-**Private Sector**-sole proprietary ship, Partnership, Joint Hindu family business, co-operative societies, joint stock companies.

Public Sector- Departmental organizations, public corporations, government companies**.** Joint Sector.

UNIT IV

Capital and Capital Budgeting Capital: Definition of Capital and its significance, Types of Capital, Sources of Raising Capital.

Capital budgeting: Definition**,** Nature and scope of capital budgeting, features of capital budgeting, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V

Introduction to Financial Accounting and Analysis Financial Accounting Definition, Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis, Definition of Financial Analysis, Ratios and its significance- types- liquidity Ratios, turnover Ratios - solvency Ratios and profitability ratios.

Text Books:

1. Gupta: Managerial Economics, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.
3. Mehta P.L., Managerial Economics-Analysis, Problems, Cases, S Chand and Sons, New Delhi, 2001.
4. M.E.Thukaram Rao., Accounting for Managers, New Age International Publishers.
5. T.S, Reddy and Y.Hari Prasad Reddy, Accounting and Financial Management, Margham Publications.

References:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.

Course Outcomes:

1. The student can able to apply principles of economics to managerial decisions.
2. Student can understand the relationship between demand and its determinants and assess the future demand.
3. The course provides information related to production, cost, profit etc.
4. The course provides a basic insight into types of markets and forms of business organizations.
5. The student can familiarized with Accounting Data and Financial Statements that can be useful for interpreting the financial information.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	-	3	-	3	2	-	-	2	2	-	3	1
2	-	3	-	3	2	2	-	2	1	-	3	1
3	-	2	-	2	2	1	-	2	1	-	3	1
4	-	3	-	3	2	-	-	2	1	-	3	1
5	-	3	-	3	3	2	-	1	1	-	3	1

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

7GC43 - COMPLEX VARIABLES AND SPECIAL FUNCTIONS
(Common to ECE and EEE)

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Course Objectives:

- The course aims to provide the student with the ability **t**o understand the complex variables and their functions.
- The course provides the student with an opportunity to apply the knowledge to evaluate the complex integrals in real life situations.
- The course offers knowledge to solve the problems of complex integration by evaluation of residue and residue theorem.
- The course explains Rouches theorem and Argument principle to determination of zeros of complex functions.
- The course enables the students solve the problems of bilinear transformation by Cross ratio**.**

UNIT I

Beta and Gamma Functions: Beta and Gamma functions their properties – Evaluation of improper integrals using Beta and Gamma functions.

Complex variables: Exponential, trigonometric, hyperbolic functions and their properties – General power z^c (c is complex), principal value.

UNIT II

Functions of complex variables: Continuity – Differentiability – Analyticity – Properties – Cauchy – Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT III

Complex Integration: Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula (without proof).

Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series (with out proof).

UNIT IV

Residues: Singular point – Isolated singular point – Pole of order m – Essential singularity. Residue – Evaluation of residues – Residue theorem. Evaluation of integrals of the types $\int_{-\infty}^{\infty} f(x)dx \; and \; \int_0^{2x} f(cos\theta, sin\theta)d\theta$.

Determination of zeros: Argument principle-Rouche's theorem

UNIT V

Conformal mapping: Definition – Translation, rotation, and inversion –- Transformation by $e^z, 1n, z, z^2, z^n, \sin z, \cos z$. Bilinear transformation -Fixed points – Cross ratio – Determination of bilinear transformation mapping for three given points.

Prescribed Text Books:

Higher Engineering Mathematics, B. S. Grewal, 43rdedition, Khanna Publishers, New Delhi, 2014.

Reference Books:

7. Advanced Engineering Mathematics, Erwin Kreyszig, 8thEdition, New Age International (Pvt.) Limited.
8. A text book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
9. Mathematics - II, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
10. Mathematics - III, E. Keshav Reddy and Rukmangadachari, Pearson Education.
11. A text book of Engineering Mathematics, N.P.Bali, Laxmi publications.

Course Outcomes: Student will be able to

1. Understand the properties of beta and gamma functions
2. Have the knowledge on functions of a complex variable
3. Understand the concepts of exponential, trigonometric, hyperbolic functions and their properties.
4. Have the knowledge of complex integration and apply it to solve complex integrals of different type**.**
5. Learn about conformal mapping**.**

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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. II Semester

7G341 - RANDOM VARIABLES AND RANDOM PROCESSES

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3 1 0

Course Objectives:

The course aims to provide the student with the ability

- To understand the basics of Probability and its Theorems
- To gain the knowledge on random variables and related operations
- To understand random processes those are useful in probability estimations

UNIT I

PROBABILITY AND RANDOM VARIABLES: Probability introduced through sets and relative frequency, Joint and Conditional Probability, Total Probability, Bayes Theorem, Independent Events, Random Variable Concept, Distribution and Density functions, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, and Conditional Distribution & Conditional Density Functions.

UNIT II

OPERATIONS ON ONE RANDOM VARIABLE: Expectation, Moments: moments about the origin, Central Moments, Variance and Skew, Chebyshev's Inequality, Functions that give moments.

UNIT III

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function and its Properties Joint Density and its properties, Conditional Distribution and Density, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, Expected Value of a Function of Random Variables, Joint Characteristic Functions, Jointly Gaussian Random Variables.

UNIT IV

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Stationarity and independence: Distribution and Density Functions, Statistical Independence, First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, N-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes. Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Discrete Time processes and sequences.

UNIT V

RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001
2. Probability, Random Variables and Stochastic Processes – Athanasius Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

References:

1. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
2. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.

Course Outcomes:

Upon completion of the course, students will be able to

1. Understand the concept of Probability and types of random variables.
2. Learn the possible operations on random variables with real time examples.
3. Understand the concept of random processes
4. Analyze the random processes based on their characteristics

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1		3	3	3	1	1	1	1				
2		3		3	3	2	2	1				
3	3	2	1	1	1							
4	1	1	2	3	3	3						

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II B. Tech. II Semester

7G342 - PULSE AND DIGITAL CIRCUITS

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Course Objectives:

The course aims to provide the student with the ability

- To study various wave shaping circuits and their applications.
- To study and acquire knowledge on different circuits that produce non-sinusoidal waveforms
- To study various voltage time base generators, Logic gates etc.

UNIT I

LINEAR WAVE SHAPING High pass & low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and Exponential inputs. High pass RC network as differentiator, Low pass RC network as integrator, attenuators, ringing circuit.

UNIT II

SWITCHING CHARACTERISTICS & NON-LINEAR WAVE SHAPING:

Switching Characteristics of Devices: Diode as a switch, Diode Switching Times, Transistor as a Switch, transistor-switching times

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, clamping operation, clamping circuit taking source and diode resistance into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNIT III

MULTIVIBRATORS

Design and analysis of Bi-stable, Monostable & Astable Multivibrator with BJT. Schmitt trigger circuit, Symmetrical & Un Symmetrical Triggering of Bi-stable Multivibrator, Monostable Multivibrator.

UNIT IV

TIME BASE GENERATORS: Voltage time base generators: General features of a time base signal, methods of generating time base waveform, Principle and working of Miller and Bootstrap time base generators.

Current time base generators: Simple current sweep circuit, linearity correction through driving waveform.

UNIT V

SAMPLING GATES, LOGIC GATES AND LOGIC FAMILIES

Sampling Gates: Basic operation and principle of Sampling gates, uni-directional diode sampling gate, Bi-Directional diode & Transistor sampling gates, four diode sampling gate and their applications.

Realization of AND, OR, NOT gates using diodes and transistors, Inhibit operation, classification of logic families, DTL, RTL, DCTL, TTL, and CMOS logic families, comparison of logic families.

Text books:

1. J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", McGraw-Hill, second edition, 2007.
2. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.Second Edition.

References:

1. Fundamentals of pulse and digital circuits-Ronald j. Tocci, third edition, 2008.
2. Solid state pulse circuits-David A. Bell, 4th Edition, 2002 PHI.

Course Outcomes:

Upon completion of the course, student can

1. Design and analyze linear and non-linear wave shaping circuits.
2. Design and analyze different multivibrator circuits.
3. identify and differentiate various time base generators
4. Understand the operation and realization of different sampling_gates and logic families.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	1	3			1							
2		3			1				1			
3	3			3		3						
4	3										2	

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II B. Tech. II Semester

7G343 - ANALOG COMMUNICATION

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Course Objectives*:*

The course aims to provide the student with the ability

- To introduce the concepts of Analog communication systems.
- To equip students with various issues related to analogue communication such as modulation, demodulation, transmitters and receivers, noise performance and pulse analog modulation techniques.

UNIT I

AMPLITUDE MODULATION: Introduction to communication system, Need for modulation, Types of Modulation, Amplitude Modulation-single tone modulation, power relations in AM waves, Generation and Detection of AM Waves, Double side band suppressed carrier modulation, Generation and Detection of DSB-SC Modulated waves, SSB Modulation, Generation and Detection of AM-SSB Modulated waves, vestigial side band modulation, Generation and Detection of VSB waves.

UNIT II

ANGLE MODULATION: Basic concepts, Frequency Modulation, Single tone frequency modulation, Narrow band FM, Wide band FM, Transmission bandwidth of FM Waves, Generation of FM Waves, and Detection of FM Waves: Comparison of FM & AM.

UNIT III

NOISE: Noise in Analog communication System, Noise in DSB & SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, SNR Calculation, Pre-emphasis & de-emphasis.

UNIT IV

TRANSMITTERS & RECEIVERS: Introduction, Classification of Transmitter, AM Transmitter, FM Transmitter, Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter, Receiver Types, Characteristics of Receiver, TRF receiver, Super-heterodyne receiver-RF section and Characteristics, Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver.

UNIT V

PULSE ANALOG MODULATION: Multiplexing-TDM, FDM, Types of Pulse modulation, PAM-Single polarity PAM, double polarity PAM, PWM-Generation & demodulation of PWM, PPM-Generation and demodulation of PPM.

Text Books:

1. Simon Haykin, John Wiley - Principles of Communication Systems , 2nd Ed.,
2. George Kennedy and Bernard Davis - Electronics & Communication System , TMH 2004

References:

1. H Taub & D. Schilling, Gautam Sahe - Principles of Communication Systems, TMH, 2007 3rd Edition.
2. John G. Proakis, Masood Salehi - Fundamentals of Communication Systems PEA, 2006.

Course Outcomes*:* *upon completion of the course, students can*

1. Gain the knowledge of components of analog communication system.
2. Learn the need of Modulation and Application in real time.
3. Gain the knowledge of Different Modulation Techniques and their Generation & Detection methods.
4. To evaluate the performance of analog communications in the presence of noise.
5. Design radio Transmitters, Receivers & applications in real life
6. Gain the knowledge of analog pulse communication systems.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	1	1		1			2	2		1	3	1
2	1		2	1			2	2		1	3	1
3	1		1	1			1	2		1	3	1
4	1		1	1			2	2		1	2	1
5	1		1	1			2	2		1	2	1
6	3		1	1			1	2		1	2	1

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II B. Tech. II Semester

7G344 - FIELD THEORY AND TRANSMISSION LINES

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Course Objectives:

The course aims to provide the student with the ability

- To understand the Concepts of Vectors and Co-ordinate Systems
- To learn the concepts of Electric and Magnetic Fields with their corresponding equations.
- To know the importance of Maxwell's equations in differential and integral forms.
- To acquire knowledge of wave propagation with its different characteristics.
- To acquire a knowledge on transmission lines & their characteristics.

UNIT I

VECTOR ANALYSIS AND INTRODUCTION TO ELECTROSTATICS: Introduction to Vector Algebra, Coordinate systems and Transformation, Vector Calculus**.** Introduction to Electrostatic Fields, Coulomb's Law, Electric Field Intensity, Fields due to continuous Charge Distributions, Electric Flux Density, Gauss's Law and Applications, Electric Potential, Relations Between E and V- Maxwell's Equations, Energy Density.

UNIT II

ELECTROSTATIC FIELDS

Introduction to electrical fields in material space- Convection and Conduction Currents, Conductors, Polarization in Dielectrics, Dielectric Constant and strength, Linear, Isotropic and Homogeneous Dielectrics, Continuity Equation and Relaxation Time, Resistance and Capacitance.

UNIT III

MAGNETOSTATIC FIELDS AND MAXWELL'S EQUATIONS: Introduction to magnetic fields, Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Static EM Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic fields, Magnetic Energy. Introduction to Maxwell's equations, Faraday's Law, Transformer and Motional EMFs, Maxwell's Equations in Final Forms.

UNIT IV

EM WAVE PROPAGATION AND CHARACTERISTICS: Introduction, Waves in general, Wave propagation in Lossy Dielectrics, Plane waves in Lossless Dielectrics, Plane Waves in Free space, Plane waves in Good conductors. Poynting Vector and Poynting Theorem, Reflection of a Plane Wave at Normal inicdence.

UNIT V

TRANSMISSION LINES: Types, Primary & Secondary Constants, Transmission Line Equations, Expressions for Characteristic Impedance &Propagation Constant, wavelength, Phase and Group Velocities, Infinite Line Concepts, Input Impedance Relations, Standing waves in SC & OC lines, Reflection Coefficient, Line Distortion, Condition for Distortion less &lossless lines, Condition for minimum attenuation, Loading concept& its types, Smith Chart – Properties and Applications.

Text Books:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition,2000.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi.

References:

1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed. 2005.
2. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

Course Outcomes:

Upon completion of the course, students can

1. Understand the vector analysis-vector algebra and vector calculus, co-ordinate systems, transformation
2. Understand the Magneto static fields in free space & also in material space.
3. Learned the usage of Maxwell's equations in differential and integral final forms in electromagnetic fields.
4. Able to analyze and apply EM wave propagation characteristics on different mediums.
5. Able to identify different transmission lines and their relations.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3		2		2						1
2	3	1		2		2			2			1
3	2			3		1			2	2		1
4	3	3	2	1		1	2	1	2			1
5	2	3	2	2		2	1	1	2		1	1

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II B. Tech. II Semester

7GC44 - APTITUDE AND REASONING SKILLS
(Common to ECE, EEE and ME)

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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.

UNIT II

Reasoning 1: Directions-Blood Relations-Problems on Cubes-Series and Sequences- Odd man out- Coding and Decoding.

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

UNIT IV

Reasoning 2: Data Sufficiency-Logical deductions-Arrangements and Combinations-Groups and Teams-Puzzles.

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, Irn K.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											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	-	-	-	-	-	-	-	-	-	-	2
2	2	-	-	-	-	3	-	-	-	-	-	1

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II B. Tech. II Semester

7GC346 - PULSE CIRCUITS LAB

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0 0 3

Course Objectives:

- To generate Different types of non-sinusoidal signals.
- To learn about Multivibrators.
- To know about sampling gates and their uses.
- To obtain Basics on digital logic families.

Perform following experiments:

1. Linear wave shaping. (RC Integrator and Differentiator)
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Astable Multivibrator.
6. Monostable Multivibrator.
7. Bi-stable Multivibrator.
8. Schmitt Trigger.
9. Bootstrap sweep circuit.
10. UJT Relaxation Oscillator
11. Sampling Gates.
12. Study of Logic Gates & some applications.

Course Outcomes:

Upon completion of the course, students will

1. Design wave shaping circuits
2. Design circuits to generate various types of signals.
3. Design various digital circuits based on the application and specifications.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3	3	2		1		2	1	2		1
2	3	3	2	1		1		1	1	1		1
3	3	2	3	3		1		1	2	1		1

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II B. Tech. II Semester

7G347 - ANALOG COMMUNICATION LAB

L T P
0 0 3

Course Objectives:

- To provide a real time environment about different Analog modulation and demodulation methods
- To analyse the available circuits behaviour in Analog communication through hardware as well as software environment

Design and Simulation* of following experiments and also verify in Hardware Laboratory (minimum 6 of the following)

1. Amplitude Modulation & Demodulation
2. SSB Modulation and demodulation
3. DSB-SC Modulation and Demodulation
4. Frequency Modulation & Demodulation
5. Characteristics of Mixer
6. Pre-Emphasis and De- Emphasis
7. Pulse Amplitude Modulation & Demodulation
8. Pulse Width Modulation & Demodulation
9. Pulse Position Modulation & Demodulation

*** Multisim OR Pspice OR Equivalent Simulation Software.**

Course Outcomes:

Upon the completion of the course the students will be able

1. To design circuits of different Analog modulation schemes
2. To understand the working mechanism of modulation methods.
3. To analyze practical behaviour of different elements available in Analog communication system such as filters and mixers.
4. To analyse the working of communication methods using both hardware and software.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	1	1			1	1		2			3	1
2	1	2	2		1	1		2			3	1
3	1	2	2		1	1		3			3	1
4	1	2	1		1	1		2			2	1

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II B. Tech. II Semester

7G348 – DIGITAL DESIGN LAB

L T P
0 0 3

Course Objectives:

- To Design different types of Combinational Logic Circuits.
- To learn about Flip-Flops and their Conversions.
- To Design Mod-N Synchronous and Shift Register Counters.

List of Experiments:

1. Logic Gates
2. Realization of AND, OR, NOT, EX-OR, EXNOR functions using universal Gates
3. Applications of logic gates –ADDER, SUBTRACTORS
4. 2-bit Magnitude comparator
5. Decoders
6. Multiplexers
7. Boolean function realization using Decoder and Mux
8. Code converters (Binary to Gray & Gray to Binary)
9. Flip-Flops
10. Flip –Flop Conversions
11. Design of MOD-N synchronous counter
12. Shift register counters (Ring & Twisted Ring Counters)

Course Outcomes:

Upon completion of the course, students will be able to

1. Design different types of Combinational Logic Circuits.
2. Learn about Various Flip- Flops and their Conversions.
3. Design various Mod-N Synchronous and Shift Register Counters.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	1	2		2		2			1			2
2	2	2	2	2			1		1			2
3	3	2	2	2			1		1			2