ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: RAJAMPET

(AN AUTONOMOUS INSTITUTION)

www.aitsrajampet.ac.in

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC REGULATIONS (R15)

AND

COURSE STRUCTURE & SYLLABI

For the students admitted to

B. Tech., Regular Four Year Degree Programme in CBCS
From the Academic Year 2015-16

And

B. Tech., Lateral Entry Scheme from the Academic Year 2016-17

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.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The B. Tech., Electronics and 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.

PROGRAMME OUTCOMES (POs)

Students in the Electronics and Communication Engineering program should, at the time of their graduation, are in possession of:

a) An ability to apply knowledge of mathematics, probability & statistics, science and engineering as it applies to the fields of software and hardware
b) An ability to design and conduct experiments, as well as to organize, analyze, and interpret data
c) An ability to identify, formulate, and solve hardware and software problems using Electronic Science principles
d) An understanding of professional, legal, and ethical issues and responsibilities as it pertains to Communication engineering
e) An ability to effectively communicate technical information in speech, presentation, and in writing
f) A recognition of the need for an ability to engage in lifelong learning,
g) A knowledge of contemporary issues
h) An ability to design and construct a hardware and software system, component, or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.
i) An ability to function on multidisciplinary teams.
j) The broad education necessary to understand the impact of computing in a global, economic, environmental, and societal context.
k) An ability to use the techniques, skills, and modern hardware and software tools necessary for Electronics engineering practice.
l) An ability to be leaders in our technological society and improve lifelong learning.

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ACADEMIC REGULATIONS

B. Tech, Four Year Degree Programme with CBCS
(For the batches admitted from the academic year 2015-16)
And
B. Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2016-17)

The following rules and regulations will be applicable for the batches of Four year B. Tech. degree admitted from the academic year 2015-16 onwards.

1. ADMISSION:

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

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

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

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

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

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

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

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

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

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

3. ACADEMIC YEAR:

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

4. COURSE STRUCTURE:

Each programme of study shall consist of:

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

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

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

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

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

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

4.4 Compulsory Discipline Courses :(30 to 40%)

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

4.5 Professional subjects - Electives: (10 to 15%)

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

4.6 Open Electives-(5 to 10%)

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

4.7 Project work, seminar and /or internship :(10-15%)

Project work, seminar and /or internship in industry or elsewhere.

4.8 Mandatory courses:

Environmental studies, Technical English and Technical 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 Communication 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 19-22 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 III B.Tech. I Sem & II Sem)

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

4.13 Open Elective

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

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

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Semester Pattern	
	Period(s) / Week	Credit(s)
Theory	01	01
Practical	3	02
Comprehensive Course	02	02
Seminar	–	02
Final Year Project	12	08

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

6.1Distribution 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: like for the theory examination.
		30	**20 Marks** for Day to Day evaluation	Performance in laboratory experiments
			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 Course	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

6.2Project 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.

6.3Eligibility 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 the following slab system.

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

2nd Slab: Less than 70% but equal to or greater than 65%, double the Condonation fee can be collected from the student.

6.3.5 Students whose shortage of attendance is not condoned in 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.

6.4Revaluation / 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.

6.5Improvement 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.

6.6Supplementary Examination:

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

6.7Internship 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.

6.8Massive Open Online Course (MOOC):

MOOC is one of the courses introduced in IV year II 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.

7.1For 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 fulfills 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 2016-2017):

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 **139** 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 **139** 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

9.2For the entire programme:

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

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

9.3Overall 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 **195/139 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.

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 (Autonomous).

13.AMENDMENTS TO REGULATIONS:

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

14. Any legal issues are to be resolved in Rajampet Jurisdiction.
15. **GENERAL:**

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

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CURRICULUM STRUCTURE

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

Regulations: **R15** Programme Code: **G3**

I Year B. Tech., I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC11	English through Literature	2	1	0	2
5GC13	Engineering Physics	4	1	0	4
5GC14	Engineering Mathematics-I	3	1	0	3
5G111	Problem solving techniques and introduction to C Programming	3	1	0	3
5G311	Electronic Devices and Circuits -I	3	1	0	3
5G513	Engineering Drawing- I	1	--	3	3
5GC16	English Language Communications Skills Lab-I	--	--	3	2
5GC18	Engineering Physics Lab	--	--	3	2
5G113	Problem Solving Through C Lab	--	--	3	2
5G312	Electronic Devices and Circuits Lab -I	--	--	3	2
5G114	IT Workshop	--	--	3	2
		16	5	18	28

I Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC21	Technical English	2	1	0	2
5GC22	Engineering Chemistry	4	1	0	4
5GC24	Engineering Mathematics-II	3	1	0	3
5G121	C programming and Data Structures	3	1	0	3
5G321	Electronic Devices and Circuits -II	3	1	0	3
5G523	Engineering Drawing- II	1	--	3	3
5GC26	English Language Communications Skills Lab-II	--	--	3	2
5GC27	Engineering Chemistry Lab	--	--	3	2
5G123	Programming in C and Data Structures Lab	--	--	3	2
5G322	Electronic Devices and Circuits Lab-II	--	--	3	2
5G524	Engineering workshop	--	--	3	2
	Total	**16**	**5**	**18**	**28**

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

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

Regulations: **R15** Programme Code: **G3**

II Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC32	Mathematical Methods-III	3	-	-	3
5GC34	Environmental Science	3	-	-	3
5G235	Electrical Circuit Theory	3	1	-	3
5G331	Electronic Circuits	3	1	-	3
5G332	Digital Design	3	1	-	3
5G333	Signals and systems	3	1	-	3
5G334	Seminar – I	-	-	2	2
5G335	Electronic Circuits Lab	-	-	3	2
5G336	Basic Simulation lab	-	-	3	2
5G337	Sports & Extension Activities	--	--	1	0
	Total	**18**	**4**	**8**	**24**

II Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC41	Complex variables and special functions	3	-	-	3
5G246	Electrical Technology	3	1	-	3
5G341	Random Variables and Random Processes	3	1	-	3
5G342	Pulse and Digital Circuits	3	1	-	3
5G343	Analog Communication	3	1	-	3
5G344	Field Theory and Transmission Lines	3	1	-	3
5GC44	Aptitude and Reasoning Skills	-	-	2	2
5G346	Pulse and Digital Circuits Lab	-	-	3	2
5G347	Analog Communication Lab	-	-	3	2
	Audit Course	2	-	-	-
	Total	**20**	**5**	**8**	**24**

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

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

Regulations: **R15** Programme Code: **G3**

III Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GA51	Managerial Economics and Financial Analysis	3	-	-	3
5G351	Digital Communications	3	-	-	3
5G352	Control Systems	3	1	-	3
5G353	Analog & Digital Integrated Circuits	3	1	-	3
5G455	Computer System Architecture	3	1	-	3
5G354	Antennas and Wave Propagation	3	1	-	3
5G359	Seminar – II	-	-	2	2
5G357	Digital Communication Lab	-	-	3	2
5G358	IC Applications Lab	-	-	3	2
5G359	Professional Ethics / Stress Management	--	--	3	0
	Total	**18**	**4**	**8**	**24**

III Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5G361	VLSI Design	3	1	-	3
5G362	Microwave Engineering	3	1	-	3
5G363	Microprocessors and Interfacing	3	1	-	3
5G364	Digital signal processing	3	1	-	3
5G365	Electronic Measurements and Instrumentation	3	1	-	3
Professional Elective-I		3	1	–	3
5G366	Radar Engineering				
5G367	Digital Color TV Engineering				
5G368	Telecommunication Switching Systems				
5GC62	English for Competitive Examinations	-	-	2	2
5G369	Digital Signal Processing Lab	-	-	3	2
5G36A	Microprocessors and Interfacing Lab	-	-	3	2
5G36B	Advanced English Communications skills Laboratory	--	--	3	0
Total		**18**	**6**	**8**	**24**

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

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

Regulations: **R15** Programme Code: **G3**

IV Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5G479	Computer Networks	3	1	-	3
5G371	Optical Communication	3	1	-	3
5G372	Embedded Systems	3	1	-	3
5G373	Digital Image Processing	3	1	-	3
Professional Elective-II		3	1	–	3
5G374	Digital Design Through Verilog HDL				
5G375	Nano Electronics				
5G376	Reliability Engineering				
	MOOC	3	1	–	3
5G37B	Comprehensive Viva-Voce	-	-	2	2
5G37C	Microwave and Optical Communication Lab	-	-	3	2
5G37D	Embedded Systems Lab	-	-	3	2
TOTAL		**18**	**6**	**8**	**24**

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

Regulations: **R15** Programme Code: **G3**

IV Year B. Tech. II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
Professional Elective-III		3	1	–	3
5G381	Cellular and Mobile Communications				
5G382	DSP Processors and Architectures				
5G383	Neural Networks & Fuzzy Logic				
Professional Elective-IV		3	1	–	3
5G384	Wireless Communication & Networks				
5G385	Satellite Communications				
5G386	FPGA Architectures & Applications				
	OPEN ELECTIVE	3	-	-	3
5G387	Technical Seminar	0	0	2	2
5G388	Project work	0	0	12	8
Total		**9**	**2**	**14**	**19**

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

LIST OF OPEN ELECTIVES SUBJECTS		**Offered By Department of**
5G679	Disaster Management	CE
5G27C	System Modelling & Simulation	EEE
5G57E	Total Quality Management	ME
5G57F	Integrated Product Development	ME
5G377	Nano Technology and Applications	ECE
5G378	Medical Instrumentation	ECE
5G178	.NET Technologies	CSE
5G47B	Cyber Laws	IT
5GA71	Intellectual Property Rights	MBA
5GA72	Human Resource Management	MBA
5GB71	Introduction to Data Science	MCA

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

(5GC11)ENGLISH THROUGH LITERATURE
(Common to all branches)

Pre-requisites: Nil

Course Objectives:

- To improve the language proficiency of the students in English through literature
- To enhance the vocabulary of the students in English through the use of diverse authentic materials
- To enable the students absorb the human values expressed in literature

Course Outcomes:

- Students will be able to read, interpret, and evaluate select literary works
- Students will be able to identify literary, cultural, and philosophical sensitivity
- Students will learn about great engineers and scientists
- Students will relish the experience of reading challenging literature: appreciate literature's ability to elicit feeling, cultivate the imagination and teach English language.
- Students will be able to read complex texts actively; recognize key passages; raise questions; appreciate complexity and ambiguity; comprehend the literal and figurative uses of language

Unit-I

Detailed Study: *Cabuliwallah* by Rabindranath Tagore; *the Road not Taken* by Robert Frost

Non-detailed Study: G. D. Naidu

Unit- II

Detailed Study: *A Dog's Tale* by Mark Twain*; If* by Rudyard Kipling

Non-detailed Study: Sudha Murthy

Unit-III

Detailed Study: *The Gift of Magi* by O. Henry; *Leisure* by W. H. Davies

Non-detailed Study: Vijay Bhatkar

Unit-IV

Detailed Study: *An Astrologer's Day* by R. K. Narayan: *Night of the Scorpion* by Nissim Ezekiel*;* Non-detailed Study: Jagadish Chandra Bose

Unit-V

Detailed Study: *The Proposal* by Anton Chekhov

Non-detailed Study: Homi Jahangir Baba

Text Books:

For Detailed study: Texts from Open Sources (Available on Web)

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

- Texts from open sources are included in the syllabus to make the teaching-learning process more interesting and inspiring. Also, the literary texts from open sources will allow the student learn language through literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year I Semester

(5GC13) ENGINEERING PHYSICS

(Common to EEE and ECE)

Pre-requisites: Nil

Course Objectives:

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

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 acoustics
- Students 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 magnetic and semiconductor.
- Students becomes familiar with the general physics of superconducting materials and nanomaterials

Unit-I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

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

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

***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 communications, sensors and medicine.

Unit-II

CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters – Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method– Defects in solids: point defects and types.

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

Unit-III

QUANTUM MECHANICS AND FREE ELECTRON THEORY:

Quantum Mechanics: Introduction to matter waves – de-Broglie's 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) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

Unit-IV

SEMICONDUCTORS AND MAGNETIC MATERIALS:

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

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

Unit-V

SUPERCONDUCTIVITY AND NANOMATERIALS:

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

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

Text Books:

1. Engineering physics –K.Thyagarajan, McGraw Hill Publishers, 2013.
2. Engineering Physics – S. Mani Naidu, Pearson Education, I Edition, 2012.
3. Engineering physics –P.K.palanisamy, SciTech publisher, Edition, 2013.

Reference Books:

1. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications , 2013
2. Engineering Physics – D.K.Battacharya and A.Bhaskaran, Oxford Heigher Education I Edition 2010.
3. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012.
4. Engineering Physics – D.K.Battacharya and A.Bhaskaran, Oxford University press.
5. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
6. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edi 2013.
7. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
8. Engineering Physics – Gaur and Gupta, Dhanapat Rai Publishers, 7th Edition, 1992.
9. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B BRath, James Murday, University Press, I Edition, 2012.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course 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
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B.Tech. I Year I Semester

(5GC14) ENGINEERING MATHEMATICS – I
(Common to all branches)

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To understand the Differential equations of first, second and higher orders with their applications.
- To understand the concept of partial differentiation and its applications.
- To understand the concept of curve tracing in various forms

Course Outcomes:

- 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 be able to apply his knowledge to solve the problems on Mean value theorems, series and sequences in day to day life.
- Students will exhibit an ability to identify, formulates, and solves the problems on functions of several variables.
- Students develop an ability to trace the curve for a given equation of a curve & its nature

Unit-I

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

Unit-II

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

Unit-III

Rolle's Theorem – Lagrange's Mean Value Theorem (without proof). Simple examples of Taylor's and Maclaurin's Series.

Infinite series – Comparison test, Integral test, Ratio test, Cauchy's root test– Alternating series: Leibnitz rule (Without proof).

Unit-IV

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.

Unit-V

Curve tracing – Tracing of Cartesian, polar and parametric curves.

Text Book:

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

Reference Books:

1. Higher Engineering Mathematics, by Kreyszig.
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S.Chand & Company.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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

(5G111)PROBLEM SOLVING TECHNIQUES AND INTRODUCTION TO C PROGRAMMING

(Common to ALL branches)

Pre-requisites: Nil

Course Objectives:

- To remember the basic concepts of problem solving aspect, algorithms, flowcharts and SDLC.
- To understand the structure of a C language program.
- To apply C program statements, Two-way selection, Multi-way selection, Loop control statements and other related statements.
- To apply Arrays and Strings for solving different problems.
- To analyze recursive and non-recursive functions.

Course Outcomes:

- To define the basic concepts ofproblem solving aspect, algorithms, flowcharts and SDLC.
- To explainthe structure of a C program.
- To implement C program statements, Two-way selection, Multi-way selection, Loop control statements and other related statements.
- To use two dimensional, Multidimensional arrays and Strings in C programs.
- To differentiate recursive and non-recursive functions in different applications of C programs.

Unit-I:

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

Unit-II:

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

Unit-III

C Program Statements, Selection and Decision making Statements-two way selection –if…else statements, multi way selection-switch statements. Loop Control Statements-concept of a loop, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, Goto, example programs for each topic.

Unit-IV

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

Strings: String Basics, String Library Functions, Array of Strings, example programs

for each topic.

Unit-V

Functions: Library Functions in C, User defined Functions,-declaration, definition, calling of function , types of User defined functions, Parameter passing methods-pass by value, pass by reference, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Using Array Elements as Function Arguments. Example programs for each topic.

Text Books:

1. C Programming and Data Structures.B.AForouzan, R. F.Gilberg, Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
4. How to Solve it By Computer, R.G.Dromey, PHI.

Reference Books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, and S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	-	2	-	-	-	-	-	-	3	2	3	2
CO2	-	-	2	3	-	-	-	-	2	-	2	-	-	-	-
CO3	2	-	3	2	-	-	-	-	-	-	-	-	3	-	3
CO4	3	2	-	-	-	-	-	-	2	-	-	2	-	-	-
CO5	-	2	3	-	-	-	-	-	-	-	3	3	-	2	-

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B.Tech. I Year I Semester

(5G311)ELECTRONIC DEVICES AND CIRCUITS - I

(**Common to EEE and ECE**)

Pre-requisites: Engineering Physics

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.

Course Outcomes:

Upon completion of the course students will

- Have the knowledge to analyze the basic circuit elements.
- Have the knowledge of semiconductor diode and its applications.
- 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.

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 DIODE: Energy Band Diagram, V-I Characteristics of PN Junction Diode (Ideal, Simplified and Piece-wise), Temperature Dependency, Transition and Diffusion Capacitances, Breakdown Mechanisms in semiconductor diodes, Zener diode characteristics.

Unit-IV

DIODE APPLICATIONS:

Rectifier Circuits: Half Wave and Full Wave Rectifiers – General Filter Considerations – Capacitor Filter – RC Filter, Choke Filter, LC Filter, π Filter – Zener diode acts as a regulator.

Unit-V

INTRODUCTION OF BJTs: Transistor construction - Transistor operation, CB, CE and CC configurations and Characteristics

Text Books:

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

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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

(5G513) ENGINEERING DRAWING- I
(Common to EEE, ECE, CSE and IT)

Pre-requisites: Nil

Course Objectives:

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

Course Outcomes:

- Students will able to know and understand the conventions and the methods of Engineering Drawing
- Able to understand the application of industry standards and techniques applied in engineering drawing
- Dimension and annotate two-dimensional engineering drawings
- Students will be able to improve their visualization skills

Unit-I

INTRODUCTION:

Lettering –Geometrical constructions - Construction of polygons by General method – Inscribing a triangle, square. Pentagon, hexagon in a circle.

Unit-II

CONICS:

Ellipse, Parabola and Hyperbola (General method only).

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

Unit-III

CYCLOIDAL CURVES:

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

Unit-IV

PROJECTIONS OF POINTS & LINES:

Projections of points - Projections of lines inclined to one reference plane.

Unit-V

PROJECTIONS OF LINESINCLINED TO BOTH REFERENCE PLANES:

Projections of lines inclined to both reference planes.

Text Book:

Engineering drawing by N.D.Bhatt.

References 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

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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

(5GC16) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - I
(Common to all branches)

Pre-requisites: Nil

Course Objectives:

- To train students to use language effectively in everyday conversations
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the students learn better pronunciation through emphasis on individual speech sounds

Course Outcomes:

- Students will learn about the significance of accent and intonation and will attempt to neutralize their accent.
- Students will be able to express themselves fluently in social and professional contexts.
- 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

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

1. **Introduction to the Sounds of English- Vowels, Diphthongs & Consonants**
2. **Situational Dialogues and Role-play**
3. **Telephone Skills**
4. **Describing Objects / Situation / People**

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

Minimum Requirement:

The English Language Lab shall have two parts:

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

Suggested Software:

Sky Pronunciation Suite

Connected Speech from Clarity

Clarity Pronunciation Power – Part I

Mastering English in Vocabulary, Grammar, Spellings, Composition

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge. Language in Use, Foundation Books Pvt. Ltd with CD
Learning to Speak English - 4 CDs
Cambridge Advanced Learners' English Dictionary with CD.
Murphy's English Grammar, Cambridge with CD

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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

B.Tech. I Year I Semester

(5GC18) ENGINEERING PHYSICS LAB
(Common to EEE and ECE)

Pre-requisites: Nil

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 to learn practical experience of theory conceptual values.

Course 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

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Determination of wavelengths of various colors of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. 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
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. Srinivasa Rao V.K.V. Krishna K.S Rudramamba
2. Engineering Practical Physics – S.L Kakani & Shubra Kakani.

Equipment required:

Spectrometers

Microscopes

Meldi's apparatus

Stewart-Gee's apparatus

Torsional pendulum

Light sources

Optical fiber cables

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech. I Year-I semester

(5G113)PROBLEM SOLVING THROUGH C LAB
(Common to ECE, EEE, ME and CE branches)

Pre-requisites: Nil

Course Objectives:

- To learn simple mathematical programs in C.
- To understand different arithmetic operators, Expressions and type conversions.
- To apply the syntax of Two-way selection, Multi-way selection and other related statements in C programs.
- To analyze string handling functions and arrays of strings in sorting the names of students.
- To differentiate the user defined functions, recursive and non-recursive functions in C programs.

COURSE OUTCOMES:

The students will be able:

- To understand programs with simple data types, variables, constants and I/O statements in C.
- To recognize and write programs on different arithmetic operators, Expressions and type conversions in C.
- To find greatest number among different numbers using C programs.
- To sort different names in alphabetical order with string handling functions and array of strings.
- To discriminate user define functions, recursive and non-recursive functions in C programs

Recommended Systems/Software Requirements:

- Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise l

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

Exercise 2

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

Exercise 3

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

Exercise 4

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

Exercise 5

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

Exercise 6

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

Exercise 7

Minimum of 4 programs on Multidimensional Arrays.

Exercise 8

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

Exercise 9

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

Exercise 10

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

Exercise 11

Minimum of 4 programs on Recursive Functions, Preprocessor commands.

Exercise 12

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	-	2	-	-	-	-	-	-	3	2	3	2
CO2	-	-	2	3	-	-	-	-	2	-	2	-	-	-	-
CO3	2	-	3	2	-	-	-	-	-	-	-	-	3	-	3
CO4	3	2	-	-	-	-	-	-	2	-	-	2	-	-	-
CO5	-	2	3	-	-	-	-	-	-	-	3	3	-	2	-

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

(5G312)ELECTRONIC DEVICES AND CIRCUITS LAB -I
(Common to EEE & ECE)

Pre-requisites: Nil

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.

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.

Perform the following Experiments

1. Identification, Specifications, Testing of R, L, C Components (Colour 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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech I Year- I semester

(5G114) I.T. WORKSHOP
(Common to ECE and EEE)

Pre-requisites: Nil

I.T. WORKSHOP

Course Objectives:

- To identify various parts of a computer and to learn Assembling of a Computer
- To demonstrate installation of various operating systems like windows, Linux
- To learn about Networking of computers and use Internet facility for Browsing and Searching.
- To choose different anti-virus software's to enhance the system performance
- To develop Productivity tools like Word processors, Spreadsheets, Presentations.

Course Outcome:

- Able to identify the main components for the PC.
- Able to learn how to prepare a HDD for storing data, installing Windows OS and various programs.
- Able to understand the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc
- Able to distinguish different anti-virus software's to enhance the system performance
- Able to familiarize themselves with the various tools available in Windows or provided by third-party companies.

Install single or dual operating systems on computer.

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, and 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 color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9

Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and

deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10

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

Optional Tasks:

Task 11

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

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

Task 12

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

Modifications to the list to suit the department concerned.

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

Reference Books:

1. Introduction to Computers, Peter Norton, 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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**2**	**3**	-	-	3	-	-	-	-	-	-	-	**3**	-	-
CO2	-	**3**	-	2	-	-	-	-	-	-	-	**3**	**3**	-	-
CO3	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-
CO4	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	**3**
CO5	-	-	2	-	3	-	-	-	-	-	-	**3**	-	-	**3**

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

(5GC21) TECHNICAL ENGLISH
(Common to all branches)

Pre-requisites: Nil

Course Objectives:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills
- To equip the students with comprehension skills to study academic subjects with greater felicity
- To develop English communication skills of the students in formal and informal situations

Course Outcomes:

- Students will increase his vocabulary through the study of word parts, use of context clues, idiomatic expressions, and practice with a dictionary
- Students will exhibit their ability to read, comprehend, organize, and retain written information
- Students will practice the unique qualities of technical writing style, such as sentence conciseness, clarity, accuracy, avoiding ambiguity, using direct order organization, readability, coherence and transitional devices
- Students exhibit effective writing skills and create effective documents in technical communication such as letters, reports and emails
- Students will understand the factors that influence the use of grammar and vocabulary in speech and writing

TEXTBOOK PRESCRIBED: *Sure Outcomes* published by Orient Black Swan (with CD)

- The book prescribed serves as students' handbook. The reader comprises essays which are particularly relevant to 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 also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

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

Unit-II

Sure Outcomes: Climatic Change and Human Strategy

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

Substitutes

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

Unit-IV

Sure Outcomes: Water: The Elixir of Life

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

Unit-V

Sure Outcomes: The Secret of Work

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

References Books:

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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I year B.Tech-II semester

(5GC22) ENGINEERING CHEMISTRY
(Common to EEE and ECE)

Pre-requisites: Nil

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

Course outcomes:

The student is expected to:

- Students will be able to understand the basic concepts of water analysis methods which helps them in solving problems related to boiler troubles and also in various water treatment methods
- Students will be able to understand the basic principles of batteries & fuel cells, and extends the knowledge to different types of sensors, corrosion and their prevention methods
- Students will be able to synthesize and differentiate different types of polymers
- Students will be able to derive/ manufacture different types of fuels and elucidate their properties
- Students will be able to manufacture cement, understand the basic concepts of propellants, refractoriness, lubricants and elucidate their properties

Unit-I

Water Treatment Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity and chlorides in water, Water treatment for domestic purpose Disinfection- Definition, Kinds of disinfectants (Bleaching powder, Ozone, chloramine, UV light and Chlorine), Break point

chlorination.

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

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

Unit-II

Electrochemistry Electrochemical cells: Basic concepts, classification of electrochemical cells, numerical calculations, Batteries: classification of batteries: Primary (Leclanche battery, mercury battery) and Secondary /rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries) Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

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

Corrosion: Definition & Types (dry & wet Corrosions), Electrochemical Theory of corrosion, concentration cell corrosion, galvanic corrosion, factors affecting the corrosion, Prevention: Anodic and Cathodic protection, Electroplating (Nickel, copper and chromium) & Electrolessplating

Unit-III

Polymers introduction to polymers, Polymerization process- types (without mechanism), Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.

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

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

Inorganic Polymers: Basic Introduction Silicones, polyphosphazines.

Unit-IV

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

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

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

Unit-V

Chemistry of Engineering Materials Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification with suitable examples, properties and applications

Lubricants: Definition and properties of lubricants, theory of lubrication, and applications of lubricants.

Rocket Propellants: Classification, Characteristics of a good propellant

Text Books

1. Engineering Chemistry by K.N.Jayaveera, G.V.Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.
2. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapat Rai Publishing Company, New Delhi, 15th Edition, 2010.

Reference Books

1. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH, Publications India Pvt. Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
5. Text Book of Engineering Chemistry, Shashichawla, Dhanapat Rai Publications, New Delhi, 4th Edition, 2011.
6. Engineering Chemistry, K. Sesha Maheswaramma and Mrudula Chugh, Pearson Education, First Edition, 2013.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO mapping:

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

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

(5GC24) ENGINEERING MATHEMATICS – II

(Common to all branches)

Pre-requisites: Engineering Mathematics-I

Course Objectives:

The course aims to provide the student with the ability

- To apply this knowledge to evaluate the multiple integrals in real life situations.
- To apply the knowledge of Laplace transforms and vector calculus for engineering problems.

Course Outcomes:

- Students will understand the applications of Multiple Integration
- Students will exhibit the knowledge of Laplace transforms
- Students will be able to apply Ordinary Differential equations with given initial and boundary conditions in engineering subjects
- Students will be able to analyze the Vector differentiation and Integration in various domains
- Student understands the applications of Vector Integral theorems.

Unit-I

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

Unit-II

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions – Inverse Laplace transform – Convolution theorem.

Unit-III

Application of Laplace transforms to ordinary differential equations of first and second order.

Unit-IV

Vector Calculus: Scalar and vector point functions, Gradient and its geometrical interpretation, Divergence–physical interpretation of divergence, Curl -physical interpretation of curl, Del applied twice to point functions, Line integral - Area, Surface and volume integrals.

Unit-V

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

Text Book:

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

References Books:

1. Higher Engineering Mathematics, by Kreyszig.
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand & Company.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO mapping:

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

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B.Tech. I Year-II Semester

(5G121) C PROGRAMMING AND DATA STRUCTURES
(Common to ALL branches)

Pre-requisites: Nil

Course Objectives:

The students will able

- To learn the basic concepts of pointers and its applications.
- To understand the syntax of structures, unions, files and different sorting and searching techniques.
- To differentiate linear data structures such as stacks, queues, circular queues and their applications.
- To compare different linear data structures such as single linked list, double linked list, circular linked list and their applications.
- To analyze non- linear data structures such as trees, graphs and their applications.

Course Outcomes:

- To understand the basic concepts of pointers and how the memory will be allocated dynamically using pointers.
- To compare the syntax of structures, unions with arrays, and to create simple text vs. binary files and different sorting and searching techniques.
- To analyze different linear data structures such as stacks, queues, circular queues and their applications.
- To implement appropriate linear data structures such as single linked list, double linked list, circular linked list in different applications of C programs.
- To construct non- linear data structures such as trees, graphs.

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 Data Structures.B.AForouzan,R. F.Gilberg, Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. Data Structures and Algorithms: Concepts, Techniques and Applications G.A.V. Pai [UNIT-V]

Reference Books

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	2	-	2	-	-	-	-	-	-	3	-	2	2
CO2	-	2	-	3	-	-	-	-	2	-	2	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-	3	-	3
CO4	3	2	-	-	-	-	-	-	2	-	-	2	-	-	-
CO5	-	-	3	-	2	-	-	-	-	-	3	3	-	3	-

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B.Tech. I Year II Semester

(5G321)ELECTRONIC DEVICES AND CIRCUITS - II
(Common to EEE & ECE)

Pre-requisites: Electronic Devices and Circuits-I

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.

Course Outcomes:

Upon completion of the course students can

- Able to understand Biasing and Stabilization conditions of BJT.
- Able to understand Biasing and Stabilization conditions of FET.
- Able to design the amplifiers circuits under given requirements.
- Able to understand the Small signal model of FET.
- Able to have the knowledge and usage of special purpose electronic devices in various applications.

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

MULTI STAGE AMPLIFIERS: Multistage transistor Amplifier-Important terms-R.C. Coupled Transistor amplifier-Direct coupled amplifier-Comparison of different types of coupling.

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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B.Tech. I Year II Semester

(5G523) ENGINEERING DRAWING- II
(Common to EEE, ECE, CSE and IT)

Pre-requisites: Nil

Course Objectives:

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

Course Outcomes:

- 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
- Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

Unit-I

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

Unit -II

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

Unit -III

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

Unit -IV

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

Unit -V

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

Text Book:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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B.Tech. I Year II Semester

(5GC26) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - II
(Common to all branches)

Pre-requisites: Nil

Course Objectives:

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

Course Outcomes:

- Students will be able to understand the importance of intonation, word and sentence stress for improving communication competence to identify and to overcome mispronunciation
- Students will be able to make spontaneous a speech confidently
- Students will enhance their public speaking skills and make technical presentations
- Students will analyze, interpret and compare data from graphs/pie charts

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

1. **Introduction to Stress and Intonation**
2. **'Just A Minute' (JAM)**
3. **Oral Presentations**
4. **Information Transfer**

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

Minimum Requirements:

The English Language Lab shall have two parts:

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

Suggested Software:

- Sky Pronunciation Suite
- Connected Speech from Clarity
- Clarity Pronunciation Power – Part I

- Language in Use, Foundation Books Pvt Ltd with CD
- Learning to Speak English - 4 CDs
- Cambridge Advanced Learners' English Dictionary with CD.
- Murphy's English Grammar, Cambridge with CD

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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B.Tech. I Year II Semester

(5GC27) ENGINEERING CHEMISTRY LAB
(Common to ECE and EEE)

Pre-requisites: Nil

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.

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

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)
2. Estimation of Chloride ion using potassium Chromite indicator (Mohr's method)

Water analysis

3. Determination of total hardness of water by EDTA method
4. Estimation of Dissolved Oxygen by Winkler's method
5. Determination of acidity of Water
6. Determination of Alkalinity of Water.

Complexometry

7. Determination of Copper by EDTA method

Iodometry

8. Determination of Copper by Iodometry

INSTRUMENTATION

Colorimetry

9. Estimation of Iron in Cement by Colorimetry.

Conductometry

10. Conductometric titration of strong acid Vs strong base (Neutralization titration)

Fuel analysis

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

Lubricants

12. Determination of Viscosity of oils using Redwood Viscometer I
13. Determination of Viscosity of oils using Redwood Viscometer II

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.

Equipment Required:

- ✓ Analytical weighing balance
- ✓ Digital Conductometer
- ✓ Photo-colorimeter
- ✓ Bomb calorimeter
- ✓ Redwood viscometers
- ✓ Deionizer plant
- ✓ Digital electronic balance

Glassware Required:

Pipettes, burettes, conical flasks, standard flasks, beakers, reagent bottles, spatulas, wash bottles, BOD Bottles, measuring cylinders, glass rods, Bunsen burners, funnels, thermometers etc.

Chemicals Required:

EDTA, Hypo, Mohr Salt Solution, HCl, Sulphuric Acid, Copper Solution, Iron Solution, Potassium Dichromate Solution, Potassium Iodide Solution, Buffer Solution, diphenyl amine, EBT indicator, NaOH solution, Benzoic acid Urea, distilled water etc.

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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B.Tech. I Year II semester

(5G123) PROGRAMMING IN C AND DATA STRUCTURES LAB
(Common to ECE, EEE, ME and CE)

Pre-requisites: Problem Solving through C lab

Course Objectives:

The students will able

- To learn simple programs of pointers and dynamic memory allocations in C.
- To understand the syntax of structures, unions, files and different sorting and searching techniques.
- To differentiate stacks, queues and circular queues programs using arrays and pointers.
- To compare single linked list, double linked list and circular linked list programs using arrays and pointers.
- To analyze the operations on binary tree.

COURSE OUTCOMES:

The students will able

- To write simple programs of pointers and how memory will be allocated dynamically in C.
- To discuss syntax of structures, unions, files and different sorting and searching techniques.
- To apply arrays and pointers in writing C code for stacks, queues and circular queues programs
- To distinguish single linked list, double linked list and circular linked list programs using arrays and pointers.
- To create binary tree and display the tree traversals of binary tree.

Recommended Systems/Software Requirements:

• Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise 1

Minimum of 4 Programs on pointer basics [declaration, A, Pointers, pointers for inter function communication.

Exercise 2.

Minimum of 4 Programs on Pointers applications.

Exercise 3

Minimum of 4 programs on structures and unions

Exercise 4

Minimum of 4 programs on basic File operations.

Exercise 5

Minimum of 4 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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	2	-	2	-	-	-	-	-	-	3	-	2	2
CO2	-	2	-	3	-	-	-	-	2	-	2	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-	3	-	3
CO4	3	2	-	-	-	-	-	-	2	-	-	2	-	-	-
CO5	-	-	3	-	2	-	-	-	-	-	3	3	-	3	-

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B.Tech. I Year II Semester

(5G322)ELECTRONIC DEVICES AND CIRCUITS LAB -II

(Common to ECE & EEE)

Pre-requisites: Electronic Devices and Circuits lab-I

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.

Course Outcomes:

Upon completion of the course students can

- 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.

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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B.Tech. I Year II Semester

(5G524) ENGINEERING WORKSHOP
(Common to ECE and EEE)

Course Objective:

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

Course Outcomes:

- 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.

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 50 x 50 mm soft wood stock

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

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

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

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

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

2. TRADES FOR DEMONSTRATION:

a. Plumbing

b. Machine Shop

c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but

they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Reference Books:

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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B.Tech. II Year I-Semester

(5GC32) MATHEMATICAL METHODS – III

Pre-requisites: Engineering Mathematics-I, Engineering Mathematics-II

Course Objectives:

- To understand several important concepts in linear algebra, including systems of linear equations and their solutions; matrices and their properties; determinants and their properties; and Eigen values and Eigen vectors.
- To improve your ability to think logically, analytically and abstractly.
- The objective of curve fitting is to find the parameters of a mathematical model that describes a set of (usually noisy) data in a way that minimizes the difference between the model and the data.
- Introduce students to how to solve linear partial differential with different methods.
- Know how to derive a Fourier series of a given periodic function by evaluating Fourier coefficients. Understand the nature of the Fourier series that represent even and odd functions and how derivation of a Fourier series can be simplified in this way. Be able to expand an odd or even function as a half-range cosine or sine Fourier series.
- To equip students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.

Course Outcomes:

Student will be able to

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

UNIT-I

Matrix algebra -Rank-Echelon form, normal form -solutions of linear system of homogenous and non-homogenous equations -Gauss Elimination Method

Eigen Values-Eigen Vectors-Properties. Cayley Hamilton theorem.

UNIT-II

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-III

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-IV

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– Charpit's method-Method of separation of variables.

UNIT-V

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.

Fourier transforms: Fourier sine Transforms-Cosine Transforms-Properties-Inverse Transforms-Finite Fourier Transforms.

Text Books:

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

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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B. Tech II Year I Semester

(5GC34)ENVIRONMENTAL SCIENCE

Pre-requisites: Nil

Course Objectives*:*

- Understand & appreciate the importance of Environmental Science.
- In order to make the students environmentally educated
- To protect the environment by preventing environmental pollution& degradation.

Course outcomes:

At the end of the course the student will

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

Unit - I

Multidisciplinary nature of environmental studies - Scope & Importance of environmental studies - Need for public awareness - Global environmental crisis (over-exploitation of natural resources, decline of ecosystems, loss to biodiversity, environmental pollution, and population growth) – People in environment – Institutions in environment

Unit- II

Renewable & non-renewable natural resources. Forest resources: Use – deforestation, case studies - dams & their effects on forest & tribal people Water resources: Use - floods, drought- conflicts over water. Mineral resources: Use - environmental effects of extracting mineral resources, case studies. 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 as a resource, 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 - Energy flow in the ecosystem- Cycling of nutrients (Bio geo chemical cycles-water, oxygen, carbon, nitrogen & energy cycles) – Types and characteristic features 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 values - 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 - Solid waste management: Causes, effects and control measures of urban wastes.

Unit –V

SOCIAL ISSUES AND THE ENVIRONMENT: Rain water harvesting - Environmental ethics: Issues & possible solutions - Global warming - Acid rain - Ozone layer depletion – Wasteland reclamation - Environment protection Act.-Air (Prevention & Control of Pollution) Act.-Water (Prevention & Control of Pollution) Act.-Wildlife Protection Act-Forest Conservation Act.

HUMAN POPULATION & ENVIRONMENT: Population explosion – Family Welfare Program -Environment & human health - Human Rights (in relation to environment) - Value Education (environmental values) - HIV/AIDS.

Text Books:

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

Reference Books:

1. Comprehensive Environmental Studies by J.P.Sharma, Laxmi Publications.
2. Environmental Studies by Anindita Basak – Pearson education.
3. Environmental Studies by Benny Joseph, Mc.GrawHill Publications.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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B. Tech. II Year I Semester

(5G235)ELECTRICAL CIRCUIT THEORY

Pre-requisites: Nil

Course Objective:

This course introduces the basic concepts of circuit analysis which helps to analyze the circuits. The emphasis of this course is laid on the basic analysis of circuits which includes Basic concepts like 1-Φ ac circuits, three phase systems. Network theorems, Magnetic Circuits.

Course Outcomes:

- Analyze the Basic concepts of Electrical Circuits.
- Analyze the concepts of 1-Φ electric circuits.
- Analyze the phenomenon of Resonance and Magnetic Circuits.
- Analyze the three phase systems.
- Solve electric circuits for voltage, current and power using network theorems.

Unit-I

FUNDAMENTALS OF ELECTRICAL CIRCUITS: Concepts of Charge, Current, Voltage & Power, Active & Passive Elements, V-I Relationships for Passive Elements, Current & Voltage Division Rules, Network Reduction Techniques, Star &Delta transformations, Source Transformation, Nodal & Mesh Analysis, Super Node & Super Mesh Concepts - Problems.

Unit-II

FUNDAMENTALS OF AC CIRCUITS: 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 Forms, Phase & Phase Difference, Power Factor, Sinusoidal response of R, L, C & Combination of RLC circuits, Concept of Reactance, Impedance, Susceptance, Admittance & Power Triangle.

Unit-III

RESONANCE & MAGNETIC CIRCUITS:

Resonance: Resonant frequency, Band Width & Q-Factor for Series & Parallel RLC Networks,

Magnetic Circuits: Basic concepts of Magnetic circuits, **S**elf & Mutual Inductance, Coefficient of Coupling, DOT Convention, Analysis of Magnetic Circuits, Series & Parallel Circuits and Comparison of Electrical & Magnetic circuits.

Unit-IV

THREE PHASE SYSTEMS: Advantages of 3-Φ System over 1-Φ System, Phase sequence, Star & Delta connections and Relationship between their Phase & Line quantities, Balanced System, Measurement of Power & P.F in 3-Φ Systems by using Two Wattmeter Method.

Unit-V

NETWORK THEOREMS: Superposition, Thevenin's, Norton's, Maximum Power Transfer, Millman's, Tellegen's, Reciprocity & Compensation Theorems for both DC & AC Excitations.

Text Books:

1. A. Sudhakar, Shyammohan S Palli. *Circuits and Networks*. (Analysis and Synthesis), 5th edition, Tata Mc Graw Hill Publishing company Ltd., 2015.
2. A. Chakrabarti. *Circuit Theory*. 6th edition, Dhanpat Rai & Co, New Delhi, 2014.

Reference Books:

1. M.E. Van Valkenberg. *Network Analysis*. 3rd edition, Pearson Publications, New Delhi 2006.
2. William H. Hayt & Jack E. Kennedy & Steven M. Durbin. *Engineering Circuit Analysis*. 8th edition, TATA Mc Graw Hill Company, 2013.
3. J.A.Edminister & M.D.Nahvy. *Theory and Problems of Electric Circuits*. 4th Edition Schaums Outline series, New Delhi TATA Mc Graw Hill Company, 2004.
4. G. K. Mittal, Ravi Mittal. *Network Analysis*. 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku. *Fundamentals of Electric Circuits*. 5th Edition, Tata Mc Graw hill Publishing Company Limited, New Delhi, 2012.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	2	-	-	2	-	-	-	3	-	-
CO2	3	3	3	3	3	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	3	-	-	1	-	-	-	-	-	3	2	-
CO4	3	3	3	3	3	-	-	-	-	-	1	-	3	2	1
CO5	3	3	3	-	-	-	-	-	-	-		-	3	-	-

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

(5G331)ELECTRONIC CIRCUITS

Pre-requisites: EDC-I, EDC-II

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 of oscillators.

Course Outcomes:

Upon completion of the course, student can

- analyze the single stage and multistage amplifiers using h-parameter model at low frequencies.
- understand the concept and analysis of BJT amplifier circuits at High frequencies using Hybrid- π model.
- design the feedback amplifiers and oscillators.
- design and analyze large signal and tuned amplifiers.

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 – Small signal model of JFET and MOSFET – Common source and common Drain amplifiers, using FET, 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, CE short circuit current gain, Current gain with resistive load, Gain Bandwidth product, Emitter follower at High frequencies.

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 and Wien bridge oscillators, Crystal Oscillators-Quartz and Pierce.

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, Push-pull and Complementary Symmetry Class B power Amplifiers, phase inverter, Transistor power dissipation. Introduction to tuned amplifiers, Q-Factor, Analysis of Small Signal Single Tuned Amplifiers–Capacitive coupled, Inductive coupled amplifiers.

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.

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	3	3	-	-	-	-	3	3	3	3
CO2	3	3	-	3	-	3	3	-	-	-	-	3	3	3	3
CO3	3	3	3	3	-	3	-	-	-	-	-	3	3	3	3
CO4	3	3	3	3	-	3	-	-	-	-	-	3	3	3	3

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

(5G332) DIGITAL DESIGN

Pre-requisites: Nil

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.

Course Outcomes:

Upon completion of the course, students can

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

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-Implicant 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-Sequence detector, Serial binary adder.

Unit-V

FSM MINIMIZATION AND ASM CHARTS: Finite state machine-capabilities and limitations, Mealy and Moore models and their conversions, minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods, concept of minimal cover table. 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.

Reference Books:

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	-	-	-	-	3	3	-
CO2	-	-	3	1	-	-	-	1	-	-	-	-	3	-	1
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-	-	3	-

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

(5G333) SIGNALS AND SYSTEMS

Pre-requisites: Nil

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 different signal transmission.
- To study the various sampling methods and convolution in communication systems

Course Outcomes:

Upon completion of the course, students can

- Understand signal representation methods and operation on signals.
- Have the knowledge to obtain Fourier series and Fourier Transforms
- Understand the convolution and correlation of signals.
- Learn various systems and their responses.
- Understand different transforms (Laplace & Z) and their responses with different types of signals.

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

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to LTI systems, Properties of LTI Systems, Transfer function of LTI System, Filter Characteristics of Linear systems, Distortion less Transmission through a system, signal and system bandwidth, Ideal filter characteristics, Causality and Paley-Wiener Criterion, Relationship between Bandwidth and Rise Time.

Unit-IV

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

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-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 Edn.

Reference Book:

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	-	-	3	-	-	-	-	-	-	3	-	3	3
CO2	3	3	-	3	3	-	-	-	-	-	-	3	-	3	3
CO3	3	3	-	-	3	-	-	-	-	-	-	3	-	3	3
CO4	3	3	-	3	3	-	-	-	-	-	-	3	-	3	3
CO5	3	3	-	3	3	-	-	-	-	-	-	3	-	3	3

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

(5G335) ELECTRONIC CIRCUITS LAB

Pre-requisites: Electronic Devices and Circuits Lab-I, Electronic Devices and Circuits Lab-II

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.

Course Outcomes: Upon completion of the course, students will

- Have the ability to analyze and design single and multistage amplifiers
- Determine the efficiencies of power amplifiers.
- Design different Oscillators.
- Be able to analyze all the circuits using simulation software and Hardware.

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.**

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	-	-	-	-	-	3	3	3	3
CO2	3	3	3	-	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	3	-	-	-	-	-	3	3	3	3
CO4	3	3	3	3	3	3	-	-	-	-	-	3	3	3	3

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

(5G336) BASIC SIMULATION LAB

Pre-requisites: Nil

***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 softwares.
- 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

Course Outcomes:

Upon the completion of course the students will be able

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

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 and imaginary parts of signal.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a gi discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform Phase spectrum.

11. Waveform synthesis using Laplace Transform
12. Locating the zeros and poles and plotting the pole Z-plane for the given transfer function.
13. Sampling theorem verification.
14. Removal of noise by autocorrelation / cross correlation.
15. Verification of winer-khinchine relations.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	3	-	2	-	-	-	-	-	-	-	3	-	3	2

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

(5GC41)COMPLEX VARIABLES AND SPECIAL FUNCTIONS

Pre-requisites: Engineering Mathematics-I, Engineering Mathematics-II, Mathematical Methods-III

Course Objectives:

The course aims to provide the students with the ability

- To understand the complex variables and their functions.
- To apply this knowledge to evaluate the complex integrals in real life situations.

Course Outcomes: Student will

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

Unit-I

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 a complex variable – 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.

Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

Unit-IV

Singular point – Isolated singular point – Pole of order m – Essential singularity.

Residue – Evaluation of residues – Residue theorem. Evaluation of integrals of the type $\int_{-\infty}^{\infty} f(x)dx$ *and* $\int_{0}^{2\pi} f(\cos\theta,\sin\theta)d\theta$.

Determination of zeros – Argument principle – Rouche's theorem.

Unit-V

Conformal mapping: Definition – Translation, rotation, and inversion –- Transformation by e^z, $\ln z$, z^2, z^n, $\sin z$, $\cos z$.

Bilinear transformation -Fixed points – Cross ratio – Determination of bilinear transformation mapping for three given points

Text Book:

Higher Engineering Mathematics, B. S. Grewal, Khanna Publication.

Reference books:

1. A Text Book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
2. A Text Book of Engineering Mathematics, Vol – III, T.K. V Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
3. Complex Variables – Chruchile and Brown.
4. Complex Variables – Schaum Series.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B. Tech. II Year II Semester

(5G246) ELECTRICAL TECHNOLOGY

Pre-requisites: Electrical Circuit Theory

Course Objectives:

- To impart the knowledge about the Transient Response.
- To inculcate the understanding about the Filters & Attenuators.
- To understand the working of various Electrical Machines.

Course Outcomes:

- Able to determine the transient response of series RL, RC and RLC circuits with DC-Excitation.
- Able to determine all network parameters for a given Two-port network.
- Able to understand the basics of Filters, Attenuators and their Design.
- Able to identify the types of DC-Machines and their applications
- Able to calculate the efficiency of DC-Machines.
- Able to explain the principle operation of Transformer.
- Able to calculate the Efficiency and Regulation of transformer.
- Able to identify the types of special machines and their applications

Unit-I

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.

Image parameters.

Unit-II

TRANSIENT ANALYSIS: Transient Response of RL, RC & RLC Series Circuits for DC Excitations, Time Constant, Initial Conditions, Solution using Differential Equations & Laplace Transform Approach.

Unit-III

FILTERS & ATTENUATORS:

Filters: Classification of Filters, Classification of Pass Band & Stop Band, Characteristic Impedance in the Pass Band & Stop Bands, Constant-k Filters Low Pass Filter, High Pass Filter, Band Pass Filter and Band Elimination Filter, m-Derived T-Section Low Pass Filter and High Pass Filter.

*Attenuators (*symmetrical*)*: T-Type, π-Type, Bridged T-Type & Lattice Attenuators.

Unit-IV

D.C MACHINES:

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

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

Unit-V

1-Φ TRANSFORMERS & SPECIAL MACHINES: Transformers*:* Principle of operation, Types, Constructional Features, Phasor diagram on No-load, Equivalent Circuit, Losses, Efficiency & Regulation, OC & SC Tests, and Pre-Determination of Efficiency & Regulation.

Special Machines: Principle of operation of Capacitor start and Capacitor run Motors, Stepper Motor - Characteristics, Applications.

Text Books:

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

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{110}	PO_{11}	PO112	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	3	-	3	3	-	3	3	3	3	-
CO2	3	3	3	-	-	3	-	3	3	-	3	3	3	3	-
CO3	3	3	3	-	-	3	-	3	3	-	3	3	3	3	-
CO4	3	3	-	-	-	3	-	3	3	-	-	3	3	3	1
CO5	3	3	-	-	-	3	-	3	3	-	-	3	-	-	-
CO6	3	3	-	-	-	3	-	3	3	-	-	3	-	-	-
CO7	3	3	-	-	-	3	-	3	3	-	-	3	-	-	-
CO8	3	3	-	-	-	3	-	3	3	-	-	3	-	-	-

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

(5G341) RANDOM VARIABLES AND RANDOM PROCESSES

Pre-requisites: S&S

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

Course Outcomes:

Upon completion of the course, students will be able to

- Understand the concept of Probability and types of random variables.
- Learn the possible operations on random variables with real time examples.
- Understand the concept of random processes
- analyze the random processes based on their characteristics

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. 2. Probability, Random Variables and Stochastic Processes – Athanasius Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	3	-	-	-	3	-	3	2	-	-
CO2	3	3	3	3	-	3	-	-	-	3	-	3	-	3	3
CO3	3	3	3	3	-	-	-	-	-	3	-	3	2	-	-
CO3	3	3	3	3	-	-	-	-	-	3	-	3	-	3	3

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

(5G342) PULSE AND DIGITAL CIRCUITS

Pre-requisites: Electronic Circuits, Digital Design

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.

Course Outcomes:

Upon completion of the course, student can

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

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 Multivibrators with BJT. Schmitt trigger circuit, Symmetrical & Un Symmetrical Triggering of Bi-stable Multivibrator, Monostable Multivibrators

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.

Reference books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	3	-	-	-	3	1	-	-	-	1	-	-	3	-	-
CO2	3	1	-	-	3	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	3	-	-	-	3	-	-	-	-	-	-	-	3	-	-

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

(5G343) ANALOG COMMUNICATION

Pre-requisites: Signals & S

Course Objectives*:*

The course aims to provide the student with the ability

- To enable the students to learn the fundamentals of modulation and different applications of modulation.
- To understand the concepts of Noise and Transmitters & Receivers in Communication.

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

- Learn the need of Modulation and Application in real time.
- Gain the knowledge of Different Modulation Techniques and their Generation & Detection methods
- gain the knowledge about the Effect of Noise in analog modulation techniques
- design radio Transmitters, Receivers & applications in real life

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 Wave, 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

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO_1	PSO_2	PSO_3
CO1	3	-	-	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	2	-	2	-	-	-	-	-	-	2	-	-	-
CO3	3	-	-	2	-	1	-	1	-	1	-	-	2	-	-

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

(5G344) FIELD THEORY AND TRANSMISSION LINES

Pre-requisites: Signals & Systems, Engineering Mathematics-I, Engineering Mathematics-II

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 a knowledge of wave propagation with its different characteristics.
- To acquire a knowledge on transmission lines & their characteristics.

Course Outcomes:

Upon completion of the course, students can

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

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, Ampere's Force Law, Inductors and Inductances, Magnetic Energy. Introduction to Maxwell's equations, Faraday's Law, Transformer and Motional EMFs, Displacement Current Density, 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 and Oblique Incidences.

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, Reflection loss, Line Distortion, Condition for Distortion less &lossless lines, Condition for minimum attenuation, Loaded line, loading coil, loading practice, Smith Chart – Properties and Applications, Single and Double Stub Matching.

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.

Reference Books:

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. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	3	-	-	3	-	3	3	3	3
CO2	3	3	3	3	-	3	3	-	-	3	-	3	3	3	3
CO3	3	3	3	3	-	3	3	-	-	3	-	3	3	3	3
CO4	3	3	3	3	-	-	3	-	1	3	-	3	3	3	3
CO5	3	3	3	3	-	3	3	-	-	3	-	3	3	3	3
CO6	3	3	3	3	-	3	3	-	1	3	-	3	3	3	3

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II Year B. Tech. I Semester

(5GC44) APTITUDE AND REASONING SKILLS
(Common to EEE, ECE & IT)

Pre-requisites: Nil

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.

Course Outcomes:

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

Quantitative Aptitude:

Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and loss, Simple interest and Compound interest, Ratio and Proposition and variation, Time and Work, Time and Distance, Mensuration, Permutation and Combinations.

Progressions, Inequalities, Logarithms, HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Pipes and Cisterns, Area, Volume and Surface Areas, Calendar, Clocks, True Discount, Banker's Discounts, Data Interpretation– Tabulation, Bar Graphs, Pie charts, Line Graphs

Reasoning:

Directions, Blood Relations, Problems on Cubes, Series and Sequences, Odd man out, Coding and Decoding, Data sufficiency, Logical deductions, Arrangements and Combinations, Groups and Teams, Puzzles to Puzzle you. More puzzles, Brain Teasers, Puzzles and Teasers

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.

Reference Books:

1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
2. Sharon Weiner-Green, IrnK.Wolf, Barron's GRE, Galgotia Publications, New Delhi, 2006.

3. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers(OPB), New Delhi, 2005.
4. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.
5. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
6. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005.

Library:

1. Mittal.U Puzzles to puzzle you (Book-I & II).
2. Aptitude (Quantitative, Analytical, Logical), By Globarena.
3. Aptitude – Student work book, Part-I &II, By Globarena.
4. Material for Soft Skills, By Globarena.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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

(5G346) PULSE & DIGITAL CIRCUITS LAB

Pre-requisites: Nil

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 of digital logic families.

Course Outcomes:

Upon completion of the course, students will

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

Perform following experiments

1. Linear wave shaping.
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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	-	-	-	-	-	-	-	-	-	3
CO2	3	3	3	-	3	-	-	-	-	-	-	2	-	2	3
CO3	3	3	3	-	3	-	-	-	-	-	-	2	-	2	3

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

(5G347)ANALOG COMMUNICATION LAB

Pre-requisites: Nil

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.

Course Outcomes:

Upon the completion of the course the students will be able

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

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.**

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	3	3	-	-	-	-	-	3	3	-
CO2	3	3	3	-	3	3	3	-	-	-	-	-	3	3	-
CO3	3	3	3	-	3	3	3	-	-	-	-	-	3	3	1

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B. Tech. III Year B.Tech. I Semester

(5GA41)MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Pre-requisites: Nil

Course Objectives:

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

Course Outcomes:

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

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 Isocosts, 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.

Reference Books:

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.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	Po12
CO1	-	3	-	3	-	-	-	-	-	3	3	3
CO2	-		-	3	-	-	-	-	-	3	3	3
CO3	-	3	-	-	-	-	-	-	-	-	3	3
CO4	-	-	-	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	-	-	3	3

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

(5G351)DIGITAL COMMUNICATION

Pre-requisites: AC

Course Objectives*:*

The course aims to provide the student with the ability

- To understand digital modulation Techniques
- To learn coding and detection techniques

Course Outcomes*:*

Upon completion of the course, students can

- understand different Modulation techniques, design of digital communication systems based on these modulation techniques in real time
- be able to use source coding techniques and channel coding techniques in communications systems and Design Different error control Codes
- To design basic digital communication systems for applications in real time

Unit-I

PULSE DIGITAL MODULATION: Elements of digital communication system, advantages of digital communication systems, Elements of PCM, Bandwidth requirements of PCM, Noise in PCM Systems, Differential PCM systems (DPCM), Delta modulation systems, Adaptive delta modulation, Noise in Delta modulation systems, comparison of PCM and DM systems,

Unit-II

DATA TRANSMISSION: Base band signal receiver, probability of error, the optimum filter, Matched filter, Probability of error using matched filter, Correlator.

Unit-III

DIGITAL CARRIER MODULATION SCHEMES: Introduction, Binary ASK Signaling Schemes, Binary FSK Signaling Schemes, Binary PSK Signaling Schemes, M-ary Signaling Schemes , Comparison of Digital Modulation Schemes.

Unit-IV

INFORMATION THEORY AND SOURCE CODING: Unit of information, Entropy, Rate of information, Joint and conditional entropy, Mutual information, Channel capacity ,Bandwidth and S/N Trade-off, Shannon theorem, Coding efficiency, Shanon-Fano coding, Huffman coding.

Unit-V

ERROR CONTROL CODING: Introduction, Linear block codes: Matrix description of Linear Block codes, Error detection and error correction capabilities of linear block codes, Binary cyclic codes: Algebraic structure, encoding, syndrome calculation, BCH Codes. Convolution Codes: Encoder & Decoder for convolution codes.

Text Books:

1. K.Sam shanmugam - Digital and Analog communication Systems, Wiley, 2010.
2. R.P.Singh & S.D.Sapre - Communication Systems Analog & Digital, TMH, 2008.

Reference Books:

1. Simon Haykin - Digital Communications, Wiley, 2006.
2. John Proakis - Digital Communications, TMH, 1983.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	-	-	3	3	3	3	3	3
CO2	3	3	3	3	3	-	-	-	-	3	3	3	3	3	3
CO3	3	3	3	3	3	-	-	3	-	3	3	3	3	3	3

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B. Tech. III Year I Semester

(5G352)CONTROL SYSTEMS

Pre-requisites: Electronic Devices& Circuits-I, Signals & Systems

Course Objectives*:*

The course aims to provide the student with the ability

- To understand the basic concepts of systems and their stability
- To apply the knowledge to design an efficient compensator to meet desired specifications.

Course Outcomes:

Upon completion of the course, students will

- understand the basic principles of systems and their mathematical representations
- Know the type and order of the systems and their time domain specifications.
- Gain the knowledge on stability and analyze it using different techniques
- Design compensators and controllers for various systems
- Know the mathematical approach for determining the stability of the control system, controllability and observability.

Unit-I

INTRODUCTION & TRANSFER FUNCTION REPRESENTATION:

Concepts of Control Systems-Classification- Open Loop and closed loop control systems and their differences-Examples- Feed-Back Characteristics, Effects of feedback-Mathematical models-differential Equations. Transfer function-Mechanical Translational & Rotational systems, electrical analogy –Transfer function of DC servo motor. Block Diagram representation of systems considering electrical systems as examples- Block diagram algebra, Signal Flow graph and Mason's gain formula.

Unit-II

TIME RESPONSE ANALYSIS & STABILITY ANALYSIS IN S-DOMAIN:

Types of test signals, Type and Order of systems, Time Response of first and second order system, Time domain specifications- and– steady state error – static error constants – generalized error coefficients. Concepts of stability: Characteristic equation, location of roots in s-plane for stability, asymptotic stability and relative stability, Routh-Hurwitz stability criterion.

Root Locus Technique: Root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

Unit-III

STABILITY ANALYSIS IN FREQUENCY DOMAIN:

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications from the Bode Diagram-Phase margin and Gain

margin-Stability Analysis from Bode Plots. Polar Plots, Nyquist stability criterion– simple problems.

Unit-IV

DESIGN AND COMPENSATION OF CONTROL SYSTEMS

Introduction to Compensation networks – Lag, Lead, Lead-Lag controllers Design in Frequency Domain–Effects of PI, PD & PID controllers.

Unit-V

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS Concepts of state, state variables and state model-derivation of state model for physical systems Diagonalization- State transition Matrix and its properties – Solution of linear state equation – Concepts of controllability and observability.

Text Books:

1. I. J. Nagrath and M. Gopal, *Control Systems Engineering*, 2nd edition, New Age International (P) Limited, Publishers.
2. Xavier .S.P.Eugune, Joseph Cyril Babu, *Principles of control systems*, S.Chand &Company.

Reference Books:

1. Katsuhiko Ogata, *Modern Control Engineering*, 3rd edition, Prentice Hall of India Pvt. Ltd., 1998.
2. NISE, *Control Systems Engg*, 3rd Edition, John wiley.
3. Richard C. Dorf, Robert H. Bishop, *Modern control systems*, 11th edition, Pearson education, 2007.
4. Graham Goodwin**,** Stefan Graebe and Mario Salgado, *Control System Design*, prentice hall.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	**PO_1**	**PO_2**	**PO_3**	**PO_4**	**PO_5**	**PO_6**	**PO_7**	**PO_8**	**PO_9**	**PO_{10}**	**PO_{11}**	**PO_{12}**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	-	-	-	-	3	-	3	-	3	3	3	-
CO2	3	3	-	-	-	-	-	-	3	3	-	-	3	3	-
CO3	3	3	-	-	-	-	-	3	3	-	-	3	3	3	-
CO4	-	3	2	-	-	-	-	-	-	-	-	3	3	3	-
CO5	3	3	-	-	-	-	-	-	3	-	-	3	3	3	-

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B. Tech. III Year I Semester

(5G353)ANALOG & DIGITAL INTEGRATED CIRCUITS

Pre-requisites: DD, PDC

Course Objectives*:*

The course aims to provide the student with the ability

- To understand the basic concepts of Linear integrated circuits.
- To apply the knowledge to design Digital Integrated circuits.

Course Outcomes:

Upon completion of the course, students will

- Understand the basic principles of analog integrated circuits.
- Gain the knowledge on VHDL
- Designing of combinational and sequential circuits.

Unit-I

IC Fabrication: Classification, IC chip size and Circuit complexity, Fundamentals of Monolithic IC technology, Basic Planar Processes, Fabrication of a Typical Circuits

Operational amplifiers: Basic Information of Op-amp, Ideal op-amp, Internal Circuit, Dc & AC Characteristics

Applications: Basic op-amp applications, Instrumentation amplifier, Ac amplifier, V-I Converter and I-V Converter, Log & Anti Log amplifier, Multiplier and Divider, Differentiator and Integrator.

Unit-II

Comparator and applications, Astable & Monostable multivibrator, Triangular wave generator, RC active filters

IC 555 Timer: Fundamental Block diagram, Monostable, Astable operation & Schmitt Trigger

PLL: Basic Principe and Operation of individual Blocks, Monolithic PLL, PLL applications, D-A and A-D Converters

Unit-III

CMOS Logic, CMOS steady State Electrical behavior, CMOS Dynamic Electrical Behavior, CMOS Logic families, Bipolar Logic, TTL logic, TTL families, ECL

Unit-IV

VHDL Hardware Description Logic: Design Flow, Program simulators, Types & constraints, Functions and Procedures, Libraries or Packages, Structural design, Elements, Dataflow design elements, Behavioral Logic elements, Time Dimension & simulation Synthesis.

Combinational Circuits & IC'S: Decoders, Encoders, Three state Devices, Multiplexers, EX-OR gates, Parity Circuits, Comparators, adders, subtractors, ALUs

and Combinational Multiplexers, VHDL programs.

Unit-V

Sequential Logic IC'S: Latches and Flip Flops: Counters, Shift Registers, Design Methodology, Impediments to synchronous Design, VHDL programs.

Text Books:

1. Ramakanth A. Gayakwad - Op-Amps & Linear ICs, 3rd edition, PHI, 2001.
2. D. Roy Chowdhury - Linear Integrated Circuits , New Age International (p) Ltd, 4th Edition, 2010.
3. John F. Wakerly- Digital Design Principles & Practices, PHI/ Pearson Education Asia, 3rd Ed., 2005
4. J.Bhaskar-VHDL primer, PHI/ Pearson Education Asia, 3rd Ed., 2003.

Reference Books:

1. David A. Bell - Operational Amplifiers & Linear ICs, 2nd edition, Oxford University Press, 2010.
2. Charles H. Roth Jr- Digital System Design Using VHDL, PWS Publications, 2nd edition, 2008.
3. Kenneth L Short – VHDL for Engineers, Pearson Education 2009.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO 10	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	3	-	-	3	-	3	3	-
CO2	3	-	-	-	-	-	-	-	-	-	3	-	3	3	-
CO3	3	3	1	-	-	-	-	3	-	-	3	-	3	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

B. Tech. III Year I Semester

(5G455) COMPUTER SYSTEM ARCHITECTURE

Pre-requisites: PROBLEM SOLVING TECHNIQUES AND INTRODUCTION TO C PROGRAMMING

Course Objectives*:*

The course aims to provide the student with the ability

- To make the students understand the structure and of various functional modules
- To understand the techniques that computers use to communicate with I/O devices
- To study the concepts of pipelining and the basic characteristics of multiprocessors

Course Outcomes:

Upon completion of the course, students will be

- Able to use memory and I/O devices effectively
- Able to explore the hardware requirements for cache memory and virtual memory
- Able to understand pipelining and multiprocessors

Unit-I

BASIC STRUCTURE OF COMPUTERS: Computer types, Functional units, Basic operational concepts, Bus structures, Software, performance, multiprocessors and multi computers. Data types, Complements, Data representation: Fixed point and floating point representations, Error detection codes.

Unit-II

REGISTER TRANSFER LANGUAGE AND MICRO-PERATIONS: Register transfer language, register transfer, Bus and memory transfer, Arithmetic Micro Operations, logic micro operations, shift micro operations, arithmetic logic shift unit, Instruction codes, Computer registers computer instructions-Instruction cycle, memory-reference instructions, input-output and interrupt.

Unit-III

CENTRALPROCESSINGUNIT and COMPUTER ARITHMETIC: Stack organization, Instruction formats, Addressing modes, data transfer and manipulation, Program control, reduced instruction set computer.

COMPUTER ARITHMETIC: Addition and subtraction, multiplication algorithms, Division algorithms

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, and micro program example.

Unit-IV:

THE MEMORY SYSTEM & INPUT-OUTPUT ORGANIZATION: Memory hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, virtual memory, memory management hardware.

INPUT-OUTPUT ORGANIZATION: Peripheral devices, input-output interface, Priority Interrupt, Direct Memory Access, Input-output processor (IOP).

Unit-V:

PIPELINE AND VECTOR PROCESSING: Parallel processing, pipelining, Arithmetic pipeline, Instruction Pipeline, RISC pipeline vector processing, Array Processing.

Multi Processors: Characteristics of multiprocessors, interconnection structures, Inter processor Arbitration.

Text Books:

1. M.Moris Mano, *Computer System Architecture*, PHI, III Edition, 2006.
2. Car Hamacher, ZvonkoVranesic, SafwatZaky, Car Hamacher, ZvonkoVranesic, SafwatZaky, *Computer Organization*, Mc.GrawHill Edition, 2002.

Reference Books:

1. William Stallings, *Computer Organization and Architecture*, PHI, Seventh Edition, 2006.
2. John P.Hayes, *Computer Architecture and Organization*, Mc Graw Hill International editions, 1998.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	-	-	3	-	3	3	-	-	3	3	3	3
CO2	-	-	-	-	3	3	1	3	3	-	1	-	3	3	3
CO3	-	3	3	-	3	-	-	-	3	-	-	-	3	3	-

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B. Tech. III Year I Semester

(5G354) ANTENNAS AND WAVE PROPAGATION

Pre-requisites: Signals & Systems, Analog Communication, Digital Communication

Course Objectives*:*

The course aims to provide the student with the ability

- To understand the concepts of Antennas and their family
- To analyze and design different antennas for various applications.
- To understand Concepts of Various Wave Propagation methods

Course Outcomes*:*

Upon completion of the course, students can have

- Knowledge on different basic concepts related to antennas and different antenna parameters mathematically
- An ability to design BSA, EFA etc... Antenna arrays. Parasitic arrays and YagiUda antenna.
- Ability to design and implement the utilization of Helical and VHF and UHF antennas.
- An Ability to analyze the propagation of wave and different parameters and Knowledge on all the layers of atmosphere and the nature of different propagation mechanisms.

Unit-I

INTRODUCTION: Introduction, Basic Antenna Parameters ,Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity and Gain, Directivity and Resolution, Antenna Apertures, Effective Height, Fields from Oscillating dipole, Antenna Field Zones.

Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Evaluation of Field Components, Antenna Family ,Antenna Theorems – Reciprocity Theorem,

Unit-II

ANTENNA ARRAYS : Point Source , Power Patterns, Field Patterns, Phase Patterns , Arrays of two isotropic point sources-Different cases, Non-isotropic point Sources, Principle of Pattern Multiplication , N element Uniform Linear Arrays – Broadside, End fire Arrays, EFA with Increased Directivity, Binomial Arrays, Arrays with Parasitic Elements, Folded Dipoles & their characteristics, Yagi - Uda Arrays.

Unit-III

ANTENNAS AND THEIR CHARACTERISTICS : Helical Antennas: Helical Geometry, Helix modes, Horn Antennas – Introduction, Optimum Horns, Rectangular Horn antenna, Beam width Comparison, Reflector Antennas: Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics, Spill

Over, Back Lobes, Aperture Blocking, Cassegrain Feeds, Lens Antennas – Geometry, Dielectric Lenses and Zoning.

Unit-IV

GROUND WAVE PROPAGATION : Introduction to wave propagation-Definition and Broad Categorization, Classification of Electromagnetic waves based on Modes of propagation, Different modes of Wave Propagation Ground Wave Propagation– Introduction, Plane earth reflection, Space wave and surface wave, Transition between surface and space wave, Tilt of Wave front due to ground losses, Impact of Imperfect Earth, Reduction factor and numerical Distance, Earth's Behavior at different frequencies, Electrical Properties of earth, Curved earth reflection.

Unit-V

SPACE WAVE PROPAGATION and SKY WAVE PROPAGATION

Introduction, Effect of imperfection of Earth, Effects due to - curvature of earth, interference zone, Shadowing of hills and buildings, Absorption by Atmospheric phenomena, Variation of field strength with Height, Super refraction, Scattering Phenomena, Tropospheric propagation, Fading.

Structural details of Ionosphere, Wave propagation mechanism, Refraction and reflection of Sky waves by Ionosphere, Ray path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip distance, Impact of Solar activity, Multihop propagation, Take-off angle, Energy loss in Ionosphere and Sky wave signal strength, Wave Characteristics.

Text Books:

1. John D. Kraus, Ronald J. Marhefka and Ahmad S Khan – "Antennas and Wave Propagation" TMH, 4e, Special Indian Edition 2010.
2. E.C. Jordan and K.G. Balmain - Electromagnetic Waves and Radiating Systems, PHI, 2nd ed., 2000

Reference Books:

1. K.D.Prasad - Antenna and wave propagation, Khanna Publications
2. Balanis- Antenna Theory

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	3	3	3	-
CO3	3	3	3	-	-	3	3	-	-	-	-	3	3	3	1
CO4	3	3	3	3	-	3	3	-	-	1	-	3	3	3	-

NNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B. Tech. III Year B.Tech. I Semester

(5G357)DIGITAL COMMUNICATION LAB

Pre-requisites: Nil

Course Objectives:

- The course aims to provide a real time experience for different digital modulation and demodulation schemes
- To simulate and analyse the digital modulation schemes

Course Outcomes:

After completion of the course the students will be able

- To experience real time behaviour of different digital modulation schemes
- To understand the working principles of Modulation and demodulation
- To simulate and analyse the digital modulation schemes.

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

1. Sampling Theorem
2. Pulse Code Modulation and Demodulation
3. DPCM Modulation and Demodulation
4. Delta Modulation
5. Time Division Multiplexing
6. FSK Modulation and Demodulation
7. PSK Modulation and Demodulation
8. DPSK Modulation & Demodulation

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	3	-	-	-	3	-	3	3	3	3
CO2	3	3	3	-	3	3	-	-	-	3	-	3	3	3	3
CO3	3	3	3	-	3	3	-	-	-	3	-	3	3	3	3

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

(5G358)IC APPLICATIONS LAB

Pre-requisites: Nil

Course Objectives:

- To verify the applications of Op-amp and timers
- To use CAD tools for development of complex digital logic circuits
- To Simulate and analyze with hardware description language.

Course Outcomes:

Upon the completion of course student will be

- Able to verify applications of Op-amp
- Able to verify applications of Timer
- Able to use computer-aided design tools for development of complex digital logic circuits.
- Able to simulate and analyze with hardware description languages.
- Able to design tests for digital logic circuits, and design for testability.

Part A (IC Application Lab – Minimum 5):

1. OP AMP Applications – Adder & Subtractor Circuits.
2. Active Filter Applications – LPF, HPF (first order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.

Part B (ECAD Lab – Minimum 7):

Simulate the internal structure of the following Digital IC's using VHDL and implement on FPGA boards & verify the operations of the Digital IC's (Hardware) in the Laboratory

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor.
3. 3-8 Decoder -74X138
4. 8-3 Encoder- 74X148.
5. 8 x 1 Multiplexer -74X151.
6. 4 bit Comparator-74X85.
7. D Flip-Flop 74X74.
8. J-K' Flip-Flop 74X109.
9. Decade counter-74X90.
10. Universal shift register -74X194.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	-	3	3	3	3	-	-	3	3	-
CO2	3	2	3	3	3	-	3	3	3	3	-	3	3	3	-
CO3	3	-	3	3	3	-	3	3	3	3	-	3	3	3	-
CO4	3	-	3	3	3	-	3	3	3	3	-	3	3	3	-
CO5	3	-	3	3	3	-	3	3	3	3	-	3	3	3	-

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III Year B. Tech., I Semester

STRESS MANAGEMENT
(AUDIT COURSE)

Pre-requisites: Nil

Course Objective:

This course examines different sources from where individuals experience a stress response. Through diligent individual and group study, students will be able to learn to apply stress management principles in order to achieve high levels of performance and understand the role of relationships to the management of stress and health.

INSTRUCTIONAL OBJECTIVES

- Understand the physiological systems that are affected by stressors and the long-term effects and illnesses that can result from stressors.
- Understand the specific applications of stress as it relates to the workplaceand different target groups.
- Create effective stress management plans for individual clients and forworkplace environments. Enhancing significance of training anddevelopment, performance evaluation

Unit–I

UNDERSTANDING STRESS Meaning – Symptoms – Work Related Stress – Individual Stress – Reducing Stress -sources of stress –consequence of stress-burnout-symptoms of Burnout- stress verses Burnout-model of stress-strategies for coping stress (individual and organizational strategies) –case study

Unit–II

TIME MANAGEMENT Techniques – Importance of Planning the day –developing concentration – Prioritizing Beginning at the start – Techniques for conquering procrastination – Sensible delegation – Taking the right breaks – Learning to say "No"

Unit–III

CAREER PLATEAU Career plateau – Identifying Career plateaus – Structural and Content - Plateauing – Making a fresh start – Importance of Sabbaticals – Counseling out – Executive leasing – Sustaining a marketable Career.

Unit–IV

CRISIS MANAGEMENT Implications – People issues – Structure issues – Environmental issues – Learning to keep calm - Preventing interruptions – Controlling crisis – Pushing new ideas – Empowerment – Work place Humour, developing a sense of Humour – Learning to laugh – role of group cohesion and team spirit.

Unit–V

SELF DEVELOPMENT Improving personality – Leading with Integrity – Enhancing Creativity – Effective decision making – Sensible Communication – The

Listening Game – Managing Self – Mediation for peace – Yoga for Life

Text Books

1. Bhatia R.L., The Executive Track: An Action Plan for Self-Development Wheeler Publishing, New Delhi
2. Charavathy.S.K, "Human Values for Manager", McGraw Hill/HenelyManagement Series

Reference Books

1. Jeffr Davison, Managing Stress, Prentice Hall of India, New Delhi
2. Jerrold S Greenberg, Comprehensive Stress Management, Jain Books, 2009

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III Year B. Tech., I Semester

PROFESSIONAL ETHICS
(AUDIT COURSE)

Pre-requisites: Nil

Course Objective:

To make the students understand ethics in engineering and infuse them with confidence to apply the same in their professional life.

INSTRUCTIONAL OBJECTIVES

- To understand the relevance of ethics and morals in engineering
- To appreciate the vulnerability to failure of engineering processes
- To comprehend the finer aspects of safety and risk with reference to the responsibilities of engineers.
- To understand the link between responsibility, rights and accountability
- To understand the global impact of engineering profession

Unit–I

MORALS AND ETHICS IN ENGINEERING Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory –Indian Theory-Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories

Unit–II

ENGINEERING AS SOCIAL EXPERIMENTATION Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study – Titanic disaster as Case Study

Unit–III

ENGINEER'S RESPONSIBILITY FOR SAFETY: Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk – Disasters at Chernobyl and Bhopal - Case Studies

Unit–IV

RESPONSIBILITIES, RIGHTS AND ACCOUNTABILITY Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

Unit–V

GLOBAL ISSUES Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct

Text Book

Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw Hill, New York, 2005.

Reference Books

1. Charles E Harris, Michael S Pritchard and Michael J Rabins, “Engineering Ethics oncepts and Cases”, Thompson Learning, 2000.
2. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico,1999.
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, 2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, 2001.
5. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, “Business Ethics – An Indian Perspective”, Biztantra, New Delhi, 2004.
6. David Ermann and Michele S Shauf, “Computers, Ethics and Society”, Oxford University Press, 2003.
7. Jayashree Suresh, Raghavan, B.S., “Professional Ethics”, S. Chand & Company Ltd., 2005

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B. Tech. III Year II Semester

(5G361)VLSI DESIGN

Pre-requisites: Digital Design, Analog and Digital Integrated Circuits

Course Objectives*:*

The course aims to provide the student with the ability

- To get knowledge on VLSI technology with applications
- To acquire design specifications of CMOS

Course Outcomes*:*

Upon completion of the course, students can

- Understand different IC technologies and their fabrication process.
- Analyze the basic electrical properties of MOS transistor and design of CMOS and Bi-CMOS inverters.
- Understand VLSI design flow of all technologies with its design rules and encoding schemes.
- be able to design the gate level and sub system modules.
- Understand the concept of programmable IC design.
- Understand the VHDL synthesis design flow and testing principles of CMOS

Unit-I

INTRODUCTION AND ELECTRICAL PROPERTIES OF MOS TECHNOLOGY Introduction to IC technology-MOS, PMOS, NMOS, CMOS and BI-CMOS fabrication processing technologies - oxidation, Photolithography, diffusion, Ion implantation, metallization , Encapsulation, probe testing, integrated resistors and capacitors , Basic electrical properties of MOS and BI-CMOS circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold voltage, g_m, g_{ds}, figure of merit (ω_o)

Unit-II

VLSI CIRCUIT DESIGN PROCESSES pass transistor, NMOS inverter, various pull-ups, CMOS inverter analysis and design, BI-CMOS inverters , VLSI design flow, MOS layers, stick diagrams, design rules and lay out,2 m CMOS design rules for wires, contacts and transistors layout diagrams for NMOS and CMOS inverters, Logic gates and Other Complex Gates, scaling of MOS circuits, limitations of scaling.

Unit-III

GATE LEVEL DESIGN Switch logic, alternate gate circuits, basic circuit concepts, sheet resistance R_S and its concept applied to MOS Transistors, area capacitance and its calculations, Inverter delays, driving large capacitive loads, wiring capacitances.

Unit-IV

SUBSYSTEM AND SEMICONDUCTOR IC DESIGN shifters, adders, multipliers, parity generators, comparators, zero/one detectors, counters, high density

memory elements, Field Programmable Gate Arrays, Complex Programmable Logic Devices, standard cell based Designs.

Unit-V

VHDL SYNTHESIS AND CMOS TESTING VHDL synthesis, circuit design flow, circuit synthesis, design capture tools, design verification tools, test principles, Need for testing, design strategies for test, chip level test techniques, system-level test techniques.

Text Books:

1. Kamran Eshraghian, Eshraghian Douglas and A. pucknell - Essentials of VLSI circuits and systems, PHI, 2005 Edition.
2. Weste and Eshraghian - Principles of CMOS VLSI design, Pearson Education, 1999.

Reference Books:

1. John P.Uyemura, John Wiley - Introduction to VLSI circuits and systems, 2003.
2. John M. Rabaey - Digital Integrated circuits, PHI, ECE, 1997.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	3	3	-	3	-	-	3	3	3	3
CO2	3	3	3	3	3	3	3	-	3	3	-	3	3	3	3
CO3	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
CO4	3	3	3	3	3	-	-	-	3	3	-	-	3	3	3
CO5	3	3	3	-	-	-	-	-	3	-	-	-	3	3	3
CO6	3	3	3	3	3	3	-	-	3	-	-	3	3	3	3

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B. Tech. III Year II Semester

(5G362)MICROWAVE ENGINEERING

Pre-requisites: Antennas and Wave Propagation

Course Objectives:

The course aims to provide the student with the ability

- To understand EM Wave theory at microwave frequencies,
- To learn about various microwave components: microwave tubes, microwave devices along with measurements.

Course Outcomes:

Upon completion of the course, students will

- Ability to solve the wave equations.
- Learn the construction and operation of microwave devices, components, sources and detectors
- Study about the various measurements of microwave parameters

Unit- I

INTRODUCTION TO MICROWAVE ENGINEERING & WAVE GUIDES: Introduction to Microwave engineering, Microwave Spectrum and Bands, Advantages & Applications of Microwaves. Wave guides- Types, Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes. Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations, Impossibility of TEM mode, Power Transmission and Power Losses in Rectangular Guide.

Unit- II

CIRCULAR WAVEGUIDES: Propagation of TE & TM waves, Nature of Fields, Characteristic Equation, TM modes, Dominant and Degenerate Modes, Attenuation, Advantages and Applications. Cavity Resonators– Introduction, Rectangular and Cylindrical Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients.

Unit- III

MICROWAVE COMPONENTS

Waveguide Microwave Junctions Formulation and Properties of S-Matrix, Microwave T-Junctions-H-Plane, E-Plane, Magic Tee and its Applications. Directional Couplers-Two Hole, Wave guide Irises- Posts & Tuning screws, Coupling Probes and loops, Waveguide Terminations, Phase Shifters and Microwave attenuators, Ferrite Devices-Faraday Rotation Microwave devices-Gyrator, Isolator, Circulator

Unit-IV

MICROWAVESOURCES-KLYSTRONS, TWT's, AGNETRONS Limitations and Losses of conventional tubes, Microwave tubes–classifications, Two Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process, Expressions for output Power and Efficiency. Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance. TWT's- Construction, Principle and working Operation, Mathematical Analysis, Performance and Applications. Magnetron-Introduction, Cavity Magnetron, Mathematical Analysis, Sustained oscillations, Mode jumping, Frequency Pushing and pulling, Performance Characteristics and Applications

Unit-V

MICROWAVE SOLID STATE DEVICES & MEASUREMENTS Introduction, TED's, Gunn Effect Diodes (GaAs), RWH Theory-Differential Negative Resistance, Two Valley Model Theory, Modes of Operation. Avalanche Transit Time devices- Introduction, IMPATT and TRAPATT Diodes -Structure, Principle of Operation, Power output and Efficiency. Microwave Measurements-Description of Microwave Bench–Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q, Impedance Measurements.

Text Books:

1. Samuel Y. Liao, PHI - Microwave Devices and Circuits, 3rd Edition,2003.
2. Microwave and Radar Engineering, M Kulkarni – Umesh Publications, 1998.

Reference Books:

1. R.E. Collin - Foundations for Microwave Engineering, IECE Press, John Wiley, 2nd Edition, 2002.
2. Herbert J. Reich, J.G. Skolnik, P.F. Ordung and H.L. Krauss - Microwave Principles, CBS Publishers and Distributors, New Delhi, 2004.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	-	3	-
CO2	-	3	3	-	-	-	-	-	-	1	1	-	-	3	-
CO3	-	3	3	-	1	-	-	-	-	-	-	-	-	3	1

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B. Tech. III Year II Semester

(5G363)MICROPROCESSORS & INTERFACING

Pre-requisites: Digital Design, Analog and Digital Integrated Circuits

Course Objectives*:*

The course aims to provide the student with the ability

- To know the basic concepts of first 16 bit general purpose microprocessor
- To learn the programming and Interfacing Concepts of Microprocessors.

Course Outcomes:

Upon completion of the course, students can

- Know the Architectural features and programming of 8086.
- be able Interface various Intel devices with 8086.
- Understand the Interrupt structure of 8086 and servicing the interrupts using interrupt controller.
- Know the Salient features of advanced microprocessors.

Unit -I

8086 ARCHITECTURE & PROGRAMMING Overview of 8085 processor architecture**,** Architecture of 8086 microprocessor, Register organization, Memory organization, Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagrams. Machine language instruction formats of 8086, Addressing modes of 8086, instruction set of 8086, Assembler directives, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation. Procedure and Macros.

Unit -II

I /O & MEMORY INTERFACING I/O Interfacing methods – I/O mapped I/O, Memory mapped I/O. Basic structure of SRAM and DRAM cell, Memory interfacing to 8086 (static RAM and EPROM). Interfacing I/O ports – latches and buffers. 8255 PPI-various modes of operation and interfacing to 8086. Seven segment Displays, stepper motor, D/A, A/D converter interfacing. Need for DMA, Architecture of 8237 and interfacing with 8086.

Unit -III

PROGRAMMABLEINTERRUPTCONTROLLER (8259) & ROGRAMMABLE INTERVAL TIMER/COUNTER (8253) Data transfer methods-Programmed I/O, interrupt driven I/O. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. 8259 PIC architecture and interfacing, cascading of interrupt controller. Simple programs. Architecture of 8253 programmable interval timer/counter, mode of operations, interfacing with 8086.

Unit- IV

COMMUNICATION INTERFACE Asynchronous and synchronous data transfer schemes. Necessity of communication interfaces, 8251 USART architecture and

interfacing. Serial communication standards- 20mA, 60mA current loops and RS-232C. TTL to RS232C and RS232C to TTL conversion. Sample program of serial data transfer.

Unit -V

ADVANCED MICROPROCESSORS Introduction to 80286, salient features of 80386, Real and protected mode segmentation and paging, salient features of Pentium and Pentium pro processors.

Text Books:

1. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.
2. Microprocessors and Interfacing- Douglas V.Hall, 2nd edition, 2007.

Reference Books:

1. The 8086 and 8088 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
2. Micro computer system 8066/8088 family Architecture, programming and Design-By Liu and GA Gibson, PHI, 2nd Ed.
3. Intel 8086/8088 microprocessor architecture, programming, design and interfacing, Bhupendra singh chabra, Dhanpatrai publications.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	3	2	-	-	2	-	-	-	3	3	-
CO2	3	2	-	-	3	-	-	-	-	-	-	-	3	3	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
CO4	3	-	-	-	3	-	-	-	-	-	1	-	3	3	1

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

B. Tech. III Year II Semester

(5G364)DIGITAL SIGNAL PROCESSING

Pre-requisites: Signals & Systems

Course Objectives*:*

The course aims to provide the student with the ability

- To understand application of Discrete Fourier series and Transforms
- To learn design techniques and applications of Digital signal processing

Course Outcomes*:*

Upon completion of the course, students will

- Understand the types of discrete time signals & systems and analyze using Fourier series and Fourier transforms.
- Know the basics of digital filters and design using different techniques**.**
- Understand the concepts of decimation and interpolation**.**
- know the applications in Real life.

Unit- I

INTRODUCTION AND DISCRETE FOURIER SERIES Discrete time signals, LTI systems, stability and causality, Solution of linear constant coefficient difference equations. Properties of discrete Fourier series, DFS representation of periodic sequences, discrete Fourier transforms: properties of DFT, linear convolution of sequences using DFT, computation of DFT.

Unit- II

FAST FOURIER TRANSFORMS

Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT, FFT for composite N.

Unit- III

IIR AND FIR DIGITAL FILTERS

Analog filter approximations-Butterworth and chebyshev, design of digital filters from analog filters, design examples: analog-digital transformations, Basics of Z-Transforms, IIR Structures- Direct form–I, Direct form- II, Transposed Structure, and Cascade form.

Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters,

Unit- IV

MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS:

Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Filter Design and Implementation for Sampling rate conversion, Multistage implementation of Sampling rate conversion.

Unit -V

APPLICATIONS OF DIGITAL SIGNAL PROCESSING:

Spectral analysis of non stationary Signals, Musical Sound processing, signal Compression, Oversampling A/D Converter, Oversampling D/A Converter.

Text Books:

1. Digital signal processing, principles, Algorithms and applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 4th ed., 2007.
2. Digital signal processing , A computer base approach- Sanjit K Mitra, Tata McGraw Hill, 3rd edition, 2009.

Reference Books:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, 2nd ed., PHI.
3. Digital Signal Processing- P.Ramesh Babu, 4th Ed. SciTech Publications.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	3	-	-	-	-	-	-	3	3	3	3	-
CO3	-	3	3	3	3	-	-	-	-	-	3	-	3	3	-
CO4	-	-	3	3	3	1	-	-	-	-	3	3	3	3	1

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

(5G365)ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To know the instrument usage for a particular application.
- To understand the internal structure of all instruments that are used in measuring parameters related to electronic based systems.

Course Outcomes*:*

Upon completion of the course, student can

- Understand the principles of measurements with different basic meters and calculate all the parameters related to measurements.
- Understand about different types of signal generators and Signal analyzers.
- Understand the basic features of oscilloscope and its internal structure and different types.
- Design different types of bridges for signal conditioning purpose.
- Understand about different types of transducers and advancements in Instrumentation.

Unit- I

MEASUREMENT ERRORS AND MEASURING INSTRUMENTS Errors in Measurement, Accuracy, Precision, Resolution. Basics of statistical analysis, D'Arsonval galvanometer, PMMC mechanism. DC Ammeter. DC voltmeter. Series Ohmmeter, shunt Ohmmeter. Volt-Ohm-Milliammeter. Digital voltmeters (DVMs): Ramp type & dual slope integrator, Digital Multimeter.

Unit-II

SIGNAL GENERATORS & ANALYZERS Audio frequency signal generation, the Sine-wave generator, frequency-Synthesized signal generator, frequency divider generator, signal generator modulation, Sweep frequency generator, pulse and square wave generators. Function generator. Wave analyzers, Harmonic distortion analyzers, Spectrum Analyzers. Simple Frequency counter.

Unit-III

OSCILLOSCOPES Oscilloscope block diagram, Cathode Ray Tube, deflection amplifiers, waveform display, oscilloscope time base, dual trace oscilloscope, and oscilloscope controls. Measurement of voltage, frequency and phase. Pulse measurements, oscilloscope probes, display of device characteristics, X-Y and Z displays, oscilloscope specifications and performance. Delayed-Time-Base oscilloscopes, Analog storage oscilloscope, Sampling oscilloscopes, digital storage oscilloscopes, DSO applications.

Unit-IV

BRIDGES Wheatstone bridge guarded Wheatstone bridge, Kelvin Bridge, AC bridges and their application, Maxwell's bridge, Hays Bridge. Schering Bridge. Wein Bridge. Q-meter.

Unit-V

TRANSDUCERS Classification of transducers, selecting a transducer, strain gauges, displacement transducers. Temperature Measurements. Data Acquisition System, strip chart recorders and X-Y recorder.

Text Books:

1. Electronic Instrumentation and Measurements, second edition – David A. Bell, Eastern Economy Edition, PHI.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PEARSON Education.

References Books

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. A Course in electrical and electronic measurements and instrumentation-A. K. Sawhney., Dhanpat Rai & Co publishers.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	-	-	-	-	-	-	3	3	3	-
CO2	3	-	-	-	3	-	-	-	-	-	-	3	3	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	3	3	3	-
CO4	3	3	3	-	3	-	-	-	-	-	-	3	3	3	-
CO5	3	-	-	-	3	-	-	-	-	-	-	3	3	-	-

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

(5G366)RADAR ENGINEERING

(Professional Elective – I)

Pre-requisites: Analog Communication, Digital Communication, Antennas and Wave Propagation

Course Objectives:

- To achieve an understanding of the fundamental design and operation of modern radar systems and a working knowledge of the mathematical tools used in analysis of radar systems problems.
- The emphasis is on physical principles, and on modern radar systems and signal processing techniques, for both civilian and defence applications

Course Outcomes*:*

Upon completion of the course, students can

- Understand the essential principles of operation of radar systems
- To gain in-depth knowledge about the different types of RADARS and their operations.
- Identify the various RADAR systems in existence; specify their applications and limitations, and explain the principles of how they work.
- Need for signal detection in RADAR and various detection techniques
- Ability to know the various technologies used in the design of RADAR systems such as antennas, transmitters, duplexers, data display screens, etc

Unit -I

RADAR PRINCIPLES

Introduction, The simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System losses

Unit- II

CW AND FREQUENCY MODULATED RADAR

Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth , Applications of CW radar, FM-CW Radar-Range and Doppler Measurement, Block Diagram FM-CW altimeter, Multiple Frequency CW Radar.

Unit- III

MTI AND PULSE DOPPLER RADAR

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, and Transversal filters, Staggered PRFs. Range Gated Doppler Filters, MTI Radar Parameters, and Limitations to MTI Performance.

Unit- IV

TRACKING RADAR

Tracking with Radar, Sequential lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one and two coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition, and Comparison of Trackers.

Unit -V

DETECTION OF RADAR SIGNALS IN NOISE

Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise, Correlation Detection.

Radar Displays & Duplexers: Noise Figure, Noise figure of networks in cascade, Noise Temperature Radar Displays – types, Duplexers – Branch type and Balanced type, Circulators as Duplexers.

Text Book:

Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Edition, 2007.

Reference Book:

Radar Principles – Peebles, Jr., P.Z.Wiley, New York, 1998.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	3	-	1	3	3	3	-	-
CO2	3	3	3	-	-	3	-	3	-	-	3	3	3	3	-
CO3	3	3	3	-	-	3	-	3	-	-	3	3	3	-	1
CO4	3	3	3	-	-	3	-	3	-	-	3	3	-	3	-
CO5	3	3	3	-	1	-	1	3	-	-	3	3	3	-	-

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

(5G367) DIGITAL COLOR TV ENGINEERING
(PROFESSIONAL. ELECTIVE – I)

Pre-requisites: Nil

Course objectives:

- To acquire the knowledge about different television standards, channel assignments and communication methods.
- To understand the design of different television circuits and Antennas.

Course outcomes:

- To understand about different television standards.
- To acquire the knowledge about different communication methods, interferences and propagation of the signal.
- To analyse the different television circuits and their application.
- Ability to understand the usage and operation of suitable television antennas for transmission /reception and their patterns.

Unit-I

Digital Television Transmission Standards ATSC terrestrial transmission standard, vestigial sideband modulation, DVB-T transmission standard, ISDB-T transmission standard, channel allocations, antenna height and power, MPEG-2

Performance Objectives for Digital Television: System noise, external noise sources, transmission errors, error vector magnitude, eye pattern, interference, cochannel interference, adjacent channel interference, analog to digital TV, transmitter requirements

Unit-II

Channel Coding and Modulation for Digital Television: Data synchronization, randomization/scrambling, forward error correction, interleaving, inner code, frame sync insertion, quadrature modulation, 8 VSB, bandwidth, error rate, COFDM, flexibility, bandwidth Transmitters for Digital Television: Pre correction and equalization, up conversion, precise frequency control, RF amplifiers, solid-state transmitters, RF amplifier modules, power supplies, power combiners, Wilkinson combiner, ring combiner, star point combiner, cooling, automatic gain or level control, ac distribution, transmitter control, tube transmitters, tube or solid-state transmitters, performance quality, retrofit of analog transmitters for DTV

Unit-III

Radio-Frequency Systems for Digital Television: Constant-impedance filter, output filters, elliptic function filters, cavities, channel combiners Transmission Line for Digital Television: Fundamental parameters, efficiency, effect of VSWR, system AERP, rigid coaxial transmission lines, dissipation, attenuation, and power handling, higher order modes, peak power rating, frequency response, standard lengths,

corrugated coaxial cables, wind load, waveguide, bandwidth, waveguide attenuation, power rating, frequency response, size trade-offs, waveguide or coax pressurization.

Unit-IV

Transmitting Antennas for Digital Television : Antenna patterns, elevation pattern, mechanical stability, null fill, azimuth pattern, slotted cylinder antennas, gain and directivity, power handling, antenna impedance, bandwidth and frequency response, multiple-channel operation, types of digital television broadcast antennas, antenna mounting

Unit-V

Radio-Wave Propagation : Free-space propagation, distance to the radio horizon, refraction, multipath, ground reflections, surface roughness, effect of earth's curvature, Fresnel zones, linear distortions, diffraction, fading, desired signal, field tests, Charlotte, North Carolina, Chicago, Illinois, Raleigh, North Carolina Test and Measurement for Digital Television: Power measurements, average power measurement, calorimetry, power meters, peak power measurement, measurement uncertainty, testing digital television transmitters.

Text Books

1. R. R. Gulati, Modern Television Practice, Principles, Technology and servicing, 2nd edition, New Age International Publishers, 2001.
2. Gerald w. Collins, Fundamentals of Digital Television Transmission', John Wiley, 2001.

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	2	-	2	-	2	-	3	2	-	-
CO2	3	2	2	3	2	-	-	-	-	2	-	3	2	2	-
CO3	1	2	2	-	-	-	-	-	-	-	-	2	1	-	1
CO4	3	3	2	2	-	-	1	-	2	-	-	3	-	1	-

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

(5G368)TELECOMMUNICATION SWITCHING SYSTEMS
(PROFESSIONAL ELECTIVE – I)

Pre-requisites: Analog Communication, Digital Communication

Course Objectives:

The course aims to provide the student with the ability

- To know the transmission techniques and switching systems working principle
- To learn the architecture of multistage networks , basics of TDM and signaling networks
- To study the Traffic measurements and different networks in telecommunication.

Course Outcomes*:*

Upon completion of the course, students can

- Understand the need of transmission techniques and analyze the switching systems.
- Knowledge the multi stage networks working principle
- Able to know the need of TDM and signaling networks in cellular systems
- Analyze the traffic measurements and services of switching systems
- Understand the necessity of different networks in telecommunication

Unit-I

Introduction Evolution of Telecommunications, Basic of switching System, Telecommunication transmission, digital Transmission, Four wire circuits, FDM, TDM, PDH, SDH. .PCM Transmission path & reception path, Transmission formats for 24-channel and 30-channel systems.

Evolution of Switching System:

Strowger, Rotary Dial Telephone, Signaling Tones, Step by Step Switching, Design Parameters, Crossbar Switching: Principal of Common Control, Touch Tone Dial Telephone, and Principals of Crossbar Switching, Digital Switching.

Unit-II

Electronic Space Division SPC, Distributed SPC, Software Stored Program Control, Centralized Architecture, Application Software, Enhanced Services, Two-Stage Networks, Three-Stage Networks, n-Stage Networks.

Unit-III

Time Division Switching Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Grade of Service, Non-blocking Networks, Synchronization. Call processing function, Common Control, stored Program Control.

Signaling Techniques In channel Signaling, Common Channel Signaling, Signaling Sytem-6 (SS6), Signaling System-7 (SS7).

Unit-IV

Traffic Engineering Network Traffic Load and Parameters Grade of Service and Blocking Probability, Modeling switching Systems, Incoming Traffic and Service Time Characterizations, Blocking Models and Loss Estimates, Delay Systems, Traffic Measurement, Lost call System, Queuing System.

Unit-V

Telecom Networks Introduction, Analog Networks, Integrated Digital Networks, Integrated services Digital Networks, Cellular radio Networks, Intelligent Networks, Private Networks, Numbering, National Schemes, International Numbering, Numbering Plan for the ISDN , Public Data Networks, Charging, Routing, General, Automatic alternative routing, Numbering, Network Management, IN, VPN, B-ISDN Telecommunications Network, Management.

Text Books

1. Telecommunication Switching Systems and Networks By Viswamohan (PHI).
2. Telecommunication Switching Traffic and Network by J.E.Flood (Pearson Education).
3. Telecommunication Transmission Systems By Robert G. Winch, (MGH).
4. Introduction to Telecommunication Voice, Data, Internet By Wayne Tomasi, (PHI).
5. Mobile Cellular Telecommunication By William C. Y. Lee, (Mc Graw Hill).
6. Digital Telephony, By John C. Bella (John wiley & Sons).

Mode of Evaluation:

External evaluation: 70%

Internal Evaluation: 20%

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	2	-	3	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	3	2
CO3	2	3	-	2	-	-	-	-	-	-	-	2	-	3	2
CO4	2	3	-	-	-	-	-	-	-	-	-	1	-	3	2
CO5	3	2	-	2	-	-	-	-	2	-	-	2	-	3	2

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

III Year B. Tech., II Semester

(5GC62)ENGLISH FOR COMPETITIVE EXAMINATIONS

Pre-requisites: Nil

Course Outcomes: Student will

- achieve proficiency in English synonyms, antonyms, idiomatic expressions and, accuracy in English spelling
- apply active reading strategies in order to comprehend, critically analyze and make inferences and predictions based on information in the text
- apply his/her knowledge of articles, prepositions, tenses and voice correct errors or improve sentences
- form meaningful sentences/passages out of the scrambled words/sentences

Correct English Usage: Articles – Prepositions – Tenses – Voice – Error spotting and correcting – Sentence improvement

Vocabulary: Synonyms – Antonyms – Analogy – Words often confused

English Proficiency: One-word substitutions – Idioms and Phrases – Homonyms – Spellings

Logic-based English Language: Rearrangement of jumbled words and jumbled sentences – word pairs – sentence completion

Comprehension Ability: Reading comprehension – Cloze tests

Note: In each lecture class, one practice paper containing objective questions on the said aspects will be discussed thoroughly by the trainer. At the end of the semester, a minimum of 20 papers will have been practiced by students.
As regular method of external assessment is not found suitable, 100 marks will be awarded for internal examinations (30 marks from the average of two Internal Mid Exams and 70 for Internal End Exam)

Reference Books:

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

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/Quiz: 10%

CO-PO Mapping:

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

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

(5G369)DIGITAL SIGNAL PROCESSING LAB

Pre-requisites: Nil

Course Objectives:

The course aims to enable the students to learn and design the concepts of MATLAB in signal processing applications**.**

Course Outcomes:

Upon the completion of course student will be

- Able to write MATLAB programs.
- Able to understand the operations on signals.
- Able to understand and design different filters.

LIST OF EXPERIMENTS

1. To Identify Fourier series & Fourier transform of Continuous and Discrete signals.
2. To verify the stability and causality of LTI Systems.
3. To verify linear convolution.
4. To verify the circular convolution.
5. To design FIR filter (LP/HP) using windowing technique
   a) Using rectangular window
   b) Using triangular window
   c) Using Kaiser window
6. To Design IIR filter by Impulse Invariant/Bi-Linear Transformation.
7. To Design Butterworth (LP/HP)
8. N-point FFT algorithm
9. MATLAB program to find frequency response of analog LP/HP filters.
10. To compute power density spectrum of a sequence.
11. Decimation by a factor D
12. Interpolation by a Factor *I*

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO_1	PSO_2	PSO_3
CO1	-	-	-	1	3	-	2	-	-	-	-	3	-	3	-
CO2	2	2	-	-	3	-	2	-	-	-	-	3	2	3	-
CO3	2	2	-	-	3	-	-	-	-	-	-	3	2	3	-

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

(5G36A)MICRO PROCESSORS & INTERFACING LAB

Pre-requisites: Nil

Course Objectives:

- To learn Assembly Language programming.
- To understand programmable peripheral devices and their Interfacing.

Course Outcomes:

Upon the completion of course student will be

- Able to write Assembly Language programs.
- Able to understand the operations and applications of microprocessors
- Able to understand programmable peripheral devices and their Interfacing.

1. Arithmetic operations.
2. Signed Arithmetic operations.
3. ASCII – arithmetic operations.
4. Addition of two BCD numbers(4-digits each)
5. Logical Operations
   a) Code conversion.
   b) Identify the parity (even/Odd) of a given byte/word.
6. String Operations
   a) Relocate a string of N words/bytes.
   b) Reverse String.
   c) Length of the String
   d) String Insertion
   e) String Deletion
   f) Scanning a byte/ word.
7. Sorting using near procedure
8. Interfacing with 8255 PPI
   a) DAC Interfacing:
      i. PWM generation in BSR mode
      ii. Triangular, sinusoidal and square wave generation in I/O mode.
   b) Stepper Motor Interfacing: Rotation in Clock wise and Anti-clock wise direction.
9. 8259 – Interrupt Controller.
10. 8251 - USART Interfacing

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	3	-	-	-	-	-	-	3	3	-	-
CO2	3	-	-	2	3	-	-	-	-	-	-	3	3	2	3
CO3	3	3	-	2	3	-	-	-	-	-	-	3	3	2	3

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

ADVANCED ENGLISH COMMUNCATION SKILLS LAB
(AUDIT COURSE)

Pre-requisites: Nil

Course Outcomes: Student will be able to

- express himself fluently in social and professional contexts
- enhance his skills of making a presentation confidently
- learn how to face Interviews confidently, to participate in meetings effectively
- face CBTs with greater felicity

RESUME PREPARATION

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

INTERVIEW SKILLS

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

GROUP DISCUSSION

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

ORAL PRESENTATIONS (INDIVIDUAL)

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

ORAL PRESENTATIONS (TEAM)

Appropriate use of visual aids – Using PowerPoint for presentation.

READING COMPREHENSION

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

LISTENING COMPREHENSION

Listening for understanding - responding relevantly.

MINIMUM REQUIREMENTS:

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

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

SUGGESTED SOFTWARE:

- It's your Job published by Clarity.
- Business Writing published by Clarity.

- Active Listening published by Clarity.
- Active Reading published by Clarity.
- Software published by Globerana.
- Cambridge Advanced Learner's Dictionary.
- Oxford Advanced Learner's Dictionary.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

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

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

(5G479) COMPUTER NETWORKS

Pre-requisites: Computer System Architecture

Course Objectives:

- Resource sharing is the main objective of the computer network.
- The Other objective is to provide the high Reliability.
- By using computer networks we can save money.
- Computer Networks will provide means to increase system performance as the work load increases.
- Computer network help people who live or work apart to report together.
- Only authorized user can access resource in a computer network.

Course Outcomes:

- Students will able to learn the use of Networks and different reference models.
- Ability to understand about the different types of Transmission media in the physical layer.
- Students can learn about the design issues and channel allocation problem in the data link layer.
- Students can know about how to route the packets using routing algorithms and familiar with IP addresses.
- Students will able to learn about different transport layer issues.
- Students will be familiar with various application layer issues.

Unit-I

INTRODUCTION: Network Hardware, Network software, Reference Models-OSI, TCP/IP

PHYSICAL LAYER: Guided Transmission, Wireless Transmission, public switched telephone networks-structure of the telephone system.

Unit-II

DATA LINK LAYER: Design issues, error detection and correction, Elementary data link Protocol, Sliding Window protocols

MEDIUM ACCESS SUB LAYER: The Channel Allocation Problem, Multiple access protocols, IEEE 802.X Standard Ethernet, wireless LANS.

Unit-III

NETWORK LAYER: Network layer Design issues, Routing Algorithms-shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing, Congestion Control Algorithms. Quality of Service, The Network layer in the internet-the IP-protocol, IP-addresses, IPV6.

Unit-IV

TRANSPORT LAYER: Transport Services, Elements of Transport protocols,

Simple Transport Protocol, The Internet Transport Protocols-TCP and UDP protocols.

Unit- V

APPLICATION LAYER: Domain Name System, Electronic Mail, The World Wide Web, Cryptography, Symmetric-KeyAlgorithms, Public-Key Algorithms

Text Book:

Andrew S Tanenbaum, *Computer Networks*. Pearson Education/PHI, 4thEd.

Reference Books :

1. Behrouz A. Forouzan,*Data Communications and Networking*. TMH, 3rdEd.
2. S.Keshav, *An Engineering Approach to Computer Networks*. Pearson Education, 2ndEd.
3. W.A. Shay, *Understanding communications and Networks*. Thomson, 3rdEd.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	1	-	-	-	-	2	-	-	3	-	-	-
CO2	-	3	-	-	3	-	-	2	-	1	-	-	-	-	-
CO3	2	-	-	-	3	-	-	-	-	-	-	3	-	-	-
CO4	-	-	-	1	-	-	1	-	-	1	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	3	-	-	2	-	-	1	-	-	-	-

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B. Tech. IV Year I Semester

(5G371) OPTICAL COMMUNICATION

Pre-requisites: Engineering Physics, Analog Communication

Course Objectives:

The course aims to provide the student with the ability

- To understand different Optical fibers with its structures and materials.
- To know different Optical sources and detectors.
- To understand the losses and different power link mechanisms of optical fibers.

Course Outcomes:

Upon completion of the course, students can

- understand historical developments of OFC and different types of OFC
- Analyze the transmission of optical signal in fibers
- be able to design the constructional features of OFC and optical sources.
- be able to design the optical links and analyze different applications.

Unit-I

Optical waveguides and materials Introduction to fiber optic cables, Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory transmission, Electromagnetic mode theory for Optical Propagation, Cylindrical Fiber. Single mode fibers, fiber materials.

Unit -II

Optical sources: Light Emitting Diodes (LEDs): LED Structures, Light Source Materials, Quantum efficiency and LED Power, Modulation of LED. LASER Diodes- Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum Efficiencies.

Unit-III

Optical detectors Physical principles of photo diodes, photo detector noise, detector response time, avalanche multiplication noise, structures for InGaAs APDs, temperature effect on avalanche gain, comparisons of photo detectors.

Unit -IV

Fiber Losses and Power Coupling Attenuation, Fiber Bend Loss, Dispersion, Chromatic dispersion, Intermodal dispersion, Overall fiber dispersion, Polarization, Fiber alignment and joint loss. Fiber connectors,optical isolators and couplers. Source to Fiber Power Launching, Lensing schemes for Coupling Improvement, fiber-to-fiber Joints, semiconductor optical amplifiers.

Unit -V

Optical links Point to point links, Over-view of analog links, carrier to noise ratio, multichannel transmission techniques, RF over fiber, radio over fiber links.

WDM Concepts and components: Over-view, dielectric thin film filters, Phased array based devices, Diffraction gratings, Active optical components, tunable light sources, Add drop multiplexers, wavelength routers.

Text Books:

1. Optical fiber communications- Gerd keiser, McGraw Hill International Edition, 3 rd Edition, 2010.
2. Optical fiber communications-John M. Senior, PHI, 3rd Edition, 2010.

Reference Book:

1. Fiber-optic communication systems, Third edition, Govind P. Agrawal, The Institute of optics university of Rochester, Rochester, Ny, WILEY Inter science, A John wiley&sons, INC., Publication.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2	PSO3
CO1	1	-	3	-	-	-	1	-	-	-	-	1	3	-	-
CO2	-	2	-	3	3	-	-	-	-	-	-	-	3	-	-
CO3	-	-	3	3	3	-	-	-	-	-	-	-	3	-	-
CO4	-	-	3	3	3	-	-	-	-	1	-	-	3	-	-

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B. Tech. IV Year I Semester

(5G372)EMBEDDED SYSTEMS

Pre-requisites: Microprocessors & Interfacing

Course Objectives:

The course aims to provide the student with the ability

- To understand concepts of embedded systems.
- To apply the knowledge acquired on the design considerations

Course Outcomes:

Upon completion of the course, students will

- Understand basic concepts to design embedded applications.
- Understand different programming models and their suitable application areas.
- Analyze the operation of I/O ports and different communication protocols.
- Design different embedded applications.

Unit -I

MICROCONTROLLER & INTERFACING 8051:

Introduction, Architecture, Register Organization, Internal and External Memory, Pin diagram, I/O port structure, Addressing modes, Instruction Set, simple programs. On-Chip Peripherals-8051 Interrupt Structure, Timer/Counter features, modes and programming. MSP 430 Low power Micro Controller (A Quantitative study only).Applications- Interfacing with switches, display – LED, seven segment display, LCD. Keyboard interfacing, D/A and A/D interfacing, Stepper motor interfacing, Handling External Interrupts.

Unit- II

INTRODUCTION TO EMBEDDED SYSTEMS:

Embedded System – Definition, Application Areas, and Categories. Overview of embedded system architecture, specialities: reliability, performance, power consumption cost, size, user interface, software upgradation capability, recent trends: processor, power, memory, operating system, communication interface, programming languages, development tools, programmable hardware.

Unit -III

ARCHITECTURE OF EMBEDDED SYSTEMS Hardware Architecture – CPU, Memory, Clock Circuitry, Watch dog Timer/Reset Circuitry, chip select, I/O devices, Debug Port, Communication Interfaces, Power supply Unit. Software Architecture – Services provided by an operating System, Architecture and categories of Embedded Operating Systems, Application Software, Communication software, Process of generating Executable image, Development/Testing tools.

Unit -IV

COMMUNICATION INTERFACES Need for Communication interface, RS232/UART, RS 422/RS 485, USB, Infrared, IECE 1394 fire wire, IECE 802.11, Blue tooth, I2C and CAN Bus.

Unit-V

REAL TIME OPERATING SYSTEM Architecture of Kernel, Tasks and Task Scheduler, Interrupt Service Routines, Inter process Communication– Semaphores, mutex, message queues, mailboxes, pipes, signals, event registers and timers. Priority Inversion Problem. Off the Shelf Operating Systems, Embedded Operating Systems, Real Time Operating Systems, And Handheld Operating Systems

Text Books:

1. Embedded/ Real Time Systems, K.V.K.K. Prasad, Dreamtech press.
2. The 8051 Microcontroller, Kenneth J Ayala, 3rd edition, Thomson Press.

Reference Books:

1. Computers and Components, Wyene Wolf, Elseveir.
2. Embedded Systems, Raj Kamal, TMH.2nd edition.2008.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	3	-	3	-	3	3	3	-	--
CO2	3	-	-	-	-	-	3	-	3	-	-	3	3	-	-
CO3	3	3	3	3	-	1	3	-	3	-	3	3	-	-	-
CO4	3	3	3	3	1	1	-	1	3	-	-	3	-	-	1

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B. Tech. IV Year I Semester

(5G373) DIGITAL IMAGE PROCESSING

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To understand the Digital Image Processing methods and their applications.
- To acquire the knowledge of terminology and concepts used for representation and processing of Images.

Course Outcomes:

Upon completion of the course, students can

- Understand how images are acquired, sampled, quantized and represented in digital form
- Understand transform-domain representation of images (Fourier, Walsh etc.,), how images are enhanced and segmented to improve perception
- Have the knowledge to identify and apply the algorithms to compress and restore the images.
- Analyse the images in different formats such as binary, grey shade and color with respect to different areas.
- Design and formulate image processing methods with respect to real time problems

Unit- I

DIGITAL IMAGE FUNDAMENTALS – Image Sensing and acquisition, Image Sampling and Quantization, Some basic Relationship between pixels. An Introduction to mathematical tools used in Image Processing, 2-D DFT, Properties. Walsh transforms, Hadamard Transform.

Unit-II

IMAGE ENHANCEMENT: Some basic Intensity Transformation functions, Histogram Processing, Smoothing and Sharpening spatial filters , Image Smoothing and sharpening using Frequency domain filters

Unit-III

IMAGE RESTORATION: A model of the Image degradation, Noise models, Restoration in the presence of Noise only, Estimating the degradation function, Inverse filtering, Wiener filtering.

Unit-IV

COLOUR IMAGE PROCESSING: Color Models, Pseudo Color Image Processing, Basics of Full Color Image Processing.

Unit-V

IMAGE SEGMENTATION & COMPRESSION: Point, Line and Edge Detection, Thresholding – Global and Optimum Global, Region based segmentation, Coding Redundancy, Spatial and temporal Redundancy, Image Compression Models

Text Books:

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 3rd Edition.
2. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Edition, 2002.

Reference Books :

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	-	-	-	3	-	3	3	3	3
CO2	3	3	3	3	3	3	-	-	-	3	-	3	3	3	3
CO3	3	3	3	3	3	3	-	-	-	3	-	3	3	3	3
CO4	3	3	3	3	3	3	-	-	-	3	-	3	3	3	3
CO5	3	3	3	3	3	3	-	-	-	3	-	3	3	3	3

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B. Tech. IV Year I Semester

(5G374) DIGITAL DESIGN THROUGH VERILOG HDL
(PROFESSIONAL ELECTIVE II)

Pre-requisites: Digital Design, Analog and Digital Integrated Circuits

Course Objectives:

The course aims to provide the student with the ability

- To understand the basics of Verilog
- To make the students renown to basics, syntax and semantics of new programming language

Course Outcomes:

Upon completion of the course, students will

- Understand, design, simulate and synthesize computer hardware using Verilog HDL
- Be able to rapidly design combinational and sequential logic
- Be able to use different Verilog programming constructs in digital system design
- gain knowledge in implementing state machines using FPGAs
- Gain ability to Design CPLDs & PGAs

Unit-I

INTRODUCTION TO VERILOG: Verilog as HDL, Levels of design description, concurrency, simulation and synthesis, functional verification, test benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS: Introduction, keywords, identifiers, whitespace characters, comments, numbers, strings, logic values, strengths, data types, scalars and vectors, parameters, memory, operators, system tasks.

Unit-II

GATE LEVEL MODELLING: Introduction, AND gate primitive, module structure, other gate primitives, illustrative examples, tristate gates, array of instances of primitives, design of Flip flops with gate primitives, delays, strengths and contention resolution, net types, design of basic circuits

SWITCH LEVEL MODELLING: Introduction, basic transistor switches, CMOS switch, Bidirectional gates, time delays with switch primitives, instantiations with strengths and delays, strength contention with trireg nets

Unit-III

MODELLING AT DATAFLOW LEVEL: Introduction, continuous assignment structures, delays and continuous assignments, assignment to vectors, operators.

BEHAVIORAL MODELLING: Introduction, operations and assignments, functional Bifurcation, initial construct, always construct, examples, assignments with delays, wait construct, multiple always blocks, designs at behavioral level,

blocking and non-blocking assignments, the case statement, simulation flow, if and if else constructs, assign-De assign construct, repeat construct, FOR loop, the disable construct, While loop, Forever loop, parallel blocks, force-release construct, event.

Unit-IV

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP)

SYSTEM TASKS, FUNCTIONS AND COMPILER DIRECTIVES: Introduction, parameters, path delays, module parameters, system tasks and functions, file –based tasks and Functions, Compiler Directives, FSM Design (Moore and Mealy Machines).

Unit-V

DIGITAL DESIGN WITH SM CHARTS: State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines, Static RAM Memory, UART Design.

DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES: Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

Text Books:

1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, IECE Press, 2004.
2. A Verilog Primier – J. Bhasker, BSP, 2003.
3. Digital System Design Using VHDL – Charles.H.Roth.Jr

Reference Books:

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
2. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	-	-	3	-	3	3	-	3	3	3	3	3
CO2	3	3	3	-	-	3	-	3	3	-	3	3	3	3	3
CO3	-	-	3	-	-	3	-	3	3	-	3	3	3	3	-
CO4	3	3	3	-	-	3	-	3	3	-	3	3	3	3	-
C05	3	3	3	-	-	3	-	3	3	-	3	3	3	3	3

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

(5G375)NANO ELECTRONICS
(PROFESSIONAL ELECTIVE-II)

Pre-requisites: Electronic Devices and Circuits-I, Engineering Physics
Electronic Devices and Circuits-II

Course Objectives:

The course aims to provide the student with the ability

- To learn the fundamentals of Nano electronics.
- To understand the applications and limitation of ICs.

Course Outcomes:

Upon completion of the course, students can

- Learn the basics of microscopy's and applications
- Knows the fundamentals of Quantum electronics
- Understands the basics of Tunneling devices and SETs
- Acquire the knowledge on limitations of ICs

Unit-I

Introduction Nano- The beginning – Electron Microscopies – Scanning probe Microscopies – Optical Microscopies for nanoscience and technology – Other kinds of microscopies.

Synthesis and purification – Filling of nanotubes – Mechanism of growth – electronic structure – transport, mechanical and physical properties and applications.

Unit-II

MODELS OF SEMICONDUCTOR QUANTUM WELLS, QUANTUM WIRES, AND QUANTUM DOTS Semiconductor Hetero structures and quantum wells – Quantum wires and nanowires – Quantum dots and nanoparticles – Fabrication Techniques for Nanostructures: Lithography, Nanoimprint lithography – split-gate technology, self-assembly.

Unit-III

QUANTUM ELECTRONICS Quantum Electronic Devices – Short channel MOS Transistor, split-gate transistor, Electron-wave transistor, Electron-spin transistor, quantum cellular automate, quantum dot array.

Unit-IV

TUNNELING DEVICES Tunneling effect and Tunneling diode, three terminal RTDs Technology of RTD. Digital circuit design based on RTDS: Memory application, basic logic circuits, dynamic logic gates.

SINGLE ELECTRON TRANSISTOR (SET) Principle of SET – Coulomb blockade, performance of SET, technology SET circuit design – wiring and drivers, logic and memory circuits, SET adder. Comparison between FET and SET circuit design.

Unit-V

LIMITS OF INTEGRATED ELECTRONICS Energy supply and heat dissipation – Parameter spread as limiting effect – Limits due to thermal particle motion – The Debye length – Reliability as limiting factor – Physical limits.

Nano systems as information processing machines – system design and its interfaces – Evolutionary Hardware – Requirements of Nano systems.

Text Books:

1. T. Pradeep, 'Nano: The Essentials", TMH Edition (2008)
2. K. Goser, P. Glosekotter, J. Dienstuhl, 'Nanoelectronics and Nano systems', Springer Edition (2004)

Reference Book:

George W. Hanson, 'Fundamentals of Nano electronics', Pearson Education (2009).

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	3	-	-	3	-	-	-	-	-	3	-	-
CO2	-	2	-	3	-	3	-	3	-	-	2	-	-	-	-
CO3	3	-	3	-	2	-	3	-	-	-	-	-	3	3	-
CO4	3	-	-	3	-	3	-	3	-	1	-	1	-	3	-

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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IV Year B.Tech. ECE-I Semester

(5G376) RELIABILITY ENGINEERING
(PROFESSIONAL ELECTIVE II)

Pre-requisites: Embedded Systems

Course Objectives:

The course aims to provide the student with the ability

- To understand the concepts of reliability
- To understand the design and availability of models

Course Outcomes:

Upon completion of the course, students will

- Understand the concepts of reliability and applications
- know design principles and testing methods of models
- Analyze the maintainability and availability of models

Unit-I

INTRODUCTION Concepts, terms and definitions, applications, brief history, Reliability function, MTTF, Hazard rate function, Bath tub curve, Conditional Reliability The exponential Reliability Function, Failure Modes – Failure modes with CFR model, failures on demand, Applications – The two-parameter Exponential distribution – Poisson process – Redundancy and the CFR model

Unit-II

TIME DEPENDENT FAILURE MODELS The weibull distribution – design life, median and mode – The three-parameter weibull – Redundancy with weibull failures – Normal and Lognormal distributions Serial configuration – Parallel configuration – combined series – Parallel Systems – Minimal cuts and minimal paths – common-mode failures – Three-state devices.

Unit-III

FAILURE ANALYSIS System definition – Identification of failure modes – Determination of cause – Assessment of Effect – Classification of severity – Estimation of probability of occurrence – Computation of criticality Index – Determination of corrective action – System safety and fault tree Analysis.

Unit-IV

DESIGN FOR MAINTAINABILITY Maintenance requirements – design methods – Maintainability prediction – preventive and corrective maintenance

Unit-V

AVAILABILITY & RELIABILITY TESTING Inherent, achieved and operational availabilities – Exponential availability model – system availability – Inspection and Repair availability model.

Text Books:

1. Charles E. Ebeling, 'An introduction to Reliability and Maintainability Engineering', TMH Edition (2007).
2. Roy Billinton and Ronald N.allan, 'Reliability Evaluation of Engineering systems', Springer International Edition (2007)

Reference Books:

1. Peyton Z. Peebles, JR, 'Radar Principles', John Wiley & Sons, Inc. (2004)
2. Simon Kingsley, and Sham Quegan, Understanding Radar Systems, Mc Graw-Hill International Edition (1993)
3. Michael O Kalanole, 'Radar System, Peak Detection and Tracking', Newnes An imprint of Elsevier (2006)
4. Mark. A. Richards, 'Fundamentals of Radar Signal Procesing', TMH Edition (2005)

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	2	-	3	2	-	1	2	3	3	2
CO2	3	3	3	-	-	3	-	3	2	-	1	2	3	3	2
CO3	3	-	3	-	-	1	-	2	-	-	1	1	3	2	-

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

(5G679) DISASTER MANAGEMENT
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

- To make the students convergent with various disasters and its impacts, risk reduction methods.

Course Outcomes

- The students will learn basic concepts of various disasters.
- The students must learn various classification of disasters hazard and vulnerability profile of India.
- The students will learn impacts, global and national disaster trends.
- The students will learn disaster management cycle and its phases and DRR programmes in India and activities of national disaster management academy.
- The students should be able to analyze factors affecting vulnerability of developmental projects and environmental modifications for sustainable development.

Unit-I

INTRODUCTION - Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation).

Unit-II

DISASTERS - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Unit-III

DISASTER IMPACTS - Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate-change and urban disasters.

Unit-IV

DISASTER RISK REDUCTION (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit-V

Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of

dams, land-use changes, urbanization etc.), sustainable and environmental-friendly recovery; reconstruction and development methods.

Text Books/Reference Books:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
4. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
5. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12
CO1	-	-	-	-	2	1	-	2	2	2	-	-
CO2	1	-	-	-	-	-	-	3	3	3	-	2
CO3	1	-	-	-	-	3	-	3	2	2	-	-
CO4	-	-	-	-	-	-	-	3	3	3	-	2
CO5	1	-	-	-	-	-	-	3	-	-	-	3

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

(5G27C) SYSTEM MODELLING & SIMULATION

(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To understand the basic system concepts and definitions of system.
- Techniques to model and to simulate various systems.
- To analyze a system and to make use of the information to improve the performance

Course Outcomes:

- Define basic concepts in Modeling and Simulation.
- Understand the fundamental logic, structure, components and management of simulation modeling& demonstrate knowledge of how to use arena
- Classify various simulation models and give practical examples for each category
- Generate and test random number variates and apply them to develop simulation models
- Analyze output data produced by a model and test validity of the model
- Perform statistical analysis of output from terminating simulation

Unit–I

Basic Simulation Modeling, Systems, Models and Simulation, Discrete Event Simulation, Simulation of Single Server Queuing System, Simulation of Inventory System, Alternative approach to Modeling and Simulation.

Unit–II

SIMULATION SOFTWARE: Comparison of Simulation Packages with Programming Languages, Classification of Software, Desirable Software Features, General Purpose Simulation Packages – Arena, Extend and Others, Object Oriented Simulation, Examples of Application Oriented Simulation Packages.

Unit–III

BUILDING SIMULATION MODELS: Guidelines for Determining Levels of Model Detail, Techniques for Increasing Model Validity and Credibility, **Modeling Time Driven Systems:** Modeling Input Signals, Delays, System Integration, Linear Systems, Motion Control Models, Numerical Experimentation.

Unit–IV

EXOGENOUS SIGNALS AND EVENTS: Disturbance Signals, State Machines, Petri Nets & Analysis, System Encapsulation,

MARKOV Process: Probabilistic Systems, Discrete Time Markov Processes, Random Walks, Poisson Processes, the Exponential Distribution, Simulating a Poison Process, Continuous-Time Markov Processes.

Unit–V

EVENT DRIVEN MODELS AND SYSTEM OPTIMIZATION: Simulation

Diagrams, Queuing Theory, Simulating Queuing Systems, Types of Queues, Multiple Servers, System Identification, Searches, Alpha/Beta Trackers, Multidimensional Optimization, Modeling and Simulation Mythology.

TEXT BOOKS:

1. System Modeling & Simulation, an Introduction – Frank L. Severance, John Wiley & Sons, 2001.
2. Simulation Modeling and Analysis – Averill M. Law, W. David Kelton, TMH, 3rdEdition, 2003.

Reference Book:

Systems Simulation – Geoffrey Gordon, PHI, 1978.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO_1	PSO_2
CO1	3	2	3	-	-	-	-	-	-	-	-	-	1	-
CO2	3	-	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	2	-	-	-	-	2	-	-	-	1
CO4	-	-	3	3	2	-	-	-	-	-	-	-	-	-
CO5	-	-	3	3	-	-	-	-	-	-	-	-	-	-
CO6	-	-	3	-	-	-	-	-	-	-	-	-	-	-

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

IV Year B. Tech. I Semester

(5G57E) TOTAL QUALITY MANAGEMENT
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To demonstrate knowledge of quality management principles, techniques and philosophies.
- To apply statistical process control techniques to improve the quality.
- To demonstrate knowledge of TQM tools for industries.
- To apply appropriate techniques for reliability assessment.
- To demonstrate knowledge of advanced techniques for reliability engineering.

Course Outcomes:

- Understand the concept of quality management principles, techniques and philosophies.
- Understand how to apply statistical process control techniques to improve the quality
- Can able to demonstrate knowledge of TQM tools for industries.
- Able to apply appropriate techniques for reliability assessment.
- Understand the concept of advanced techniques for reliability engineering

Unit-I

INTRODUCTION: Definition of Quality, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Strategic Planning, Deming Philosophy, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen

Unit-II

STATISTICAL PROCESS CONTROL (SPC) : The seven tools of quality, Statistical Fundamentals, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

Unit-III

TQM TOOLS AND QUALITY SYSTEMS : Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Quality Auditing

Unit-IV

INTRODUCTION TO RELIABILITY : Importance of reliability, performance cost and reliability, quality and safety, system configuration with examples, stochastic processes, bathtub concept, MTBF, MTTR, hazard rate, failure rate, probability and sampling, cumulative probability distribution function, data and distributions.

Unit-V

RELIABILITY IN DESIGN AND LIFE CYCLE COSTING : Survival rate, bath-tub curve analysis of characteristics of failure regimes, design synthesis, reliability effort function, safety margin, allocation of reliabilities by AGREE, ARINC, proportional distribution of unreliability, heuristic method, mean and median methods.

Text Books:

1. Joel E. Rose, *Total Quality Management*, 3rd Edition, Kogan Page Ltd., USA 1999
2. Srinath, L. S., *Reliability Engineering*, Affiliated East West Press, New Delhi 2005

Reference Books:

1. James R.Evans& William M.Lidsay, "The Management and Control of Quality", (5^{th} Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. "Total Quality Management", McGraw Hill, 1991.
3. Zeiri. "Total Quality Management for Engineers", Wood Head Publishers, 1991.
4. E. E. Lewis, "Introduction to Reliability Engineering", John Wiley and Sons.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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

(5G57F) INTEGRATED PRODUCT DEVELOPMENT (OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

The course aim to provide the student with the ability

- To understand the various society inputs required to develop the product and methodology to be followed to develop the product.
- To understand the various requirements for the product system design, modeling and optimization of the total product system.
- To know the various activities involved in the Design and Testing of a Product and its components.
- To understand the usage of Rapid prototype technology to develop the prototypes of components, assembling of components, manufacturing of components, testing the product as per the test standards and certification from various approval agencies.
- To know the various activities involved in the product maintenance, estimation of product life, Intellectual Property Rights and configuration of management.

Course Outcomes:

Students able to

- Learn the various society inputs required to develop the product and methodology to be followed to develop the product.
- Understand the various requirements for the product system design, modeling and optimization of the total product system.
- Learn the various activities involved in the Design and Testing of a Product and its components.
- Learn the usage of Rapid prototype technology to develop the prototypes of components, assembling of components, manufacturing of components, testing the product as per the test standards and certification from various approval agencies.
- Know the various activities involved in the product maintenance, estimation of product life, Intellectual Property Rights and configuration of management.

Unit-I

FUNDAMENTALS OF PRODUCT DEVELOPMENT Global Trends Analysis and Product decision: Types of various trends affecting product decision - Social Trends-Technical Trends- Economical Trends- Environmental Trends- Political/ Policy Trends- PESTLE Analysis. Introduction to Product Development Methodologies and Management: Overview of Products and Services- Types of Product Development- Overview of Product Development methodologies - Product Life Cycle - Product Development Planning and Management .

Unit-II

REQUIREMENTS AND SYSTEM DESIGN Requirement Engineering: Types of Requirements- Requirement Engineering- Analysis -Traceability Matrix and

Analysis- Requirement Management. System Design & Modeling: Introduction to System Modeling- introduction to System Optimization- System Specification-Sub-System Design- Interface Design.

Unit-III

DESIGN AND TESTING Conceptualization -Industrial Design and User Interface Design- Introduction to Concept generation Techniques-Concept Screening & Evaluation- Concept Design- S/W Architecture- Hardware Schematics and simulation-Detailed Design: Component Design and Verification- High Level Design/Low Level Design of S/W Programs- S/W Testing-Hardware Schematic-Component design- Layout and Hardware Testing.

Unit-IV

IMPLEMENTATION & INTEGRATION Prototyping: Types of Prototypes - Introduction to Rapid Prototyping and Rapid Manufacturing. System Integration-Testing- Certification and Documentation: Introduction to Manufacturing /Purchase and Assembly of Systems- Integration of Mechanical, Embedded and S/W systems-Introduction to Product verification and validation processes - Product Testing standards, Certification and Documentation.

Unit-V

SUSTENANCE ENGINEERING AND BUSINESS DYNAMICS Sustenance - Maintenance and Repair- Enhancements Product End of Life (EoL): Obsolescence Management-Configuration Management- EoL Disposal.

The Industry - Engineering Services Industry overview- Product development in Industry versus Academia The IPD Essentials- Introduction to vertical specific product development processes- Product development Trade-offs- Intellectual Property Rights and Confidentiality- Security and configuration management

Text Books:

1. NASSCOM student Handbook "Foundation Skills in Integrated Product Development".
2. Anita Goyal, Karl T Ulrich, Steven D Eppinger, “Product Design and Development”, 4th Edition, 2009, Tata McGraw-Hill Education, ISBN-10-007-14679-9

Reference Books:

1. George E. Dieter, Linda C. Schmidt, “Engineering Design”, McGraw-Hill International Edition, 4th Edition, 2009, ISBN 978-007-127189-9
2. Kevin Otto, Kristin Wood, “Product Design”, Indian Reprint 2004, Pearson Education, ISBN: 9788177588217
3. Yousef Haik, T. M. M. Shahin, “Engineering Design Process”, 2nd Edition Reprint, Cengage Learning, 2010, ISBN 0495668141
4. Clive L.Dym, Patrick Little, “Engineering Design: A Project-based Introduction”, 3rd Edition, John Wiley & Sons, 2009, ISBN 978-0-470-22596-7

5. Product Design Techniques in Reverse Engineering and New Product Development, KEVIN OTTO & KRISTIN WOOD, Pearson Education (LPE), 2001.
6. The Management and control of Quality-6th edition-James R. Evens, William M Lindsay Pub: son south-western (www.swlearning.com).

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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

(5G377) NANOTECHNOLOGY AND APPLICATIONS
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

The course aims to provide the student with the ability

- To learn the fundamentals of Nano materials and technology.
- To understand the applications and limitation of Nano Technology.

Course Outcomes:

Upon completion of the course, students can

- Learn the basics of Nano Materials and Nano Scale
- Knows the fundamentals of Quantum Mechanics.
- Understands the basics of different Nano Materials.

Unit-I

INTRODUCTION: Introduction to nanotechnology and materials, Nano materials, Introduction to nano-sizes and properties comparison with the bulk materials, Different shapes and sizes and morphology.

FABRICATION OF NANO MATERIALS: Top Down Approach Grinding, Planetory milling and Comparison of particles, Bottom Up Approach, Wet Chemical Synthesis Methods, Micro emulsion Approach, Colloidal Nano particles Production, Sol Gel Methods, Sono chemical Approach, Microwave and Atomization, Gas phase Production Methods : Chemical Vapour Depositions.

Unit-II

KINETICS AT NANOSCALE: Nucleation and growth of particles, Issues of Aggregation of Particles, Oswald Ripening, Stearic hindrance, Layers of surface charges, Zeta Potential and pH.

Carbon Nano materials: Synthesis of carbon bucky-balls, List of stable carbon allotropes extended, fullerenes, metallo fullerenes, solid C60, bucky onions, nano tubes, nano cones.

Unit-III

QUANTUM MECHANICS: Quantum dots and its Importance, Pauli exclusion principle, Schrödinger's equation, Application of quantum Dots: quantum well, wire, dot, characteristics of quantum dots, Synthesis of quantum dots Semi-conductor quantum dots

Unit-IV

NANOMATERIALS CHARACTERIZATION: Fractionation principles of Particle size measurements, Particle size and its distribution, XRD, Zeta potential, Electronic band structure Electron statistics Application:

Unit-V

NANOBIOLOGY: Biological synthesis of nano particles and applications in drug

delivery, Nano containers and Responsive Release of active agents, Layer by Layer assembly for nano spheres, Safety and health Issues of nano materials, Environmental Impacts, Case Study for Environmental and Societal Impacts.

Text Books:

1. Kulkarni Sulabha K, Nanotechnology: Principles and Practices, Capital Publishing Company, 2007
2. Stuart M. Lindsay, Introduction to Nanoscience, Oxford University Press, 2009.
3. Robert Kelsall, Ian Hamley, Mark Geoghegan, Nanoscale Science and Technology, John Wiley & Sons, 2005.
4. Gabor L. Hornyak , H.F. Tibbals , Joydeep Dutta , John J. Moore Introduction to Nanoscience and Nanotechnology CRC Press
5. Davies, J.H. 'The Physics of Low Dimensional Semiconductors: An Introduction', Cambridge University Press, 1998.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	2	3	2	2	2	2	3	3	2	2	2	1
CO2	2	2	3	2	3	2	2	2	2	3	2	2	3	2	1
CO3	1	2	3	3	3	2	2	2	2	1	3	2	3	2	1

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

IV Year B. Tech. I Semester

(5G378) INDUSTRIAL ELECTRONICS
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

- To get an overview of different types of power semi-conductor devices and their switching characteristics.
- To understand the operation, characteristics and performance parameters of controlled rectifiers.
- To study the characteristics of DC and AC drives
- To learn the different modulation techniques of pulse width modulated inverters and to understand the harmonic reduction methods.

Course Outcomes:

The students are able to acquire

- Knowledge on different power devices and inverters
- Understand the concepts of DC and AC drives.
- Knowledge on different applications of Industrial electronics

Unit-I

POWER DEVICES: Power diode – Power transistor – Power MOSFET – SCR – TRIAC – GTO – IGBT – MCT – Protection of power devices.

Unit-II

CONVERTERS: Introduction to half wave, full wave and bridge rectifiers – Single phase and three phase – Half controlled and fully controlled converters – Dual converters – Introduction to cyclo converters and ac controllers.

Unit-III

INVERTER AND HOPPER: Voltage, current and load commutation – Voltage Source Inverter (VSI) – Series and Parallel inverter – Bridge inverters – Single and three phase – Voltage control using PWM – Current Source Inverter (CSI) – Choppers – Step up and step down choppers – Chopper classification – Class A, B, C, D, E – AC choppers.

Unit-IV

DC AND AC DRIVES : Steady state characteristic of dc motors – Control of DC motor using converters and choppers – Regenerative and dynamic braking – Closed loop control scheme – Speed-torque characteristic of induction motor – Static stator voltage control – V/f control – Static rotor resistance control – Slip power recovery scheme – Self-control of synchronous motor.

Unit-V

OTHER APPLICATIONS: Electronic timers – Digital counters – Voltage regulators – Online and offline ups – Switched mode power supply – Principle and application of induction and dielectric heating.

TEXT BOOK:

G. K. Mithal, “Industrial Electronics”, Khanna Publishers, Delhi, 2000.

Reference Books:

1. M. H. Rashid, "power Electronics Circuits, Devices and Application", PHI, 3rd edition, 2004.
2. G. M. Chute and R. D. Chute, "Electronics in Industry", McGraw Hill Ltd, Tokyo, 1995.
3. F. D. Petruzulla, "Industrial Electronics", McGraw Hill, Singapore, 1996.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	3	2	-	-	-	-	-	-	-	2	-	-
CO2	2	2	2	-	2	-	-	-	-	-	-	-	-	3	-
CO3	2	-	2	-	2	-	-	-	-	2	-	-	2	-	-

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

(5G379) MEDICAL INSTRUMENTATION
(OPEN ELECTIVE – I)

Course Objectives:

The course aims to provide the student with the ability

- To learn the fundamentals of Electro neurogram and Blood Pressure.
- To understand the applications of Blood flow measurement and Pulse Oximeter.

Course Outcomes:

Upon completion of the course, students can

- Learn the basics of Human being Bio potentials.
- Know the fundamentals of Blood flow and volume measurement.

Unit-I

GENERAL INTRODUCTION: The cell, body fluids, Musculoskeletal system, respiratory system, gastrointestinal system, Nervous system, endocrine system and circulatory system. Origin of Bio potentials: electrical activity of Excitable cells: the resting state, The active state, Volume conductor fields, Functional organization of the peripheral nervous system: Reflex are & Junctional transmission.

Unit-II

THE ELECTRONEUROGRAM (ENG): The H-Reflex, The Electromyogram (EMG), The Electrocardiogram (ECG), heart and the circulatory system, Electro conduction system of the heart and heart problems, ECG waveform and Physical significance of its wave features, Electrical behavior of cardiac cells, The standard lead system, The ECG preamplifier, DC ECG Amplier, Defibrillator protection circuit, Electro surgery Unit filtering, Functional blocks of ECG system, Multichannel physiological monitoring system, Common problems encountered and remedial techniques.

Unit-III

BLOOD PRESSURE: indirect measurement of blood pressure, korotkoff sounds, auscultatory method using sphygmo manometer, Oscillometric and ultrasonic non invasive pressure measurement, Direct measurement of blood pressure H2O manometers, electronic manometry, Pressure transducers,. Pressure amplifier designs, Systolic, diastolic mean detector circuits

Unit-IV

BLOOD FLOW AND VOLUME MEASUREMENT: indicator dilution methods, Transit time flow meter, DC flow meter, Electromagnetic flow meter AC electromagnetic flow meter, Quadrature suppression flow meter, Ultrasonic flow meter, Continuous-wave Doppler flow meter, Electric impedance plethysmography, chamber plethysmography, Photo plethysmography.

Unit-V

PULSE OXIMETR: Principles of Operation, Absorption Spectrum, Sensor design, Pulse oximeter, Therapeutic and Prosthetic Devices. Cardiac Pacemakers: Lead wires and electrodes, Synchronous Pacemakers, rate responsive pacemaking, Defibrillators,

cardioverters, Electrosurgical-unit, Therapeutic applications of laser, Lithotripsy Haemodialysis.

TEXT BOOKS:

1. John G Webster, Medical Instrumentation: Application and Design , John Wiley,3rd Ed. 2012.
2. Joseph J. Carr & John M. Brown , Introduction to biomedical Equipment Technology, 4th Ed., Prentice Hall India, 2001.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2	PSO3
CO1	2	2	2	2	3	2	-	-	-	-	-	2	2	3	-
CO2	2	2	2	2	3	2	-	-	-	-	-	2	2	3	-

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IV Year B. Tech. I Semester

(5G178) .NET TECHNOLOGIES
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

The Objective of the course is the student should be able to do the following things:

- Understand the components and ecosystem of Microsoft .NET framework.
- Apply object oriented programming concepts to develop C#.Net applications.
- Analyze data base connectivity through ADO.NET.
- Implement server side programming concepts through ASP.NET framework.
- Learn Web services to discover, access and use remote applications and data.

Course Outcomes:

After the completion of the course the student will be able to:

- Understand the fundamentals of Microsoft .NET framework to develop, access, and interact with Internet applications.
- Implement Object oriented programming concepts through C#.NET framework.
- Apply ADO.NET to access data and data services from a database.
- Analyze ASP.NET to build dynamic sites, web applications and web administrations.
- Apply web services like WSDL and UDDI to exchange data between applications or systems.

Unit-I

INRODUCTION TO .NET FRAMEWORK: .NET Overview- Behind Microsoft .NET- The .NET Platform-.NET Framework Design Goals- .NET Framework- Common Language Runtime –CLR Environments and Executables-Metadata-JIT Compilation-Automatic Memory Management-Assemblies and Manifests-Intermediate Language(IL)- CTS and CLS- CLR Execution.

Unit-II

INTRODUCTION TO C# .NET PROGRAMMING: A Demonstration of Visual C#- Common Elements in Visual C- C# Core Language Features- Types- Classes- Structures- Enumeration- Inheritance- Interfaces- Polymorphism- Arrays and Collections- Generics- Operator Overloading- Delegates and Events- Introduction to LINQ Programming- Exception Handling- MSIL Programming.

Unit-III

APPLICATION DEVELOPMENT USING ADO .NET: Features of ADO .NET- Architecture of ADO .NET- ADO .NET Providers- Accessing Database using ADO .NET- Connection Opening and Closing- Command Object- Data Adapter- Dataset- Data Tables- Controlling table views with Data Views and Data Relation Objects- Data-binding in Windows Forms and Web Forms.

Unit-IV

INTRODUCTION TO ASP.NET: Introduction- Working in ASP.NET Controls-

Session and Cookies- Caching- Authentication and Authorization-Web User Controls- Working with Web Config file- Implementing Security- Crystal Reports- Creating Setup and Deployment.

Unit-V

WEB SERVICES: Introduction to Web Services- Web Services Protocol and Standards- WSDL-Overview of UDDI- Calling a Web Service from a Browser- Calling a Web Service by using a proxy- Creating a Simple Web Service-AJAX

Text Books:

1. Thuan L. Thai. .NET Framework Essentials. O'Reilly, 2003, 3rd Ed.
2. Donis Marshall. Programming Microsoft Visual C# 2008. Microsoft Press 2008.
3. Francesco Balena. Programming Microsoft Visual Basic .NET. Microsoft Press 2006.

Reference Books:

1. Rebecca M. Riordan. Microsoft ADO.NET Step by Step. Microsoft Press 2002.
2. Kogent, ASP.NET 3.5 Black Book, Dream Tech Publications, 2010.
3. Andy Wigley, Peter Roxburgh. Building Microsoft ASP.NET Applications for Mobile Devices. Microsoft Press 2003, 2nd Ed.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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

(5G47B) CYBER LAWS
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

- To explain the basic information on cyber security.
- To understand the issues those are specific to amendment rights.
- To have knowledge on copy right issues of software's.
- To understand ethical laws of computer for different countries.

Course Outcomes:

At the end of the course, students should be able to:

- Critically evaluate ongoing developments in law relating to information technologies
- Display an understanding of how these developments relate to one another.
- Examine areas of doctrinal and political debate surrounding rules and theories;
- Evaluate those rules and theories in terms of internal coherence and practical outcomes;
- Draw on the analysis and evaluation contained in primary and secondary sources.

Unit-I

FUNDAMENTALS OF CYBER SECURITY Introduction-Cyber Security and its Problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

Unit-II

ISSUES IN CYBER SECURITY Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

Unit-III

INTELLECTUAL PROPERTY RIGHTS Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

Unit-IV

PROCEDURAL ISSUES Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

Unit-V

LEGAL ASPECTS OF CYBER SECURITY Ethics, Legal Developments, Late 1990 to 2000, Cyber security in Society, Security in cyber laws case. studies, General law and Cyber Law-a Swift Analysis.

Reference Books:

1. Jonathan Rosenoer, “Cyber Law: The law of the Internet”, Springer-Verlag, 1997.
2. Mark F Grady, Fransesco Parisi, “The Law and Economics of Cyber Security”, Cambridge University Press, 2006.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12
CO1	3	3	-	3	-	3	-	3	-	-	-	3
CO2	3	-	-	-	-	3	-	3	-	-	-	3
CO3	3	3	-	3	-	3	2	3	-	2	-	3
CO4	3	3	-	3	-	3	2	3	-	2	-	3
CO5	3	3	-	3	-	3	-	3	-	-	-	3

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

(5GA72) HUMAN RESOURCE MANAGEMENT
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objective:

- The course is designed broadly to promote understanding of procurement, development, maintenance, evaluation and overall effective utilization of manpower.

Course Outcome:

- Provides a basic insight into seeking solutions for managerial problems.
- The student can familiarize with Accounting Data and Financial Statements.

Unit-I

INTRODUCTION TO HUMAN RESOURCE MANAGEMENT: Definition, Introduction, Nature of HRM, Scope of HRM, Functions of HRM - Managerial Functions, Operative Functions, Role of HRM. Personnel Management and HRM, Competitive Challenges influencing HRM, Ethical Aspects of HRM.

Unit-II

HUMAN RESOURCE PLANNING: Introduction to Human Resource Planning (HRP), Nature of HRP, Need and Importance of HRP in Organizations, Factors Affecting HRP, HRP Process, Barriers to Human HRP. Human Resource Information System**. Job Analysis and Job Design** – Definition, Steps in Job Analysis, Methods for Collecting Job Analysis Data, Job Description, Job Specification, Job Design - Methods of Job Design.

Unit-III

PROCUREMENT OF MANPOWER: Recruitment - Meaning and Definition, Process of Recruitment, Factor Affecting Recruitment, Sources of Recruitment, Methods of Recruitment. **Selection** – Introduction, Selection Procedure, Selection Decision Outcomes. Placement and Orientation.

Unit-IV

DEVELOPMENT OF MANPOWER: Employee Training – Concept, Need for Employee Training, Process of Employee Training, Methods of Employee Training, Advantages and disadvantages. **Executive Development** –Objectives, Importance, Factors Influencing Executive Development, Process, Methods of Executive Development, Career Planning and Development.

Unit-V

COMPENSATING, MAINTAINING AND EVALUATING THE MANPOWER: Compensation - Objectives, components of pay structure in India, Wage Policy in India - Minimum Wage, Fair Wage and Living Wage. **Discipline and Grievance Procedures** - Disciplinary Procedure, Grievance Handling Procedure, importance and approaches of Industrial Relations. Collective Bargaining Process. **Performance Appraisal -** Definition, Purpose of appraisal, Procedures and Techniques including 360 degree Performance Appraisal, Job Evaluation.

Reference Books:

1. Noe A.Raymond John Hollenbeck, Barry Gerhart and Patrick Wright - Human Resource Management, (Tata McGraw Hill.).
2. Ian Beardwell & Len Holden - Human Resource Management, (Macmillan India Ltd.).
3. Aswathappa K - Human Resource and Personnel Management (Tata McGraw Hill, 5th Ed.).
4. Rao VSP – Human Resource Management, Text and Cases (Excel Books, 2nd Ed.).
5. Ivansevich – Human Resource Management (Tata McGraw Hill, 10th Ed.).
6. Dessler – Human Resource Management (Prentice Hall, 10th Ed.).
7. Bernardi – Human Resource Management (Tata McGraw Hill, 4th Ed.).
8. Human Resource Management, T.N Chhabra, Dhanpat Rai & Sons Pvt Ltd.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

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

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

IV Year B. Tech. I Semester

(5GA71) INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)

Pre-requisites: Nil

Course Objectives:

- This course is aimed at familiarizing students with the nuances of Intellectual Property Rights (IPR) so as to help them integrate the IPR process in their academic, research (project) activities and to facilitate the students to explore career options in IPR.
- To make the technological students familiar with basics of IPR and their implications in research, development and commercialization.

Course Outcome:

- The students will able to understand the issues related to intellectual properties. The knowledge gained by the students on copyrights, trademarks, patents, designs, etc. shall be useful to focus on new inventions and their commercialization.

Unit-I

CONCEPT OF PROPERTY: Meaning of Property, Kinds of property: Movable and Immovable property; Tangible and Intangible property; Intellectual property; Private and Public property. Possession and ownership.

Unit-II

INTELLECTUAL PROPERTY RIGHTS: Introduction and the need for Intellectual Property Rights (IPR), IPR in India – Genesis and Development, Forms of Intellectual Property- Copyright, Trademarks, Patents, Designs, Geographical Indicators, Merchandise, Franchise and Forms of Unfair Competition. Competing rationales of the legal regimes for the protection of Intellectual Property.

Unit-III

COPYRIGHTS & TRADEMARKS: Copy Right: Meaning of Copyright, Copyright in literary, dramatic, musical work and cinematograph films Ownership, Assignment, Author's special rights, Importation and infringement, Fair use provisions. **Trademarks:** Definition; conception of trademarks, Registration, Distinction between trademark and property mark, Standards of proof in passing off action.

Unit-IV

PATENTS, DESIGNS & GEOGRAPHICAL INDICATORS: Conception of Patent, Patentable Inventions, Process of obtaining a Patent: application, examination, opposition and sealing of patents; Rights and obligations of a Patentee, International Patents, Transfer of technology, know-how and problems of self-reliant development. Basic provisions related to Designs, Geographical Indicators.

Unit-V

INTERNATIONAL INSTRUMENTS CONCERNING INTELLECTUAL PROPERTY RIGHTS: The Berne Convention, Universal Copyright Convention, the Paris Union, the World Intellectual Property Rights Organization (WIPO),

UNESCO, TRIPS, TRIMS, and WTO.

Reference Books:

- Intellectual Property Rights: Basic Concepts, MMS Karki, Atlantic, 2009.
- Intellectual Property Rights, Pandey, Neeraj, Dharani, Khushdeep.
- Intellectual Property Rights in India: General Isuues and Implications, Dr. Prankrishna Pal, Regal Series.
- Intellectual Property, W.R. Cornish, Sweet & Maxwell, London, 2012.
- Principles of Intellectual Property, N.S. Gopalakrishnan & T.G. Agitha, Eastern Book Company, Lucknow, 2009.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO112	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	3	3	-	-	3	3	3	-	-	3

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

(5GB71) INTRODUCTION TO DATA SCIENCE
(OPEN ELECTIVE)

Pre-requisites:

Some linear algebra and previous exposure to probability and statistics is ideal; as well as some programming experience

Course Objective:

The objective of this course is to introduce commerce and researchers are being transformed by data-driven discovery and prediction. Skills required for data analytics at massive levels – scalable data management on and off the cloud, parallel algorithms, statistical modeling, and proficiency with a complex ecosystem of tools and platforms

Course Outcomes:

- To understand multi-dimensional data presentation
- To learn more about relation algebra queries
- To learn more about data scalability
- To gain knowledge about Map Reduce and parallel processing patterns
- To analyze statistical analysis and machine learning
- To learn NoSQL queries

Unit -I

Introduction to Data Science, Data Science articulated, history and context, technology landscape, Exploratory Data Analysis, Review of probability and probability distribution

Unit -II

Data Manipulation at Scale*:* Databases and the relational algebra , Parallel databases, parallel query processing, in-database analytics , Map Reduce, Hadoop, relationship to databases, algorithms, extensions, languages, Key-value stores and NoSQL; tradeoffs of SQL and NoSQL

Unit -III

Data Analytics: Descriptive analytics, Predictive analytics and Prescriptive analytics
Statistical Modeling: basic concepts, experiment design, pitfalls
Machine learning: supervised learning (rules, trees, forests, nearest neighbor, regression), optimization (gradient descent and variants), unsupervised learning , Kernel Density estimation, k-means , Naïve Bayes , Data and Data scraping, classification and logistic regression

Unit -IV

Communicating Results*:* Data Visualization, Data Journalism, data products, visual data analytics, Provenance, privacy, ethics, governance

Unit -V

Data Engineering, Shading in mango DB, and proto buffers
Graph Analytics: structure, traversals, analytics, Page Rank, community detection, recursive queries, and semantic web

Use Cases

1. Social network analysis
2. You tube data analysis

Text Books:

As this is an emerging field, there is no single good textbook for it yet:

1. Jure Leskovec, Anand Rajaraman and Jeffrey David Ullman , "Mining of Massive Datasets", 2nd edition, Cambridge University Press, 13-Nov-2014
2. Zoran Majkic , "Big Data Integration Theory: Theory and Methods of Database Mappings, Programming Languages, and Semantics ", Springer Publishers
3. **Trevor Hastie** and Robert Tibshirani, "The Elements of Statistical Learning: Data Mining, Inference and Prediction", **Springer series in statistics, 2003**
4. William S Cleveland, "The Elements of Graphing Data", Wiley Publishers, ISBN: 978-0963488411, 2013 **Nathan Yau**, "Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics", Wiley Publishers, ISBN: 978-0-470-94488-2, 2011
5. **Tom White, "**Hadoop: The Definitive Guide", O' Reilly Media, 2015
6. **Norman Matloff, "**The Art of R Programming: A Tour of Statistical Software Design", William Pollock Publishers, 2011.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Quiz/Slip Test: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	2	1	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	1	-	-	-	-
CO3	-	-	-	-	2		3	-	-	-	-	1
CO4	-	-	-	1	3	-	-	-	-	-	1	-
C05	-	2	-	3	-	-	-	2	-	-	-	-
CO6	1	-	1	1	2	-	-	-	-	-	-	-

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

(5G37C) MICROWAVE & OPTICAL COMMUNICATIONS LAB

Pre-requisites: Nil

Course Objectives:

- To analyse the characteristics of various microwave components using microwave test bench.
- To enable the students to know about optical fiber communication and its applications.

Course Outcomes:

Upon the completion of course the students will be able

- To understand applications and testing of microwave components.
- To understand the connections regarding various microwave components
- To acquire knowledge on the various applications of optical fiber communications

Minimum Twelve Experiments to be conducted:

Part – A (Any 7 Experiments):

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Directional Coupler.
9. Scattering parameters of Magic Tee.

Part – B (Any 5 Experiments):

1. Characterization of LED.
2. Characterization of Laser Diode.
3. Intensity modulation of Laser output through an optical fiber.
4. Measurement of Data rate for Digital Optical link.
5. Measurement of NA.
6. Measurement of losses for Analog Optical link.
7. Radiation Pattern Measurement of Antennas (at least two antennas).

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	1	-	3	-	-	2	-	-	2	3	-
CO2	2	2	3	-	-	-	3	-	-	-	-	-	2	3	-
CO3	-	-	3	-	-	-	3	-	-	2	-	-	-	3	1

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

(5G37D)EMBEDDED SYSTEMS LAB

Pre-requisites: Nil

Course Objectives:

- To learn the interfacing concepts of embedded systems.
- To develop Embedded Applications.

Course Outcomes:

Upon the completion of course the student will be able to

- To design real time Embedded systems
- To understand the applications of embedded systems through experimentations.

Minimum Eight Experiments to be conducted

1. Switch and LED Interfacing
2. LCD Interfacing
3. Serial Transmission
4. Serial Reception
5. Key Pad Interfacing
6. Analog Interfacing
7. Sorting RTOS
8. Elevator Interfacing
9. Seven segment Display
10. Door Sensor Buzzer

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 30%**

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	3	3	3	-	3	3	3	3	3
CO2	3	3	3	3	3	-	3	3	3	-	3	3	3	3	3

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

(5G381)CELLULAR & MOBILE COMMUNICATIONS
(PROFESSIONAL ELECTIVE-III)

Pre-requisites: Analog Communication, Digital Communication

Course Objectives:

The course aims to provide the student with the ability

- To make the student explore in a cellular communication field
- To understand concepts of Cellular Communications design and types of interferences

Course Outcomes:

Upon completion of the course, students will

- Understand fundamentals of cellular system design, coverage and interference
- Understand different types of non-co channel interference
- Understand cell coverage in different traffic and their effects over different terrains
- Acquire knowledge on numbering of radio channels, channel sharing and borrowing
- Understand concept of handoffs &dropped calls

Unit-I

CELLULAR MOBILE SYSTEMS Introduction to Cellular Mobile system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

Elements of cellular radio system design: General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system, Cell splitting, consideration of the components of cellular system.

Unit- II

INTERFERENCE Introduction to Co-channel interference, real time co-channel interference, Co-channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference types-SINAD, adjacent channel interference, cross talk.

Unit -III

CELL COVERAGE FOR SIGNAL AND TRAFFIC Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, straight line path loss slope, and general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

Cell site and mobile antennas: Sum and difference patterns and their synthesis, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

Unit- IV

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

Unit- V

HANDOFF Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

Digital cellular networks: GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

Text Books:

1. Mobile cellular telecommunications-W .C. Y. Lee, Tata Mc-Graw Hill, 2nd Edition, 2006.
2. Wireless communications-Theodore. S. Rappaport, Pearson Education, 2nd Edn., 2002.

References Books:

1. Principles of Mobile communications-Gordon L. Stuber, Springer International 2nd Edition, 2007.
2. Wireless and Mobile Communications-Lee Mc Graw Hills, 3rd Edition, 2006.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	-	-	-	-	-	3	-	3	3	3
CO2	3	3	3	-	3	-	-	-	-	-	3	-	3	3	3
CO3	3	3	3	-	3	-	-	-	-	-	3	-	3	3	3
CO4	3	3	3	-	-	-	-	1	-	-	3	-	3	3	3
CO5	3	3	3	1	-	-	-	1	-	1	3	-	3	3	3

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

(5G382) DSP PROCESSORS & ARCHITECTURES
(PROFESSIONAL ELECTIVE III)

Pre-requisites: Digital Signal Processing

Course Objectives:

The course aims to provide the student with the ability

- To understand of the programmable DSP processors and their applications.
- To acquire the knowledge of terminology and concepts of architectures , implementation and algorithms of DSP processors

Course Outcomes:

Upon completion of the course, students can

- Understand concepts of programmable DSPs and their architectures
- Have the knowledge to identify and apply the algorithms
- Design and formulate the implementations of algorithms

Unit-I

INTORODUCTION TO PROGRAMMABLE DSPs: Multiplier & Multiplier accumulator, Modified bus structures & memory access schemes in P – DSPs, Multiple access memory, Multi ported memory, VLIW architecture, Pipelining, Special addressing modes in P–DSPs, On chip peripherals. Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

Unit-II

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

Unit-III

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

IMPLEMENTATION UNIT V-IMPLEMENTATIONS OF BASIC DSP ALGORITHMS: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

Unit-IV

FFT ALGORITHMS: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum. Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

Unit-V

RECENT TRENDS IN DSP SYSTEM DESIGN: An over-view of the application nodes on DSP systems, An over-view of open multimedia applications platform (OMAP), An Introduction to FPGA, Design flow for an FPGA based system design, Cad tools for FPGA based system design, soft core processors, FPGA based DSP system design, New algorithms for Implementation of filters in VLSI, Distributed arithmetic algorithm, Case studies, Comparison of the performances of the systems designed using FPGAs and digital signals processors.

Text Books:

1. Avtar Singh and S. Srinivasan, *Digital Signal Processing*, Thomson Publications, 2004.
2. B. Venkata Ramani and M. Bhaskar, *Digital Signal Processors, Architecture, Programming and Applications*, TMH, 2004.

Reference Book:

1. Jonathan Stein, *Digital Signal Processing*, John Wiley, 2005.
2. Lapsley et al. S. Chand & Co, *DSP Processor Fundamentals, Architectures & Features*, 2000.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	3	-	-	-	-	-	3	3	3	3	-
CO2	3	3	3	-	3	-	-	-	-	-	3	3	3	3	-
CO3	3	3	3	-	3	-	-	-	-	-	3	3	3	3	-

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

(5G383) NEURAL NETWORKS AND FUZZY LOGIC
(PROFESSIONAL ELECTIVE – III)

Course Objectives:

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

Course Outcomes:

On completion of this course, students should be able to

- Understand the basics of neural networks
- Use the different layers of neural networks in feed forward.
- Understand the major applications of neural networks and FUZZY technology.
- Understand the different layers associate memories like BAM and BAM algorithms. Classification of FUZZY sets and FUZZY logic system components.

Unit-I

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Structure and functions of biological and artificial neural networks, Neural network architectures, Characteristics of neural networks, types of neuron activation functions, learning methods, Historical Developments, Evaluation of neural networks

***Unit*- II**

SINGLE LAYER FEED FORWARD NEURAL NETWORKS: McCulloch-Pitts Model, Adaptive Linear Neuron, Perceptron Model, Deltarule, Perceptron Convergence theorem.

MULTILAYER FEED FORWARD NEURAL NETWORKS: Generalized Delta Rule, Back propogation Network, Learning Difficulties and Improvements, Counter Propagation Networks.

Unit-III

ASSOCIATIVE MEMORIES: Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm,

HOPFIELD NETWORKS: Architecture, Discrete and Continuous versions, Stability Analysis, Adaptive Resonance Theory Networks.

Unit-IV

CLASSICAL & FUZZY SETS: Introduction to classical sets - properties,

Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions**, FUZZY LOGIC SYSTEM COMPONENTS**: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Unit-V

NEURAL NETWORKS APPLICATIONS: Process identification, control, fault diagnosis and load forecasting.

FUZZY LOGIC APPLICATIONS: Fuzzy logic control and Fuzzy classification

Text Books:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.
2. Introduction to Neural Networks using MATLAB 6.0 - S. N. Sivanandam, S. Sumathi, S. N. Deepa, TMH, 2006

Reference Books:

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Halkins , Pearson Education
3. Neural Engineering by C. Eliasmith and CH. Anderson, PHI.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	1	-	-	-	-	-	-	3	-	-
CO2	3	2	-	-	2	1	-	-	2	-	-	2	3	-	1
CO3	3	2	-	-	2	1	-	-	2	-	-	2	3	2	-
CO4	3	-	-	-		1	-	-	-	-	-	2	-	2	-

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

(5G384)WIRELESS COMMUNICATIONS & NETWORKS
(PROFESSIONAL ELECTIVE-IV)

Prerequisites: Analog Communication, Digital Communication

Course Objectives:

The course aims to provide the student with the ability

- To Gain knowledge and experience with regard to wireless communication engineering including multiple access techniques.
- To Identify and understand wireless communication network and their evaluation.

Course Outcomes:

Upon completion of the course, students can

- Understand the effective bandwidth utilization to accommodate large number of mobile users by using various accessing techniques
- Analyze networking considerations, practical networking approaches with mobile data services.
- Analyze the protocols used in wireless LAN technologies.
- be able to identify mobile data and advanced wireless networks and their applications in real time.

Unit-I

INTRODUCTION TO WIRELESS COMMUNICATIONS AND MULTIPLE ACCESS TECHNIQUES: Evolution of mobile radio communications, examples of Wireless Communication systems, comparison of common Wireless Communication systems, **Multiple access techniques:** Introduction, FDMA, TDMA, Spread Spectrum, Multiple Access, SDMA, Packet radio, Packet radio protocols, CSMA protocols, Reservation protocols.

Unit-II

WIRELESS NETWORKING AND DATA SERVICES: Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks, Data services, CCS, BISDN and ATM, SiganalingSystemNo7

Unit-III

MOBILE IP AND WIRELESS ACCESS PROTOCOL: Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

Unit-IV

WIRELESS LAN TECHNOLOGY AND BLUETOOTH: Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE802.11 Protocol architecture

and services. **Bluetooth:** Overview, Radio specification, Base band specification, Links manager specification, Logical link control and adaptation protocol.

Unit-V

MOBILE DATA NETWORKS AND HIPER LAN: Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, **HIPER LAN:** HIPERLAN-1, Adhoc Networking .

Text Books:

1. Wireless Communications, Principles, Practice – Theodore S. Rappaport, PHI, 2nd Ed., 2002.
2. Wireless Communication and Networking – William Stallings, PHI, 2003.

Reference Books:

1. Wireless Digital Communications – KamiloFeher, PHI, 1999.
2. Principles of Wireless Networks – KavehPahLaven and P. Krishna Murthy, Pearson Education, 2002.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	3	-	-	-
CO2	3	3	3	3	-	3	-	-	-	3	-	3	3	3	-
CO3	3	3	3	3	-	3	-	-	-	3	-	3	3	3	-
CO4	3	3	-	-	-	-	-	-	-	3	-	3	-	-	-

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B. Tech. IV Year II Semester

(5G385) SATELLITE COMMUNICATIONS
(PROFESSIONAL ELECTIVE – IV)

Pre-requisites: Analog Communication, Digital Communication

Course Objectives:

The course aims to provide the student with the ability

- To understand concepts of Satellite Engineering and applications
- To design basic Satellite links

Course Outcomes:

Upon the completion of course the students will

- understand the operating principles of major characteristics of satellites
- apply this knowledge to the analysis and design of basic satellite links
- learn the satellite navigation and global positioning system

Unit-I

INTRODUCTION & ORBITAL MECHANICS:

Origin of satellite communications, Historical background, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

Unit-II

SATELLITE SUBSYSTEMS:

Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

Unit-III

SATELLITE LINK DESIGN:

Basic transmission theory, system noise temperature and G/T ratio, design of down links, uplink design, design of satellite links for specified C/N, system design example. Basic concepts of Multiple access, Time Division multiple access (TDMA) frame structure, examples. Satellite switched TDMA onboard processing,

Unit-IV

EARTH STATION TECHNOLOGY, LEO AND GEO-STATIONARY SATELLITE SYSTEMS:

Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods. Orbit consideration, coverage and

frequency considerations, delay and throughput considerations, system considerations, operational NGSO constellation designs.

Unit-V

SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM:

Radio and satellite navigation, GPS position location principles, GPS receivers and codes, satellite signal acquisition, GPS navigation message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, differential GPS.

Text Books:

1. Satellite communications-Timothi Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley publications, 2nd Edition, 2003.
2. Satellite communications Engineering-Wilbur L.Prichard, Robert A. Nelson & Henry G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

Reference Books:

1. Satellite communications: Design principles-M. Richharia, BS publications, 2nd Edition, 2003.
2. Satellite communications-D.C.Agarwal, Khanna publications, 5th Ed.
3. Fundamentals of Satellite communications-K.N.Rajarao, PHI, 2004.
4. Satellite communications-Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	3	3	2	-	2	2	-	-	-	-	-	3	3	-
CO3	3	3	3	2	-	2	2	1	1	1	-	-	3	-	2

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

B. Tech. IV Year II Semester

(5G386) FPGA ARCHITECTURES & APPLICATIONS
(PROFESSIONAL ELECTIVE – IV)

Pre-requisites: VLSI Design

Course Objectives:

1. Familiarization of various complex programmable Logic devices of different families.
2. To study Field programmable gate arrays and realization techniques

To study different case studies using one hot design methods

Course Outcomes

- Able to gain knowledge about PLDs, FPGA design architectures.
- Able to understand different types of arrays.
- FSM and different FSM techniques like petrinets and different case studies

Unit-I

PROGRAMMABLE LOGIC: ROM, PLA, PAL, PLD, PGA – Features, Programming and Applications using Complex Programmable Logic Devices Altera Series – Max 5000/7000 Series and Altera FLEX Logic – 10000 Series CPLD, AMD's – CPLD (Mach 1 To 5); Cypres FLASH 370 Device Technology, Lattice Plsi's Architectures – 3000 Series – Speed Performance and in System Programmability.

Unit-II

FPGA: Field Programmable Gate Arrays – Programming technologies, Logic Blocks, Routing Architecture, Design Flow, Technology Mapping for FPGAs.

Unit-III

COMMERCIAL FPGA'S: Xilinx XC4000 & ALTERA's FLEX 8000/10000 FPGAs: AT & T – ORCA's (Optimized Reconfigurable Cell Array): ACTEL's – ACT-1,2,3 and Their Speed Performance.

Unit-IV

REALIZATION OF STATE MACHINE: Top Down Design – State Transition Table, State Assignments for FPGAs. Problem of Initial State Assignment for One Hot Encoding. Charts with a PAL. Alternative Realization for State Machine Chart using Microprogramming. Linked State Machines. One – Hot State Machine, Petrinetes for State Machines – Basic Concepts, Properties. Extended Petrinetes for Parallel Controllers. Finite State Machine – Ex: Traffic Light Controller, Implementation of Petrinet Description

Unit-V

FSM ARCHITECTURES AND SYSTEMS LEVEL DESIGN: Architectures Centered Around Non-Registered PLDs. State Machine Designs Centered Around Shift Registers. One – Hot Design Method. Use of ASMs in One – Hot Design. Application of One – Hot Method. System Level Design – Controller, Data Path and Functional Partition

Text Books:

1. P.K.Chan & S. Mourad, Digital Design Using Field Programmable Gate Array, jPrentice Hall (Pte), 1994.
2. S.Trimberger, Edr., Field Programmable Gate Array Technology, Kluwer Academic Publicatgions,1994.
3. J. Old Field, R.Dorf, Field Programmable Gate Arrays, John Wiley & Sons, Newyork, 1995.
4. S.Brown, R.Francis, J.Rose, Z.Vransic, Field Programmable Gate Array, Kluwer Pubin, 1992.
5. Richard F. Tinder, Engineering Digital Design, Second Edition, Academic Press.

Mode of Evaluation:

External evaluation: 70% **Internal Evaluation: 20%**

Assignment/Slip Test/ Quiz: 10%

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	2	-	3	3	3
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	3	3
CO3	3	-	-	2	-	-	-	-	-	-	2	-	3	3	3