ACADEMIC REGULATIONS

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

The following rules and regulations will be applicable for the batches of 4 year B.Tech degree admitted from the academic year 2014-15 onwards.

1. ADMISSION:

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

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

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

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

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

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

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

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

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

3. ACADEMIC YEAR:

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

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

4. COURSE STRUCTURE:

Each programme of study shall consist of:

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

i. Language / Communication Skills
ii. Humanities and Social Sciences : Environmental Science
iii. Economics and Accounting
iv. Principles of Management

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

i. Computer Literacy with Numerical Analysis
ii. Mathematics
iii. Physics
iv. Chemistry

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

i. Engineering Drawing
ii. Engineering and IT Workshop
iii. Engineering Mechanics
iv. Basic Mechanical Engineering
v. Electrical and Electronics Engineering
vi. Basic civil Engineering
vii. Computer Programming

4.4 Compulsory Discipline Courses :(45 to 55%)

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

4.5 Elective Courses: (10 to 15%)

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

4.6 In the final year first semester comprehensive Electronics and Communication Engineering, with 2 hours / week is introduced.

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

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

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

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

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

6.1 Distribution of Marks:

S. No		Marks	Examination and Evaluation	Scheme of Evaluation
1.	Theory	70	Year-end / Semester-end examination	The question paper shall be of descriptive type with 5 questions with internal choice are to be answered in 3 hours duration of the examination.
		30	Mid - Examination of 120 Min. duration - Internal evaluation-20 marks. The question paper shall be of descriptive type with 4 questions with internal choice are to be answered. Remaining 10 marks is for Assignments, 3-5 in number will be given and each assignment will be evaluated for 10 marks and average is considered.	**For I B Tech:** Three (03) mid exams, each for 20 marks are to be conducted. Two best performances to be considered. **Mid-I:** After first spell of instructions (I Unit). **Mid-II:** After second spell of instructions (II & III Units) **Mid-III:** After third spell of instructions (IV & V Units) **For a Semester**: Two mid-exams 20 marks each are to be conducted. Better one to be considered. **Mid-I:** After first spell of instructions (I & II Units). **Mid-II:** After second spell of instructions (III to V Units).

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
2	Laboratory, Design and / or drawing	70	Year-end / Semester-end Lab Examination		**For laboratory courses:** **3** hours duration – two examiners. For drawing and/ or Design: like for the theory examination.
		30	20	Day to Day evaluation	Performance in laboratory experimentations
			10	Internal evaluation	Practical Tests (For first year / semester one best out of two tests)
3	Seminar	100	Internal Evaluation 20 Marks for Report 20 Marks for subject content 40 Marks for presentation 20 Marks for Question and Answers		Continuous evaluation during a semester by the Departmental Committee (DC)
4	Comprehensive Electronics and Communication Engineering	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.		
5	Project Work	100	70	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30	Internal evaluation	Continuous evaluation by the DC. 15 Marks by DC as detailed under 6.2.1 & 15 Marks by Supervisor

6.2. Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project, the best one to be considered. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, Coordinator 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 Coordinator. The evaluation of project work shall be conducted at the end of the IV year.

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

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

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

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

6.3.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute as per following slab system

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

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

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

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

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

6.4 Revaluation / Recounting:

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

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

6.5 Supplementary Examination:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8. TRANSITORY REGULATIONS:

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

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

9.1 For a semester/year:

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

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

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

9.2 For the entire programme:

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

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

9.3 Overall Performance:

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

10. TRANSCRIPTS:

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

11. ELIGIBILITY:

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

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
(ii) Successfully acquired all **236 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.
(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

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

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 under Rajampet Jurisdiction.

15. GENERAL:

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

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Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2014							
Department	Department of Electronics and Communication Engineering							
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering							
I Year B.Tech								
Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4GC11	English	2	1	-	4	30	70	100
4GC12	Engineering Physics	2	-	-	4	30	70	100
4GC13	Engineering Chemistry	2	-	-	4	30	70	100
4GC14	Mathematics – I	3	1	-	6	30	70	100
4G113	Programming in C and Introduction to data structures	3	1	-	6	30	70	100
4G513	Engineering Drawing	1	-	3	6	30	70	100
4G311	Electronic Devices and Circuits	3	1	-	6	30	70	100
4GC16	Engineering Physics and Chemistry Lab	-	-	3	4	30	70	100
4GC17	English Language and Communication Skills Lab	-	-	3	4	30	70	100
4G114	Programming in C and Introduction to data structures Lab	-	-	3	4	30	70	100
4G411	Engineering and IT workshop	-	-	3	4	30	70	100
4G312	Electronic Devices and Circuits Lab	-	-	3	4	30	70	100
Total		**16**	**4**	**18**	**56**	**1200**		

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits, CO: Course Outcomes

Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2014							
Department	Department of Electronics and Communication Engineering							
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering							
II B.Tech I Semester								
Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4GC32	Engineering Mathematics	4	-	-	4	30	70	100
4GC34	Environmental Science	4	-	-	4	30	70	100
4G235	Electrical Circuit Theory	4	1	-	4	30	70	100
4G331	Electronic Circuits	4	1	-	4	30	70	100
4G332	Pulse and Digital Circuits	4	1	-	4	30	70	100
4G333	Signals and systems	4	1	-	4	30	70	100
4G334	Seminar – I	-	-	2	2	100	-	100
4G335	Electronic Circuits Lab	-	-	3	2	30	70	100
4G336	Pulse and Digital Circuits Lab	-	-	3	2	30	70	100
Total		**24**	**4**	**8**	**30**	**900**		

Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2014							
Department	Department of Electronics and Communication Engineering							
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering							
II B.Tech II Semester								
Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4GC41	Mathematics – III	4	-	-	4	30	70	100
4G245	Electrical Technology	4	1	-	4	30	70	100
4G341	Random Variables and Random Processes	4	1	-	4	30	70	100
4G342	Switching Theory and Logic Design	4	1	-	4	30	70	100
4G343	Analog Communication	4	1	-	4	30	70	100
4G344	Field Theory and Transmission Lines	4	1	-	4	30	70	100
4GC44	Aptitude and Reasoning Skills	-	-	2	2	100	-	100
4G247	Electrical Technology Lab	-	-	3	2	30	70	100
4G345	Analog Communication Lab	-	-	3	2	30	70	100
Total		**24**	**5**	**8**	**30**	**900**		

Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2014							
Department	Department of Electronics and Communication Engineering							
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering							
III B.Tech I Semester								
Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4GA51	Managerial Economics and Financial Analysis	4	-	-	4	30	70	100
4G455	Computer System Architecture	4	-	-	4	30	70	100
4G351	Control Systems	4	1	-	4	30	70	100
4G352	Linear IC Applications	4	1	-	4	30	70	100
4G353	Digital IC Applications	4	1	-	4	30	70	100
4G354	Antennas and Wave Propagation	4	1	-	4	30	70	100
4G355	Seminar – II	-	-	2	2	100	-	100
4GC51	Advanced English Language Communication skills lab	-	-	3	2	30	70	100
4G356	IC Applications Lab	-	-	3	2	30	70	100
Total		**24**	**4**	**8**	**30**	**900**		

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
Department	Department of Electronics and Communication Engineering
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering

III B.Tech II Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
4GA62	Management Science	4	-	-	4	30	70	100
4G361	VLSI Design	4	1	-	4	30	70	100
4G362	Microwave Engineering	4	1	-	4	30	70	100
4G363	Microprocessors and Interfacing	4	1	-	4	30	70	100
4G364	Digital Communications	4	1	-	4	30	70	100
4G365	Digital Signal Processing	4	1	-	4	30	70	100
4GC62	English for Competitive examinations	-	-	2	2	100	-	100
4G366	Digital Communication Lab	-	-	3	2	30	70	100
4G367	Microprocessors and Interfacing Lab	-	-	3	2	30	70	100
Total		**24**	**5**	**8**	**30**	**900**		

Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2014							
Department	Department of Electronics and Communication Engineering							
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering							
IV B.Tech I Semester								
Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4G479	Computer Networks	4	1	-	4	30	70	100
4G371	Optical Communication	4	1	-	4	30	70	100
4G372	Electronic Measurements and Instrumentation	4	1	-	4	30	70	100
4G374	Embedded Systems	4	-	-	4	30	70	100
	Elective – I	4	-	-	4	30	70	100
	Elective – II	4	-	-	4	30	70	100
4G378	Comprehensive Electronics and Communication Engineering	-	-	2	2	100	-	100
4G379	Microwave and Optical Communication Lab	-	-	3	2	30	70	100
4G37A	DSP and Embedded Systems Lab	-	-	3	2	30	70	100
Total		**24**	**4**	**8**	**30**	**900**		

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
Department	Department of Electronics and Communication Engineering
Programme Code & Name	G3, B.Tech. Electronics and Communication Engineering

IV B.Tech II Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
4G381	Cellular and Mobile Communications	4	-	-	4	30	70	100
4G382	Digital Image Processing	4	-	-	4	30	70	100
	Elective –III	4	-	-	4	30	70	100
	Elective – IV	4	-	-	4	30	70	100
4G388	Seminar III	-	-	2	2	100	-	100
4G389	Project	-	-	12	12	30	70	100
Total		**16**	**-**	**14**	**30**	**600**		

LIST OF ELECTIVES		
ELECTIVE-I	4G373	Digital Design Through Verilog HDL
	4G377	Nano Electronics
	4G175	Advanced Computer Architecture
ELECTIVE – II	**4G47A**	Object Oriented Programming
	4G375	Television Engineering
	4G376	Reliability Engineering
ELECTIVE – III	4G383	DSP Processors and Architectures
	4G384	Radar Engineering
	4G48A	Neural Networks and Fuzzy Logic
ELECTIVE – IV	4G385	Wireless Communication & Networks
	4G386	Satellite Communications
	4G387	Biomedical Instrumentation

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

I Year B.Tech. ECE

(4GC11) ENGLISH
(Common to All Branches)

Course Objectives:

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

TEXTBOOKS PRESCRIBED:

- The books prescribed serve as students' handbooks. The reader for detailed study comprises essays which are particularly relevant to engineering students. Texts from open sources are also included in the syllabus to make the teaching-learning process more interesting. Also, the literary texts from open sources will allow the student learn language from literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.
- The teacher should focus on developing LSRW skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

Unit I

Detailed Study: a) Technology with a Human Face, b) *Cabuliwallah* by Rabindranath Tagore Non-detailed Study: G. D. Naidu

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

Unit II
Detailed Study: a) Climatic Change and Human Strategy, b)*If* by Rudyard Kipling
Non-detailed Study: Sudha Murthy
Grammar: Tenses; Writing: Letters of Application; Vocabulary: One-word Substitutes

Unit III
Detailed Study: a) Emerging Technologies: Solar Energy in Spain, b) *The Gift of Magi* by O. Henry
Non-detailed Study: Vijay Bhatkar
Grammar: Types of Sentences: Simple, Compound and Complex; Declarative, Interrogative, Imperative and Exclamatory; Writing: E-mails; Vocabulary: Commonly Confused Words

Unit IV
Detailed Study: Water: a) The Elixir of Life, b)*Night of the Scorpion* by Nissim Ezekiel
Non-detailed Study: Jagadis Chandra Bose
Grammar: Subject-verb Agreement; Writing: Official Reports, Technical Reports; Vocabulary: English Spelling, Commonly misspelt words

Unit V
Detailed Study: a) The Secret of Work, b) *The Zoo Story,* a One-act Play by Edward Albee
Non-detailed Study: HomiJehangir Baba
Grammar: Active and Passive Voice; Writing: Note-making; Vocabulary: Connotations
For Detailed study:***Sure Outcomes*** published by Orient Black Swan, Texts from Open Sources (Available on Web)
For Non-detailed study:***Trailblazers*** published by Orient Black Swan

REFERENCES:

1. Technical Communication, Principles and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2011, 2nd edition
2. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
3. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.
4. English for Technical Communication, AyshaViswamohan, Tata Mc-Graw Hill
5. English Grammar and Composition, David Green, Mc Millan India Ltd.
6. Murphy's English Grammar, Raymond Murphy, CAMBRIDGE

7. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
8. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
9. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji , Macmillan, 2009
10. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
11. Longman Dictionary of Contemporary English with DVD, Pearson Longman

Course Outcomes:

CO.1. The student will appreciate the significance of silent reading and comprehension

CO.2. The student will demonstrate the ability to guess the contextual meaning of the words and grasp the overall message of the text to draw inferences

CO.3. The student develops critical thinking and creative writing skills through exposure to literary texts

CO.4. The student will understand the components of different forms of writing

CO.5. The student will exhibit effective writing skills through his understanding of English Grammar

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

I Year B.Tech. ECE

(4GC12) ENGINEERING PHYSICS

(Common to All Branches)

COURSE OBJECTIVS:

1. 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.
2. The Engineering Physics course educate the principles of optical science and engineering necessary to understand optical systems.
3. The Crystallography, X-ray diffraction of crystals and crystal defects explains how basic structure modulate properties of materials.
4. The principles of quantum mechanics and electron theory of metals gives an idea on basic development of energy in metals.
5. The main objective of this course to provide basic understanding of different engineering materials (semiconductors, magnetic, superconducting and nano materials).

UNIT 1 PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

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

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

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

UNIT II CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography*:* Introduction – Space lattice –Unit cell – Lattice parameters – Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Laue and Powder methods – Defects in solids: point defects, line defects (qualitative) - screw and edge dislocation, burgers vector.

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

UNIT III QUANTUM MECHANICS AND FREE ELECTRON THEORY:

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

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

UNIT IV SEMICONDUCTORS AND MAGNETIC MATERIALS:

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

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

UNIT V SUPERCONDUCTIVITY AND NANOMATERIALS:

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

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

Text Books:

1. Engineering physics – S. ManiNaidu, Pearson Education, I Edition, 2012.
2. Engineering Physics – V. Rajendran, MacGraw Hill Publishers, I Edition,2008.
3. Engineering physics –P.K.palanisamy, scietech publisher,Edition, 2013.

Reference Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers, III Edition, 2012.
2. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna,

Maruthi Publications , 2013
3. Engineering Physics – D.K.Battacharya and A.Bhaskaran,OxfordHeigher Education I Edition, 2010.

4. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012
5. Engineering Physics – D.K.Bhattacharya and A.Bhaskaran, Oxford University press
6. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
7. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edition, 2013.
8. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
9. Engineering Physics – Gaur and Gupta Dhanapati, RaiPublishers , 7th Edition, 1992.
10. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

Course Outcomes:

The student is able to

- **CO.1.** Understand basic principles of optics, optical engineering materials and incorporation of optics in engineering field.
- **CO.2.** Identify different types of crystal structures in materials and x-ray diffraction through crystals.
- **CO.3.** Know about importance of ultrasonic's in engineering field.
- **CO.4.** Analysis basic concepts of quantum mechanics and electron theory and consequences.
- **CO.5.** Explain about basic mechanism of different types of advanced materials used in engineering field.
- **CO.6.** Get brief idea about synthesis, properties and applications of nano materials.

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I Year B.Tech. ECE

(4GC13) ENGINEERING CHEMISTRY
(Common to All Branches)

Course Objectives:

1. 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.
2. The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
3. 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.
4. The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
5. 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.

SYLLABUS:

UNIT I: WATER TREATMENT

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

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

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

UNIT II: ELECTROCHEMISTRY

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

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea.
Corrosion: Definition & Types (dry & wet Corrosions) concentration cell, galvanic corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion, Prevention: Anodic and Catholic protection, Electroplating & Electrolessplating

UNIT III: POLYMERS

Introduction to polymers, Polymerization process- types, Elastomers (rubbers), Natural Rubber, Compounding of Rubber, Synthetic Rubber: Preparation, properties and engineering applications of Buna-S & Buna-N rubbers. Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.
Conducting polymers: Mechanism, synthesis and applications of polyacetylene, polyaniline.
Inorganic Polymers: Basic Introduction, Silicones.

UNIT IV: FUEL TECHNOLOGY

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, its determination using bomb calorimeter, Numerical Problems. Solid Fuels-Coke: Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.
Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol
Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

UNIT V: CHEMISTRY OF ENGINEERING MATERIALS

Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification, properties and applications
Lubricants: Theory of lubrication, properties of lubricants and applications, Rocket Propellants: Classification, Characteristics of good propellant

Text Books prescribed:

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 Enigneering Chemistry, Jain and Jain, DhanapathRai Publishing Company, New Delhi, 15th Edition, 2010.
3. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.

Reference Books:

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

Course outcomes:

The student is expected to:

CO.1. Understand the electrochemical sources of energy
CO.2. Understand industrially based polymers, various engineering materials.
CO.3. Differentiate between hard and soft water.
CO.4. Understand the disadvantages of using hard water domestically and industrially.
CO.5. Select and apply suitable water treatment methods domestically and industrially.
CO.6. Understand the manufacture of synthetic petrol.
CO.7. Differentiate between thermoplastics and thermosetting plastics.
CO.8. Understand the manufacture, setting and hardening of cement.

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I Year B.Tech. ECE

(4GC14) MATHEMATICS-I
(Common to All Branches)

Course Objectives:

The course aims to provide the student with the ability

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

UNIT I

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

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

UNIT II

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

UNIT III

Curve tracing – Cartesian, polar and parametric curves.

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

UNIT IV

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

UNIT V

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

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

Upon completion of the course, students will

- **CO.1.** Understand the various types of ordinary differential equations
- **CO.2.** Have the knowledge on functions of several variables.
- **CO.3.** Understand the concepts of curve tracing, applications of integration.
- **CO.4.** Have the knowledge of Laplace transforms and their inverse.
- **CO.5.** Learn about vector integral theorems.

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I Year B.Tech. ECE

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

(Common to CIVIL, ECE, ME & EEE)

Course Objectives:

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

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

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

UNIT II

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

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

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

UNIT III

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

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

UNIT IV

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

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

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

UNIT V

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

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

Text books:

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

Reference books:

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

Course Outcomes:

CO.1. Understand the importance of the software development process and System development tools.

CO.2. Understand general principles of C programming language and able to write simple program in C. Able to develop programs based on arrays and functions.

CO.3. Understand the purpose of pointers for parameter passing, referencing and dereferencing and understands the concepts of structures, unions and File management.

CO.4. Understands what and how to design data structure programs using C programming language.

CO.5. Understands how to solve applications like searching and sorting using C Programming language.

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I Year B.Tech. ECE

(4G513) ENGINEERING DRAWING

(Common to ECE, EEE, CSE and IT)

Course objectives:

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

UNIT – I

Introduction to Engineering Drawing – Construction of Ellipse, Parabola and Hyperbola (General method only). Construction of Ellipse using special methods like Concentric Circles method, Oblong method & Arcs of Circles method only.

Cycloidal Curves – Cycloid, Epi cycloid, Hypo cycloid.

UNIT – II

Projections of points, Projections of lines - Inclined to one planes and inclined to both the planes

UNIT – III

Projections of Planes –Inclined to one planes and inclined to both the planes

UNIT – IV

Projections of solids:

Cylinder, Cone, Prism, Pyramid and Sphere positions - Axis Inclined to one planes and inclined to both the planes

UNIT – V

Isometric projections of Lines, Planes and Simple Solids. Conversion of Orthographic views into Isometric views & Isometric views to Orthographic views.

TEXT BOOKS:

1. Engineering drawings by N.D.Bhatt
2 Engineering graphics by K.L. Narayana & P.Kannayya

REFERENCES:-

1. Engineering drawing and graphics by Venugopal/ New age
2. Engineering drawing by Johle / TMI

Course Outcomes:

CO.1. Student gets knowledge on various drawing instruments and its usage.

CO.2. Students capable to draw various curves like conic curves, cycloidal curves.

CO.3. Student can understand about orthographic projection and able to draw points, lines, planes and solids according to orthographic projections.

CO.4. Student able to draw, when the simple solids.

CO.5. Student can convert and draw the given orthographic view to isometric view and vice versa.

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I Year B.Tech. ECE

(4G311) ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE & EEE)

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To learn the fundamentals of Circuit Laws and Network Theorems.
2. To understand the concepts of semiconductor devices and its applications.
3. To understand the concepts of BJT and FET & their biasing

UNIT-I CIRCUIT LAWS AND THEOREMS:-Introduction-Ohm's law-Kirchoff laws-network reduction techniques-series, parallel, series parallel circuits-source transformations. Thevenin's Theorem-Norton's Theorem-Superposition Theorem- Maximum power transfer theorem.

UNIT-II DIODE AND DIODE APPLICATIONS:- Energy Band Diagrams of PN diode, Ideal Diode – Characteristics of PN Junction Diode and Temperature Dependency , Diode Capacitances, Breakdown Mechanisms in semiconductor diodes, Zener diode characteristics.
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-III INTRODUCTION OF BJTs, BIASING & STABILITY: Transistor construction - Transistor operation & its Characteristics - 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-IV 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-V SPECIAL PURPOSE ELECTRONIC DEVICES:
Varactor Diode, Tunnel Diode, LED, PIN diode, Schottkey Diode, SCR, UJT, Phototransistor.

TEXTBOOKS:

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. "Electronic Devices and Circuits" J. Millman and Halkias, 1991 edition, 2008, TMH.

REFERENCES:

1. "Electronic Devices and Circuit Theory" Robert L.Boylestad and Louis Nashelsky, 9th edition, PHI.
2. "Integrated Electronics, Analog and Digital Circuits and Systems" J. Millman and Halkias, TMH.
3. "Micro Electronic Circuits" Sedra and Smith, Oxford University Press.

COURSE OUTCOMES:

Upon completion of the course, students will

CO.1: Understand the principles of semiconductor physics.

CO.2: Have the knowledge on the theory of semiconductor devices and its applications.

CO.3: Understand the concepts of BJT and FET as well as its Biasing and Stability.

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I Year B.Tech. ECE

(4GC16) ENGINEERING PHYSICS AND CHEMISTRY LAB
(Common to all branches)

Objectives:

1. The student will learn practical understanding of the redox reaction.
2. The student will able to understand the function of fuel cells, batteries and extends the knowledge to the processes of corrosion and its prevention.
3. 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.
4. 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.

PART A: ENGINEERING PHYSICS LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

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

References:

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

PART B: ENGINEERING CHEMISTRY LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

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

References:

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

Course Outcomes:

CO.1. The student would be confident in handling energy storage systems and would be able combat chemical corrosion

CO.2. The student would have acquired the practical skill to handle the analytical methods with confidence.

CO.3. The student would feel comfortable to think of design materials with the requisite properties

CO.4. The student would be in a position to technically address the water related problems.

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B.Tech. I Year

(4G117) ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB

(Common to all branches)

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

Course Objectives:

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

SYLLABUS:

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

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

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

Minimum Requirement:

The English Language Lab shall have two parts:

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

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

Course Outcomes:

- **CO.1.** The student will be able to express himself fluently in social and professional contexts
- **CO.2.** The student will enhance his skills to make a presentation confidently
- **CO.3.** The student will learn how to neutralize his accent
- **CO.4.** The student will be able to decipher information from graphics and describe it professionally

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B.Tech. I Year.ECE

(4G114) PROGRAMMING IN C AND INTRODUCTION TO DATA STRUCTURES LAB

Course Objectives:

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

Recommended Systems/Software Requirements:

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

Exercise l.

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

Exercise 2.

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

Exercise 3.

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

Exercise 4.

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

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

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

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

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

Exercise 5.

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Exercise 6.

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

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

Exercise 7.

a) Write a C program to find both the largest and smallest number in a list of integers.

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

i) Addition of Two Matrices ii) Multiplication of Two Matrices

Exercise 8.

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Exercise 9.

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

i) To insert a sub-string into a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not.

Exercise 10.

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

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

Exercise 11.

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

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

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

(Note: represent complex number using a structure.)

Exercise 12

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

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

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

Exercise 13

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

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

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

Exercise 14

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Exercise 15

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Exercise 16

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

i) Arrays ii) Pointers

Exercise 17

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

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Exercise 18

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

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

Exercise 19

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

i) Linear search ii) Binary search

Exercise 20

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

Exercise 21

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

REFERENCE BOOKS

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

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

(4G411) ENGINEERING & I.T. WORKSHOP
(Common to all branches)

ENGINEERING WORKSHOP

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

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.
c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.
d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

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

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

I.T. WORKSHOP

Course Objectives:

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

Preparing your Computer (5 weeks)

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

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

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

Networking and Internet (4 weeks)

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

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

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

Productivity tools (6 weeks)

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

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

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

Optional Tasks:

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

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

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

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

References:

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

Course Outcomes:

CO.1. Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
CO.2. Prepare the Documents using Word processors
CO.3. Prepare Slide presentations using the presentation tool
CO.4. Interconnect two or more computers for information sharing
CO.5. Access the Internet and Browse it to obtain the required information
CO.6. Install single or dual operating systems on computer

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.

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I Year B.Tech. ECE

(4G312) ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to ECE & EEE)

OBJECTIVES :

1. To study about all the components used in laboratory
2. To learn the operation of devices and their testing
3. To Design the circuits and perform the experiments

ELECTRONIC WORKSHOP PRACTICE (in 4 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
3. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

Perform the following experiments

1. Verification of Kirchhoff's Voltage and Current Law
2. Forward and Reverse Bias Characteristics of PN junction Diode.
3. VI Characteristics of Zener Diode
4. Half Wave Rectifier with and without filter.
5. Full Wave (Center trapped) Rectifier with and without filter.
6. Full Wave (Bridge) Rectifier with and without filter.

7. Zener Diode as a Voltage Regulator.
8. Input and Output Characteristics of Transistor CB Characteristics.
9. Input and Output Characteristics of Transistor CE Characteristics.
10. Input and Output Characteristics of Transistor CC Characteristics.
11. JFET Characteristics.
12. Frequency response of Common Emitter Amplifier
13. Frequency response of Common Source FET Amplifier.
14. VI Characteristics of LED.
15. UJT Characteristics.

COURSE OUTCOMES: Upon completion of the course, students will be able to

CO1: Understand the importance of the Electronic components and their applications
CO2: understand the working principles of the devices and components.
CO3: Design the circuits, after experimentation plot their characteristics and analyze.

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II Year B.Tech. ECE - I Semester

(4GC32)ENGINEERING MATHEMATICS

(Common to EEE & ECE)

COURSE OBJECTIVES:

1. 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.
2. To improve your ability to think logically, analytically, and abstractly; and
3. 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.
4. Introduce students to how to solve linear Partial Differential with different methods
5. 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.
6. To equip students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.

UNIT I

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.

UNIT II

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.

UNIT III

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 IV

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 V

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

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

Text Books:

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

References:

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

COURSE OUT COMES:

Upon completing this course students should be able to:

CO.1. Analyze real world scenarios to recognize when matrices, or linear systems are appropriate, formulate problems about the scenarios, creatively

CO.2. Model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.

CO.3. Appreciate linear algebra concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation.

CO.4. Apply numerical method to obtain approximate solutions to mathematical problems.

CO.5. Have the knowledge of interpolation, numerical integration, and numerical differentiation; know how to approximate definite integrals and derivatives.

CO.6. Be competent in solving linear PDEs using classical solution methods.

CO.7. Compute the Fourier series representation of a periodic function, in both exponential and sine-cosine forms. Be able to apply Fourier analysis to simple initial condition standing wave Problems and determine the resulting time evolution.

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

(4GC34)ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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.

TEXTBOOKS:

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.

REFERENCES:

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.graHill Publications.

COURSE OUTCOMES: Upon completion of the course, students will

CO1: To aware about global environment crisis & to understand the different resources and their problems.

CO2: To make the student know about different types of pollution, their sources, effects & control measures.

CO3: Broad awareness about ecosystems, biodiversity, solid waste & disaster management.

CO4: Understand the main social issues & population issues related to the environment.

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II Year B.Tech. ECE - I Semester

(4G235)ELECTRICAL CIRCUIT THEORY

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To learn the fundamentals of Electrical Circuits Both DC & AC, Network Theorems.
2. To apply this knowledge for the Analysis of Complex Circuits.

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, 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, Band Width & Q-Factor for Series & Parallel Networks, **S**elf & Mutual Inductance, Coefficient of Coupling, DOT Conventions, Analysis of Magnetic Circuits, Series & Parallel Circuits, Comparison of Electrical & Magnetic circuits.

UNIT-IV :: THREE PHASE SYSTEM: Advantages of 3-Φ System over 1-Φ System, Phase sequence, Star & Delta connections Relationship between 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, Substitution & Compensation Theorems for both DC & AC Excitations - Applications.

TEXT BOOKS:

1. *Electric Circuits* by Sudhakar A & Shyam Mohan, TMH, 3rd Edition, 2007.
2. *Circuits Theory* by Chakrabarthi A, Dhanpat Rai & Co. New Delhi, 2009.

REFERENCE BOOKS:

1. *Network Analysis* by M.E.Van Valkenberg, Pearson Publications, 3rd Edition, New Delhi 2006.

Engineering Circuit Analysis by William H.Hayt & Jack E.Kennedy & Steven M. Durbin, 6th Edition, TMH, 2009.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Learns the fundamentals of Electrical Circuits and Kirchhoff's laws Analysis.

CO2: Knows the fundamentals of AC circuits both Single Phase & Three Phase systems

CO3: Understands the basics of Magnetic Circuits their analysis & comparison with Electric Circuits.

CO4: Acquire the knowledge on different Network Theorems for Both Dc & Sinusoidal Excitations

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II Year B.Tech. ECE - I Semester

(4G331)ELECTRONIC CIRCUITS

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers and tuned amplifiers.
2. To understand the concepts and design of oscillators and voltage regulators

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.

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.

Tuned Amplifiers: Introduction, 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.

References:

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

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: analyze the single stage and multistage amplifiers using h-parameter model at low frequencies.
CO2: understand the concept and analysis of BJT amplifier circuits at High frequencies using Hybrid- π model and feedback amplifiers.
CO3: design the oscillators, large signal and tuned amplifiers.
CO4: understand the concepts of basic types and IC voltage regulators.

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II Year B.Tech. ECE - I Semester

(4G332)PULSE AND DIGITAL CIRCUITS

COURSE OBJECTIVE: The course aims to provide the student with the ability

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

UNIT I: LINEAR WAVE SHAPING

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

UNIT II: SWITCHING CHARACTERISTICS & NON-LINEAR WAVE SHAPING:

Switching Characteristics of Devices: Diode as a switch, Diode Switching Times, Transistor as a Switch, transistor-switching times
Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, clamping operation, clamping circuit taking source and diode resistance into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNIT III: TIME BASE GENERATORS, SYNCHRONIZATION AND FREQUENCY DIVISION

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.
Synchronization and Frequency Division: Pulse Synchronization of relaxation devices, Frequency division in sweep circuit, astable relaxation circuits, Monostable relaxation circuits, stability of relaxation devices, Synchronization of a sweep circuit with symmetrical signals.

UNIT IV: MULTIVIBRATORS

Design and analysis of Bistable, Monostable & Astable Multivibrators with BJT. Schmitt trigger circuit, Symmetrical & Un Symmetrical Triggering of Bistable Multivibrator, Monostable Multivibrators

UNIT V: SAMPLING GATES, LOGIC GATES AND LOGIC FAMILIES

Sampling Gates: Basic operation and principle of Sampling gates, uni-directional diode sampling gate, Bi-Directional diode & Transistor sampling gates, four diode sampling gate and their applications.
Realization of AND,OR,NOT gates using diodes and transistors, Inhibit operation, classification of logic families, DTL, RTL, DCTL,TTL, and CMOS logic families, comparison of logic families.

Text Books:

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

References:

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

COURSE OUTCOMES: Upon completion of the course, students will

CO1: Understand the response of high pass and low pass circuits for different non-sinusoidal signals and Clippers, Clampers.
CO2: Learn the characteristics of switching devices & operation of different multivibrator circuits.
CO3: Get knowledge about different time base signals to improve the linearity and sampling gates.
CO4: Understand the principles of synchronization and also know how synchronization is established.
CO5: Understand the operation and realization of different logic gates and logic families.

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II Year B.Tech. ECE - I Semester

(4G333) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
2. To acquire practical knowledge on various transform techniques in the analysis of signals and systems

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

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

UNIT III 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.

REFERENCES :

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

COURSE OUTCOMES: Upon completion of the course, students will

CO1: Understand signal representation methods and operation on signals.
CO2: Have the knowledge to obtain Fourier series and Fourier Transforms
CO3: Understand the convolution and correlation of signals.
CO4: Learn various systems and their responses.
CO5: Understand different transforms (Laplace & Z) of signals.

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II Year B.Tech. ECE - I Semester

(4G335)ELECTRONIC CIRCUITS LAB

Course Objectives:

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

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

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

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

Course Outcomes: Upon completion of the course, students will

CO.1. *Have the ability to analyze and design single and multistage amplifiers*

CO.2. *Determine the efficiencies of power amplifiers.*

CO.3. *Design different Oscillators.*

CO.4. Be a*ble to Analyze all the circuits using simulation software and Hardware*.

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II Year B.Tech. ECE - I Semester

(4G336)PULSE & DIGITAL CIRCUITS LAB

Course Objectives:

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

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. Bistable Multivibrator.
8. Schmitt Trigger.
9. Bootstrap sweep circuit.
10. UJT Relaxation Oscillator
11. Sampling Gates.
12. Study of Logic Gates & Some applications.

Course Outcomes: Upon completion of the course, students will

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

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II YEAR B.TECH. – II SEMESTER

(4GC41) MATHEMATICS - III
(ECE &ECE)

COURSE OBJECTIVES:

The course aims to provide the student with the ability

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

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 $\int_{-\infty}^{\infty} f(x)dx \quad and \quad \int_{0}^{2\pi} f(\cos\theta, \sin\theta)d\theta$.

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 BOOKS:

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

REFERENCES:

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.

COURSE OUTCOMES: Upon completion of the course, students will

CO1: Understand the properties of Beta and Gamma functions

CO2: Have the knowledge on functions of a complex variable.

CO3: Understand the concepts of exponential, trigonometric, hyperbolic functions and their properties.

CO4: Have the knowledge of complex integration and apply it solve complex integrals of different type.

CO5: Learn about **c**onformal mapping

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II Year B.Tech. ECE-II Semester

(4G245) ELECTRICAL TECHNOLOGY

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand Networks and their analyses.
2. To learn the fundamentals of Filters , Attenuators, D.C.Machines and Transformers 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 ,Image parameters- Problems.

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

Attenuators: 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 - Starters - Testing - Brake Test & Swinburne's Test - Speed control of DC Motors - 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, Pre-Determination of Efficiency & Regulation, Auto-Transformer.

Special Machines: Principle of operation of Capacitor Motors, Shaded Pole Motor, AC Tachometer, Stepper Motor - Characteristics, Applications.

TEXT BOOKS:

1. *Network Analysis* by A. Sudhakar & Shyam Mohan S.Pilli, 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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Learn the fundamentals of Two-port Networks and their parameters.

CO2: Know the Concept of Transient analysis

CO3: Understands the basics of Filters and Attenuators

CO4: Acquire the knowledge on D.C.Machines and Transformers and their applications

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II YEAR B.TECH. – II SEMESTER

(4G341) RANDOM VARIABLESAND RANDOM PROCESSES

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

UNIT I

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

UNIT II

OPERATIONS ON ONE RANDOM VARIABLE: Expectation, Moments: moments about the origin, Central Moments, Variance and Skew, Chebychev'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.

UNITV

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

TEXT BOOKS:

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

REFERENCES:

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

COURSE OUTCOMES: *Upon completion of the course, students will be able to*

CO1: Understand the concept of Probability and types of random variables.
CO2: Learn the possible operations on random variables with real time examples.
CO3: Understand the concept of random processes
CO4: analyze the random processes based on their characteristics

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II Year B.Tech. ECE-II Semester

(4G342) SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To get the knowledge on Number Systems and Boolean Algebra
2. To acquire the knowledge of various circuits in Digital systems design.

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

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

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

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

UNIT III COMBINATIONAL LOGIC DESIGN & PROGRAMMABLE

LOGIC DEVICES: Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adder, Look Ahead carry 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.

COURSE OUTCOMES: *Upon completion of the course, students will be able to*

CO1: Understand different number systems conversions & Binary codes
CO2: simplify Boolean functions& realize them using digital logic gates.

CO3: design various combinational & sequential circuits
CO4: Understand the Minimization techniques of Finite State Machine & the elements of ASM chart.

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II Year B.Tech. ECE-II Semester

(4G343) ANALOG COMMUNICATION

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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.

UNITV

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.

TEXTBOOKS:

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

REFERENCES:

1. H Taub & D. Schilling, Gautam Sahe - Principles of Communication Systems, TMH, 2007 3rd Edition.

2. John G. Proakis, Masood Salehi - Fundamentals of Communication Systems PEA, 2006.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the need of Modulation and Application in real life.
CO2: Gain the knowledge of Different Modulation Techniques and their Generation & Detection methods
CO3: Understands the Effect of Noise in analog modulation techniques
CO4: design radio Transmitters, Receivers & applications in real life

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II Year B.Tech. ECE - II Semester

(4G344) FIELD THEORY AND TRANSMISSION LINES

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To Understand the Concepts of Vectors and Co-ordinate Systems
2. To Learn the concepts of Electric and Magnetic Fields with their corresponding equations
3. To acquire knowledge on transmission lines & 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.

TEXTBOOKS:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.

2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition,2000.

3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech.India Publications), New Delhi.

REFERENCES:

1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed.,2005.

2. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: understand the vector analysis, co-ordinate systems, transformations & vector calculus.

CO2: Understand the electrostatic fields in free space and in material space.
CO3: Understand the Magneto static fields in free space & also in material space.
CO4: Learn the final forms of Maxwell`s equations in electromagnetic fields.
CO5: Understand EM wave propagation characteristics on different mediums & its applications.
CO6: Have the knowledge on different transmission lines & their relations.

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II B.Tech. II Sem.

(4GC44)APTITUDE AND REASONING SKILLS

(Common for all Branches of II B. Tech I or II Semester)

APTITUDE AND REASONING SKILLS

QUANTITATIVE APTITUDE:

1. Number Systems
2. Averages
3. Problems on ages
4. Allegations
5. Percentages
6. Profit and loss
7. Simple interest and Compound interest
8. Ratio and Proposition and variation
9. Time and Work
10. Time and Distance
11. Menstruation
12. Permutation and Combinations
13. Progressions
14. Inequalities
15. Logarithms
16. HCF and LCM
17. Decimal Fractions
18. Simplification
19. Square Roots and Cube Roots
20. Pipes and Cisterns
21. Area, Volume and Surface Areas
22. Calendar, Clocks
23. True Discount, Banker's Discounts
24. Data Interpretation, Tabulation, Bar Graphs, Pie charts, Line Graphs

REASONING:

1. Directions
2. Blood Relations
3. Problems on Cubes
4. Series and Sequences
5. Odd man out
6. Coding and Decoding
7. Data sufficiency
8. Logical deductions
9. Arrangements and Combinations
10. Groups and Teams
11. Puzzles to Puzzle you. More puzzles, Brain Teasers, Puzzles and Teasers

REFERENCE BOOKS:

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

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

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II Year B.Tech. ECE-II Semester

(4G247) ELECTRICAL TECHNOLOGY LAB

ANY TEN EXPERIMENTS FROM THE FOLLOWING:

(i) PART - A :

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

(ii) PART - B :

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

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II B.Tech. II Sem.

(4G345) ANALOG COMMUNICATION LABORATORY

Course Objectives:

1. To provide a real time environment about different analog modulation and demodulation methods
2. To analyse the available circuits behavior in analog communication through hardware as well as software environment

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

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

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

Course Outcomes:

Upon the completion of the course the students will be able

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

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III Year B.Tech. ECE-I Semester

(4GA51)MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

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

Unit I Introduction to Managerial Economics

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

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

Unit II Production and Cost Analysis

Production – Theories of the firm, Production Function, Cobb-Douglas Production function, Isoquants and 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.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.

2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.

3. Suma Damodaran, Managerial Economics, Oxford University Press.

4. Lipsey & Chrystel, Economics, Oxford University Press.

5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.

Course Outcomes:

CO1. The course provides a basic insight into seeking solutions for managerial problems.
CO2.The student can familiarized with Accounting Data and Financial Statements that can be useful for interpreting the financial information.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

III Year B.Tech. ECE-I Semester

(4G455) COMPUTER SYSTEM ARCHITECTURE

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To make the students understand the structure and of various functional modules
2. To understand the techniques that computers use to communicate with I/O devices
3. To study the concepts of pipelining and the basic characteristics of 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 CENTRAL PROCESSINGUNIT&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, 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, Zvonko Vranesic, Safwat Zaky, Car Hamacher, Zvonks Vranesic, Safwat Zaky,*Computer Organization* , McGrawHill,V 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.

COURSE OUTCOMES: *Upon completion of the course, students will be*

CO.1. Able to use memory and I/O devices effectively

CO.2. Able to explore the hardware requirements for cache memory and virtual memory

CO.3. Able to understand pipelining and multiprocessors

ANNAMACHARYA INSTITUTE OF TECHNOLOG &SCIENCES:: RAJAMPET
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III Year B.Tech. ECE-I Semester

(4G351) CONTROL SYSTEMS

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

UNIT-I: INTRODUCTION & *TRANSFER FUNCTION PRESENTATION*

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 a 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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: understand the basic principles of systems and their mathematical representations

CO2: Know the type and order of the systems and their time domain specifications.

CO3: Gain the knowledge on stability and analyze it using different techniques

CO4: Design compensators and controllers for various systems

CO5: know the mathematical approach for determining the stability of the control system, controllability and observability.

ANNAMACHARYA INSTITUTE OF TECHNOLOG &SCIENCES:: RAJAMPET
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III Year B.Tech. ECE-I Semester

(4G352) LINEAR IC APPLICATIONS

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To Understand the Concepts of differential amplifier and OP-Amp.
2. To learn filters, Timer, converters and Analog Multipliers.

UNIT-I

DIFFERENTIAL AND OPERATIONAL AMPLIFIERS

Differential amplifier: Introduction, DC&AC analysis of Differential amplifier configuration, FET differential amplifier, cascaded differential amplifier stages, Level Translator, constant current bias, current mirror.

Operational amplifier: Block diagram representation of typical Op-Amp, integrated circuits-types, classification, package types , temperature ranges and power supplies, Inverting & Non-inverting amplifiers (ideal and practical), voltage follower, OP-Amp specifications (ideal and practical),μA741/TL082 OP-Amp features, open loop OP-Amp configuration, DC & AC characteristics of Op-Amp, CMRR, PSRR.

UNIT-II

OPERATIONAL AMPLIFIER APPLICATIONS

Linear applications: Inverting and non-inverting summing amplifier, subtractor, adder-substractor, integrator, differentiator, instrumentation amplifier, V-I & I-V converters.

Non-linear applications: Comparators and applications, Multivibrators- astable and monostable, Schmitt trigger, Triangular and saw tooth wave generators, Log and antilog amplifiers, precision rectifiers.

UNIT-III

TIMERS AND PHASE LOCKED LOOPS

Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks,565 PLL ,applications of PLL-Frequency multiplication, frequency translation, AM, FM and FSK demodulators.

UNIT–IV

D-A AND A-D CONVERTERS

Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC monolithic DAC, ADCs-parallel comparator type ADC, counter type ADC, servo or tracking ADC, successive approximation ADC, Dual slope ADC, DAC and ADC specifications.

UNIT-V

VOLTAGE REGULATOR & ACTIVE FILTERS

Voltage Regulator: Introduction, Series Op-Amp regulator, IC voltage regulators, 723 general purpose regulator, Switching regulator. Active Filters: Introduction, Butterworth filters-first order, second order LPF, HPF filters design. Band pass filters- wide BPF, narrow BPF, Band reject filters - wide BRF, narrow BRF, All pass filters.

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.

REFERENCES:

1. David A. Bell - Operational Amplifiers & Linear ICs, 2nd edition, Oxford University Press, 2010.
2. Sergio Franco - Design with Operational Amplifiers & Analog Integrated Circuits, McGraw Hill, 1988.
3. C.G. Clayton Operational Amplifiers, Butterworth & Company Publ. Ltd./ Elsevier, 1971.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the analysis of differential amplifier and characteristics of OP-Amp.
CO2: Design Op-Amp circuits for liner & non linear applications.
CO3: Design different analog filters
CO4: Understand the applications of 555 timer and PLL.
CO5: know the principles of converters and analog multipliers

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III Year B.Tech. ECE-I Semester

(4G353)DIGITAL IC APPLICATIONS

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To Understand Concept of logic families & the basics of VHDL
2. To design circuits using available ICs
3. To have a knowledge of memories.

UNIT I: CMOS & BIPOLAR LOGIC

Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families. Bipolar logic, Transistor-Transistor logic, TTL families, CMOS/TTL interfacing, Low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families.

UNIT II: VHDL ELEMENTS & STRUCTURAL MODELING

Introduction to HDLs, Design flow, Program structure, Basic language elements- Data Objects, Data types, Operators, Functions and procedures, Packages and Libraries. **Structural design elements:** Introduction, Component declaration, Component instantiation, Examples.

UNIT III: DATAFLOW & BEHAVIORAL MODELING

Data flow design elements: Introduction, Concurrent signal assignment statement, Concurrent versus Sequential signal assignment statement, Conditional signal assignment statement and Selected signal assignment statement, **Behavioral design elements:** Introduction, Entity declaration, Architecture body, Process statement, Variable assignment statement, Signal assignment statement, Wait statement, If statement, Case statement, Null statement, Loop statement, Exit statement, Next statement, Assertion statement, Report statement, Delay models- Inertial delay model, Transport delay model.

UNIT IV: COMBINATIONAL LOGIC DESIGN

Decoders, Encoders, Three state devices, Multiplexers and Demultiplexers, Code Converters, EX-OR gates and Parity circuits, Comparators, Adders & subtractors, ALUs, Combinational multipliers. VHDL models for the above ICs. **Design examples**: Barrel shifter, Comparators, Ones counter.

UNIT V: SEQUENTIAL LOGIC DESIGN

Latches and flip-flops, Counters, Shift register, and their VHDL models, Synchronous design methodology, Impediments to synchronous design.

TEXT BOOKS:

1. John F. Wakerly- Digital Design Principles & Practices, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. J.Bhaskar-VHDL primer, PHI/ Pearson Education Asia, 3rd Ed., 2003.

REFERENCES:

1. Charles H. Roth Jr- Digital System Design Using VHDL , PWS Publications, 2nd edition, 2008.

2. Kenneth L Short – VHDL for Engineers, Pearson Education 2009.
3. Stephen Borwn and Zvonko Vramesic- Fundamentals of Digital Logic with VHDL Design , McGraw Hill, 2nd Edition., 2005.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the theory of logic families & interfacing.
CO2: Understand the basics of VHDL & programming.
CO3: Be able to design combinational & sequential circuits using available ICs & their VHDL programming.
CO4: Understand the theory of memories.

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III Year B.Tech. ECE-I Semester

(4G354)ANTENNAS AND WAVE PROPAGATION

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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, Shape-impedance Considerations.

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, Wave Environment, 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

REFERENCES:

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

COURSE OUTCOMES: *Upon completion of the course, students will have*

CO1: A knowledge on different basic concepts related to antennas and different antenna parameters mathematically

CO2: An ability to design BSA, EFA etc... Antenna arrays. Parasitic arrays and YagiUda
antenna

CO3: An ability to design and implement the utilization of Helical and VHF and UHF antennas.

CO4: an Ability to analyse the propagation of wave and different paremetrs such as MUFetc... Knowledge on all the layers of atmosphere and the nature of different propagation mechanisms.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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III Year B.Tech. ECE-I Semester

(4GC51)ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB (AECS Lab)

Course Objectives:

1. To sensitize the student with the significance of the language skills required in his professional career
2. To improve reading and listening comprehension and communication skills of the student
3. To enable the student discuss ideas, and face interviews with confidence
4. To help the students cultivate the required ability to face computer-based competitive exams such as GRE, TOEFL, CAT, GMAT etc

Syllabus:

- **Résumé 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 - transitions – handling questions from audience
- **Oral Presentations (Team)**- appropriate use of visual aids –PowerPoint 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

Course Outcomes

CO.1. The student will be able to express himself fluently in social and professional contexts

CO.2. The student will enhance his skills of making a presentation confidently

CO.3. The student will learn how to face Interviews confidently, to participate in meetings effectively

CO.4. The student will face CBTs with greater felicity

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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III Year B.Tech. ECE-I Semester

(4G356) IC APPLICATIONS LAB

Course Objective:

1. To verify the applications of Op-amp and timers
2. To use computer-aided design tools for development of complex digital logic circuits
3. To Simulate and analyze with hardware description language

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 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 -74138
4. 8-3 Encoder- 74X148.
5. 8 x 1 Multiplexer -74X151.
6. 4 bit Comparator-74X85.

7. D Flip-Flop 74X74.

8. JK Flip-Flop 74X109.

9. Decade counter-74X90.

10. Universal shift register -74X194.

Course Outcomes: Upon the completion of course student will be

CO.1. Able to verify applications of Op-amp

CO.2. Able to verify applications of Timer

CO.3. Able to use computer-aided design tools for development of complex digital logic circuits.

CO.4. Able to simulate and analyze with hardware description languages.

CO.5. Able to design tests for digital logic circuits, and design for testability.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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III Year B.Tech. ECE-II Semester

(4GA62)MANAGEMENT SCIENCE

Course objectives :

1. The objective of this course is to get basic knowledge of management and organization.
2. To understand the concepts of plant location plant layouts its types& types of productions.
3. To get the concepts of work study & method study.
4. Learn about the materials management and inventory classification techniques.
5. To know the concepts of PERT & CPM.
6. To understand the concepts of inspection, quality control techniques, job description, merit rating, product life cycle.

UNIT I MANAGEMENT AND ORGANISATION STRUCTURE: Meaning, Nature, Importance Elements Of Management;. Planning, Organizing, Staffing, Directing, Coordinating, Reporting, Budgeting.-Systems Approach To Management. Evolution Of Scientific Management, Modern Management. Principles Need Of Organization Structure -Types Of Organization Structure Line, Line And Staff, Functional And Matrix Organizations.

UNIT II OPERATIONS MANAGEMENT: Plant Location And Layout - Methods Of Production (Job, Batch And Mass Production) Objectives Of Inventory Management- Need For Inventory Control- Method Of Inventory Management : EOQ, ABC Analysis.

MARKETING MANAGEMENT **-** Core Concepts Of Marketing. Need, Want, Demand, Product, Value, Satisfaction, Marketing Mix- Product, Price, Place, Promotion, Product Levels -Product Life Cycle, – Channels Of Distribution.

UNIT III. **HUMAN RESOURCES MANAGEMENT (HRM):** Significance Of HRM, Basic Functions of hr manager. Hr planning, Job evaluation. Recruitment, and Selection. Placement And Induction. Training. Performance Appraisal. Compensation. Industrial Relations.

UNIT IV FINANCIAL MANAGEMENT, Objectives, Scope, Techniques Of Investment Analysis, Pay Back Period, Accounting Rate Of Return, Working Capital, Cost Of Capital, Sources Of Financing.

PROJECT MANAGEMENT (PERT/CPM): Network Drawing - Programme Evaluation And Review Technique (PERT) - Critical Path Method (CPM) - Probability Of Completing The Project Within Given Time – Project Crashing (Simple Problems).

UNIT V ADVANCES IN MANAGEMENT PRACTICES: Basic Concepts And Overview Of Management Information System (MIS), Enterprise Resource Planning (ERP), Value Analysis, Just –In-Time (JIT), Total Quality Management (TQM) And Supply Chain Management.
Overview Of Ethics-Nature And Objectives Of Ethics - Relationship Between Ethics And An Organisation.

TEXT BOOKS:
1. L.M.Prasad, Priciples and Practice of Management, S.Chand & Sons.
2. Shridhara Bhat, Production and operation management, HPH.

REFERENCE BOOKS:
1. Harnold Koontz, Cyril 'O' Donnell, Essentials of Management, Tata McGraw Hill, New Delhi, 1979.

2. Human Resource Management, Dessler Gary, 10th Edition, Pearson/Prentice Hall of India 2006.

3. Marketing Management, V.S. Ramaswamy and S. Namakumari, 4/eMcMillan, 2010.

4. Production, Planning and Control Text and Cases, S K Mukhopadhyay, PHI, New Delhi. 2009

Course outcomes :

CO.1. An ability to demonstrate basic knowledge in mathematics, science and engineering.
CO.2. An ability to design and conduct experiments, interprets, analyze and report results

CO.3. An ability to identify, formulate and solve mechanical engineering problems.
CO.4. An ability to understand of their professional and ethical responsibilities.
CO.5. An ability to communicate effectively in both verbal and written forms.
CO.6. Confidence to apply engineering solutions in global and societal contexts.

CO.7. Board scene education and will have an understanding of the impact of engineering on society and
CO.8. demonstrate awareness of contemporary issues.
CO.9. An ability to function on multi-disciplinary teams.

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III Year B.Tech. ECE-II Semester

(4G361) VLSI DESIGN

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To get knowledge on VLSI technology with applications
2. To acquire design specifications 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 Dougles and A. pucknell - Essentials of VLSI circuits and systems, PHI, 2005 Edition.
2. Weste and EShraghian - Principles of CMOS VLSI design, Pearson Education, 1999.

REFERENCES:

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

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand different IC technologies and their fabrication process.
CO2: Analyze the basic electrical properties of MOS transistor and design of CMOS and Bi-CMOS inverters.
CO3: Understand VLSI design flow of all technologies with its design rules and encoding schemes.
CO4: be able to design the gate level and sub system modules.
CO5: Understand the concept of programmable IC design.
CO6: Understand the VHDL synthesis design flow and testing principles of CMOS

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III Year B.Tech. ECE-II Semester

(4G362)MICROWAVE ENGINEERING

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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-IVMICROWAVESOURCES-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.

REFERENCES :

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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Ability to solve the wave equations.
CO2: Learn the construction and operation of microwave devices, components, sources and detectors
CO3: Study about the various measurements of microwave parameters

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

III Year B.Tech. ECE-II Semester

(4G363)MICROPROCESSORS & INTERFACING

COURSE OBJECTIVE: The course aims to provide the student with the ability

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

UNIT-I

8086 ARCHITECTURE& PRORAMMING:

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-III /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

PROGRAMMABLE INTERRUPT CONTROLLER&INTERVAL TIMER/COUNTER(8253):

Data transfer methods-Programmed I/O,interrupt driven I/O. and simple programs. 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-, RS-232C, 20mA,60mA current loop. 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 Interfacing-Douglas V.Hall, 2nd edition, 2007.

REFERENCES:

1. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
2. 4 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.

COURSE OUTCOMES: Upon completion of the course, students will

CO1: Know the Architectural features and programming of 8086.
CO2: be able Interface various Intel devices with 8086.
CO3: Understand the Interrupt structure of 8086 and servicing the interrupts using interrupt controller.
CO4: Know the Salient features of advanced microprocessors.

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III Year B.Tech. ECE-II Semester

(4G364) DIGITAL COMMUNICATION

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand digital modulation Techniques
2. To learn coding and detection techniques

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, PCM versus Analog modulation.

UNIT II

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 III

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

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.

REFERENCES :

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

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: understand different Modulation techniques, design of digital communication systems based on these modulation techniques in real life

CO2: be able to use source coding techniques and channel coding techniques in communications systems and Design Different error control Codes

CO3: To design basic digital communication systems for applications in real life

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III Year B.Tech. ECE-II Semester

(4G365) DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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, Basics of Z-Transforms.

UNIT-II

FAST FOURIER TRANSFORMS

Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and 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, IIR Structures- Direct form –I , Direct form- II, Transposed Structure, Cascade form.

Characteristics of FIR digital filters, frequency response. 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 nonstationary 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.

REFERENCES:

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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: understand the types of discrete time signals & systems and analyze using Fourier series and Fourier transforms.
CO2: know the basics of digital filters and design using different techniques**.**
CO3: understand the concepts of decimation and interpolation**.**
CO4: know the applications in Real life

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III Year B.Tech. ECE-II Semester

(4GC62)ENGLISH FOR COMPETITIVE EXAMINATIONS

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)

References:

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"

Course Outcomes:

CO.1. The student will be successful in recruitment drives

CO.2. The student will get through competitive examination in public/private sector

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III Year B.Tech. ECE-II Semester

(4G366) DIGITAL COMMUNICATION LAB

Course Objectives:

1. The course aims to provide a real time experience for different digital modulation and demodulation schemes
2. 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.**

Course Outcomes:

After completion of the course the students will be able

CO.1. To experience real time behavior of different digital modulation schemes
CO.2. To understand the working principles of Modulation and demodulation
CO.3. To simulate and analyse the digital modulation schemes

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III Year B.Tech. ECE-II Semester

(4G367)MICRO PROCESSORS & INTERFACING LAB

***Course Objectives*:**

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

1. Arithmetic operations

   a) Series of n bytes/words addition

   b) Multi byte Addition and Subtraction

   c) 8/ 16 bit Multiplication and Division

   d) Signed Arithmetic operations

   e) ASCII – arithmetic operation.

   f) Addition of two, 4 digit BCD numbers

2. Logical Operations

   a) Code conversion – BCD ⇔ ASCII, BCD ⇔HEX.

   b) Number of 1's and 0's in a given word.

3. String Operations

   a) Relocate a string of N words/bytes.

   b) Reverse String.

   c) Bubble Sort

   d) Length of the String

   e) String Insertion

   f) String Deletion

   g) String comparison

   h) Scanning a byte/ word.

4. Write near procedure for

   a) Factorial of a given number

   b) Largest/smallest number in an N number of given words.

5. Interfacing with 8255 PPI

   a) DAC Interfacing: Sawtooth, Triangular, Staircase, sinusoidal and square wave generation in BSR mode.

   b) Stepper Motor Interfacing: Rotation in Clock wise and Anti-clock wise direction.

6. 8259 – Interrupt Controller.

7.8251 - USART Interfacing

***Course Outcomes*: Upon the completion of course student will be**

CO.1. Able to write Assembly Language programs.

CO.2. Able to understand the operations and applications of microprocessors

CO.3. Able to understand programmable peripheral devices and their Interfacing.

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IV Year B.Tech. ECE-I Semester

(4G479) COMPUTER NETWORKS

COURSE OBJECTIVES:

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

UNIT I INTRODUCTION: Network Hardware, Network Software, References Models.

The Physical Layer-The Theoretical Basis for Data Communication Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching.

UNIT II THE DATA LINK LAYER: Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols.

THE MEDIUM ACCESS CONTROL SUB LAYER: The Channel allocation Problem, Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sub layer Protocol. The Binary Exponential Back off Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC Sub Layer Protocol, The 802.11 Frame Structure.

UNIT III THE NETWORK LAYER: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms. Internetworking, The Network Layer in the Internet.

UNIT IV THE TRANSPORT LAYER: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, TCP.

UNTI V THE APPLICATION LAYER: DNS-The Domain Name System, Electronic Mail. The World Wide Web, Multimedia. **NETWORK SECURITY:** Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:

1. Andrew S. Tanenbaum, *Computer Networks*, Pearson Education, Fourth Edition.

REFERENCE BOOKS:

1. Michael A. Gallo, William M. Hancock, *Computer Communications and Networking Technologies,* Cengage Learning.
2. Natalia Olifer, Victor Olifer*, Computer Networks: Principles, Technologies and Protocols for Network Design*, Wiley India.
3. Behrouz A. Forouzan, *Data Communications and Networking*, Tata McGraw Hill, Fourth Edition.
4. W.A.Shay, *Understanding Communications and Networks*, Cengage Learning, Third Edition.
5. Nader F. Mir, *Computer and Communication Networks*, Pearson Education
6. James F.Kurose, K.W.Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, Pearson Education, Third Edition.
7. G.S.Hura and M.Singhal, *Data and Computer Communications*, CRC Press, Taylor and Francis Group.

COURSE OUTCOMES:

CO.1. Students will able to learn the use of Networks and different reference models.
CO.2. Ability to understand about the different types of Transmission media in the physical layer.
CO.3. Students can learn about the design issues and channel allocation problem in the data link layer.
CO.4. Students can know about how to route the packets using routing algorithms and familiar with IP addresses.
CO.5. Students will able to learn about different transport layer issues.
CO.6. Students will be familiar with various application layer issues.

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IV Year B.Tech. ECE-I Semester

(4G371) OPTICAL COMMUNICATION

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand and design optical fiber communication system.
2. To understand the losses and fabrication methods of optical fiber communication system.

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.

REFERENCES:

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

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: understand historical developments of OFC and different types of OF
CO2: Analyze the transmission of optical light in fibers
CO3: be able to design the constructional features of OF and optical sources.
CO4: be able to design the optical links and analyze different applications.

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IV Year B.Tech. ECE-I Semester

(4G372)ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

UNIT –I: MEASUREMENT ERRORS AND MEASURING INSTRUMENTS

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

UNIT –II: SIGNAL GENERATORS & ANALYZERS

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

UNIT –III: OSCILLOSCOPES

Cathode Ray Tube, deflection amplifiers, waveform display, oscilloscope time base, dual trace oscilloscope, 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, Kelvin Bridge, guarded wheatstone bridge, AC bridges and their application, Maxwell bridge, Hay Bridge. Schering Bridge. Unbalance conditions. 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:

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.,DhanpatRai& Co publishers.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the principles of measurements with different basic meters and calculate all the parameters related to measurements.

CO2: Understand about different types of signal generators and Signal analyzers.

CO3: Understand the basic features of oscilloscope and its internal structure and different types.

CO4: Design different types of bridges for signal conditioning purpose.

CO5: Understand about different types of transducers and advancements in Instrumentation.

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IV Year B.Tech. ECE-I Semester

(4G374)EMBEDDED SYSTEMS

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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.

References:

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

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand basic concepts to design embedded applications.
CO2: Understand different programming models and their suitable application areas.
CO3: Analyze the operation of I/O ports and different communication protocols.
CO4: Design different embedded applications.

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IV Year B.Tech. ECE-I Semester

(4G373) DIGITAL DESIGN THROUGH VERILOG HDL

(ELECTIVE I)

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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

REFERENCES:

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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand,design,simulate and synthesize computer hardware using Verilog HDL

CO2: Be able to rapidly design combinational and sequential logic
CO3: Be able to use different verilog programming constructs in digital system design
CO4: gain knowledge in implementing state machines using FPGAs
CO5: Gain abiity to Design CPLDs & PGAs

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IV Year B.Tech. ECE-I Semester

(4G377)NANOELECTRONICS
(ELECTIVE I)

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To learn the fundamentals of Nanoelectronics
2. To understand the applications and limitation of IC's

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 Heterostructures 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.

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. George W. Hanson, 'Fundamentals of Nanoelectronics', Pearson Education (2009)

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Learn the basics of microscopy's and applications

CO2: Knows the fundamentals of Quantum electronics

CO3: Understands the basics of Tunneling devices and SET's

CO4: Acquire the knowledge on limitations of IC's

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

(4G175)ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE I)

Course Objective:

1. The course focuses on processor design, pipelining, superscalar, out-of-order execution, caches (memory hierarchies), virtual memory, storage systems, and simulation techniques.
2. Advanced topics include a survey of parallel architectures and future directions in computer architecture.

UNIT I

PARALLEL COMPUTER MODELS: The state of computing-Multiprocessors and Multi computers- Multi vector and SIMD Computers-PRAM and VLSI Models- Architectural Development tracks.

Program and Networks Properties: - Conditions of Parallelism- Program Partitioning and Scheduling- Program Flow Mechanisms-System Interconnect Architectures.

PRINCIPLES OF SCALABLE PERFORMANCE:

Performance Metrics and Measures- Parallel Processing Applications-Speedup Performance Laws-Scalability Analysis and Approaches.

UNIT II

PROCESSORS AND MEMORY HIERARCHY: Advanced Processor Technology-Superscalar and Vector Processors- Memory Hierarchy Technology.

BUS, CACHE AND SHARED MEMORY: Bus Systems-Cache Memory Organizations-Shared-Memory Organizations.

PIPELINING AND SUPER SCALAR TECHNIQUES: Linear Pipeline Processors-Nonlinear Pipeline Processors-Instruction Pipeline Design-Arithmetic Pipeline Design.

UNIT III

MULTIPROCESSORS AND MULTICOMPUTERS:

Multiprocessor System Interconnects-Cache Coherence and Synchronization Mechanisms-Three Generations of Multicomputers –Message-Passing Mechanisms.

MULTIVECTOR AND SIMD COMPUTERS:

VectorProcessing Principles-MultivectorMultiProcessors-Compound Vector Processing-SIMD Computer Organizations-The Connection Machine CM-5.

UNIT IV

SCALABLE, MULTITHREADED, AND DATAFLOW ARCHITECTURES : Latency –Hiding Techniques-Principles of Multithreading-Fine-Grain Multicomputers -Scalable and Multithreaded Architectures- Dataflow and Hybrid Architectures.

UNIT-V

INSTRUCTION LEVEL PARALLELISM: Introduction-Basic Design Issues-Problem Definition-Model of a Typical Processor- Operand Forwarding-Reorder Buffer-Register Renaming-Tomasulo's Algorithm- Branch Prediction-Limitations in Exploiting Instruction Level Parallelism-Thread Level Parallelism.

TRENDS IN PARALLEL SYSTEMS: Brief Overview of Technology-Forms of Parallelism-Case Studies.

TEXT BOOK:

1. Kai Hwang &Jotwani, *Advanced Computer Architecture*. McGraw-Hill Publications, 2nd Ed.

REFERENCE BOOKS:

1. D.Sima, T.Fountain, P.Kacsuk,*Advanced Computer Architecture*. Pearson Education.
2. John L.Hennessy& David A. Patterson, Morgan Kufmann,*Computer Architecture A quantitative approach.* An Imprint of Elsevier, 3rd Ed.
3. Hwang and Briggs,*Computer Architecture and parallel processing*.

Course Outcomes:

CO.1. Student will be familiar with Different Parallel Computer models.

CO.2. Ability to apply Program and Network Properties in Parallel Computers.

CO.3. Student will be able to understand the advanced concepts of Parallel computer architecture.

CO.4. Student will be Investigating modern design structures of Pipelined and Multiprocessors systems.

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IV Year B.Tech. ECE-I Semester

(4G47A)OBJECT ORIENTED PROGRAMMING (ELECTIVE-II)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1.To Gain knowledge and experience with regard to Object Oriented Programming

2.To Identify and understand the concepts , packages, Multithreading and networking

UNIT I

OBJECT ORIENTED THINKING: History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, Review of control statements, type conversion and costing, simple java program,

classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT II

INHERITANCE: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

INTERFACES: differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Abstract Classes, Inner Classes.

PACKAGES: Predefined Java Packages, Defining, Creating and Accessing a User Defined Package, Understanding CLASSPATH, importing packages.

UNIT III

EXCEPTION HANDLING: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

MULTITHREADING Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT IV

NETWORKING: Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package

COLLECTIONS FRAMEWORK: Collection Interface: Queue, Collection class: LinkedList, Stack class, StringTokenizer, Date, Random, Scanner.

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT-V

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT: class hierarchy, component, container, panel, window, frame, canvas, graphics. Introduction to awt controls.

SWING: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing-JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables

TEXT BOOKS:

1. Herbert schildt .Java. The complete reference, TMH. 7th edition.

REFERENCE BOOKS:

1. J.Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John wiley&sons.

2. Y. Daniel Liang .Introduction to Java programming , pearson education. 6th edition
3. R.A.Johnson- Thomson.An introduction to Java programming and object oriented application development,
4. Cay.S.Horstmann and Gary,Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education. 7th edition,
5. .Cay.S.Horstmann and GaryCornell Core Java 2, Vol 2, Advanced Features, Pearson Education. 7th edition,
6. P. Radha Krishna, Object Oriented Programming through Java,University Press.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the concepts of Classes and Objects
CO2: Understand the concepts of Inheritance and Multithreading
CO3: Analyze the different packages and networking procedures
CO4: Understand the handling and swing concepts

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IV Year B.Tech. ECE-I Semester

(4G375) TELEVISION ENGINEERING

(ELECTIVE – II)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To study the evolution of television systems
2. To know the television display, storage devices

UNIT I: INTRODUCTION

Television Pictures: Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal: Horizontal and vertical sync, scanning sequence. Colour signal generation and Encoding: Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder.

Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas, Receiver Antennas.

UNIT II: TV CAMERAS AND PICTURE TUBES

Camera tube types, Vidicon, Silicon Diode Array Vidicon, Monochrome TV camera, color camera. CCD Image Sensors.

Monochromatic Picture tube, Electrostatic focussing, Beam deflection, picture tube characteristics and specifications, colour picture tubes. TV Standards: American 525 line B&W TV system, NTSC colour system, 625-line monochrome system, PAL colour system, TV standards.

UNIT III: MONOCHROME TV RECEIVER

RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits. PAL-D Colour Receiver: Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Colour Phasors, synchronous demodulators, Subcarrier generation, raster circuits, AFC.

UNIT IV: VISION IF SUBSYSTEM

AGC, noise cancellation, video and intercarrier sound signal detection, vision IF subsystem of Black and White receivers, Colour receiver IF subsystem. Receiver sound system: FM detection, FM Sound detectors, typical applications. TV Receiver Tuners: Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions.

UNIT V: COLOUR SIGNAL DECODING

PAL – D decoder, chroma signal amplifiers, separation of U and V signals, Color burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, RO phase shift and 180o PAL–SWITCH circuitry, U & V demodulators, Colour signal mixing. DIGITAL TV Digital Satellite TV, Direct to Home Satellite TV, Digital TV Receiver, Digital Terrestrial TV,EDTV,HDTV,LCD&Plasma screen TV, Projection TV.

TEXT BOOKS:

1. R.R. Gulati, *Modern Television Practice – Principles, Technology and Service*, New Age International Publication, 2002.

2. R.R. Gulati, *Monochrome and Colour TV*, New Age International Publication, 2002.

REFERENCES:

1. S.P. Bali, *Colour Television Theory and Practice*, TMH, 1994.
2. A.M. Dhake, Television and Video Engineering, 2nd Edition.
3. B. Grob and C.E. Herndon, *Basic Television and Video Systems*, McGraw Hill, 1999

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Be able to understand fundamentals and components of Television

CO2: Understand the working principles of cameras and tubes

CO3: Understand monochrome and colour television concepts

CO4: Know the latest TV technologies

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IV Year B.Tech. ECE-I Semester

(4G376)RELIABILITY ENGINEERING
(ELECTIVE – II)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand the concepts of reliability
2. To understand the design and availability of models

UNIT-I

INTROCUTION

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)
   Mark. A. Richards, 'Fundamentals of Radar Signal Procesing', TMH Edition (2005)

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the concepts of reliability and applications
CO2: know design principles and testing methods of models
CO3: Analyze the maintainability and availability of models

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IV Year B.Tech. ECE-I Semester

(4G379) MICROWAVE & OPTICAL COMMUNICATIONS LAB

Course Objective:

1. To analyse the characteristics of various microwave components using microwave test bench.
2. To enable the students to know about optical fiber communication and its applications.

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).

Course Outcome:*Upon the completion of course the students will be able*

CO.1. To understand applications and testing of microwave components.
CO.2. To understand the connections regarding various microwave components
CO.3. To acquire knowledge on the various applications of optical fiber communications

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IV Year B.Tech. ECE-I Semester

(4G37A)DSP AND EMBEDDED SYSTEMS LAB

Course Objectives:

1. To design real time DSP and Embedded systems .
2. To verify DSP algorithms using simulation tools.

I. DSP Processor: (Any six of the following)

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
    a) Using rectangular window
    b) Using triangular window
    c) Using Kaiser window
5. To Implement IIR filter (LP/HP) on DSP Processors.
6. N-point FFT algorithm.
7. MATLAB program to find frequency response of analog LP/HP filters.
8. To compute power density spectrum of a sequence.

II. Embedded Systems: (Any six of the following)

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

Course Outcomes: Upon the completion of course the student will be able to

CO.1. To design real time DSP and Embedded systems

CO.2. To understand the applications of DSP and Embedded systems through experimentations

CO.3. To implement DSP algorithms using simulation tools

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IV Year B.Tech. ECE-II Semester

(4G381) CELLULAR & MOBILE COMMUNICATIONS

COURSE OBJECTIVES:

The course aims to provide the student with the ability

1. To make the student explore in a cellular communication field
2. To understand concepts of Cellular Communications design and types of interferences

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:

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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand fundamentals of cellular system design, coverage and interference
CO2: Understand different types of non-co channel interference
CO3: Understand cell coverage in different traffic and their effects over different terrains
CO4: Acquire knowledge on numbering of radio channels, channel sharing and borrowing
CO5: Understand concept of handoffs &dropped calls

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IV Year B.Tech. ECE-II Semester

(4G382)DIGITAL IMAGE PROCESSING

COURSE OBJECTIVES: The course aims to provide the student with the ability

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

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 fiters

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 BOOK:

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.

REFERENCES :

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.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand how images are acquired, sampled, quantized and represented in digital form

CO2: Understand transform-domain representation of images (Fourier, Walsh etc.,) , how images are enhanced and segmented to improve perception

CO3: Have the knowledge to identify and apply the algorithms to compress and restore the images.

CO4: Analyse the images in different formats such as binary , grey shade and color with respect to different areas .

CO5: Design and formulate image processing methods with respect to real time problems

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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IV Year B.Tech. ECE-II Semester

(4G383) DSP PROCESSORS & ARCHITECTURES (ELECTIVE – III)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand of the programmable DSP processors and their applications.
2. To acquire the knowledge of terminology and concepts of architectures , implementation and algorithms of DSP processors

UNIT I-INTORODUCTION TO PRGRAMMABLE 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-OF 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.

REFERENCES:

1. Jonathan Stein, *Digital Signal Processing*, John Wiley, 2005.

Lapsley et al. S. Chand & Co, *DSP Processor Fundamentals, Architectures & Features*, 2000.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand concepts of programmable DSPs and their architectures
CO2: Have the knowledge to identify and apply the algorithms
CO3: Design and formulate the implementations of algorithms

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IV Year B.Tech. ECE-II Semester

(4G384) RADAR ENGINEERING

(ELECTIVE – III)

COURSE OBJECTIVES:

1. 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.
2. The emphasis is on physical principles, and on modern radar systems and signal processing techniques, for both civilian and defence applications

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, Transversal filters, Staggered PRFs. Range Gated Doppler Filters, MTI Radar Parameters, 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, 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 BOOKS:

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

REFERENCES:

1. Radar Principles – Peebles, Jr., P.Z.Wiley, NweYork, 1998.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the essential principles of operation of radar systems

CO2: To gain indepth knowledge about the different types of RADARS and their operations.

CO3: Identify the various RADAR systems in existence; specify their applications and limitations, and explain the principles of how they work.

CO4: Need for signal detection in RADAR and various detection techniques

CO5: Ability to know the various technologies used in the design of RADAR systems such as antennas, transmitters, duplexers, data display screens, etc.

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IV Year B.Tech. ECE-II Semester

(4G48A) NEURAL NETWORKS AND FUZZY LOGIC

(ELECTIVE – III)

COURSE OBJECTIVE:

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

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, Backpropogation 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 Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI

COURSE OUTCOMES:

On completion of this course, students should be able to

CO.1. Understand the basics of neural networks

CO.2. Use the different layers of neural networks in feed forward.

CO.3. Understand the major applications of neural networks and FUZZY technology.

CO.4. understand the different layers associate memories like BAM and BAM algorithms. Classification of FUZZY sets and FUZZY logic system components.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

IV Year B.Tech. ECE-II Semester

(4G385)WIRELESS COMMUNICATIONS & NETWORKS

(ELECTIVE – IV)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1.To Gain knowledge and experience with regard to wireless communication engineering including multiple access techniques.

2.To Identify and understand wireless communication network and their evaluation.

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, IECE 802 protocol Architecture, IECE802 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.

REFERENCES:

1. Wireless Digital Communications – KamiloFeher, PHI, 1999.

2. Principles of Wireless Networks – KavehPahLaven and P. Krishna Murthy, Pearson Education, 2002.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the effective bandwidth utilization to accommodate large number of mobile users by using various accessing techniques
CO2: Analyze networking considerations, practical networking approaches with mobile data services.
CO3: Analyze the protocols used in wireless LAN technologies.
CO4: be able to identify mobile data and advanced wireless networks and their applications in real time.

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IV Year B.Tech. ECE-II Semester

(4G386)SATELLITE COMMUNICATIONS

(ELECTIVE – IV)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1. To understand concepts of Satellite Engineering and applications
2. To design basic Satellite links

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.

REFERENCES:

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.

COURSE OUTCOMES:

Upon the completion of course the students will

CO1: understand the operating principles of major characteristics of satellites
CO2: apply this knowledge to the analysis and design of basic sateliite links
CO3: learn the satellite navigation and global positioning system

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

IV Year B.Tech. ECE-II Semester

(4G387)BIO-MEDICAL INSTRUMENTATION
(ELECTIVE – IV)

COURSE OBJECTIVES: The course aims to provide the student with the ability

1.To Gain knowledge and experience with regard to medical instruments and applications

2.To Identify and understand the different Instruments and medical imaging systems

UNIT-I: INTRODUCTION

Physiological system of the body, Bio signals, Need for Bio-Instrumentation, Medical instrumentation system and its components- Bio-Amplifier, Characteristics of medical instruments, Problems encountered in measuring a living system.

Organization of Cell, Sources of Bio electric potentials – Resting & Action potentials, Derivation for Nernst equation for resting potential, Propagation of action potentials, Various Bio electric potentials and their waveforms – ECG, EEG, EMG.

UNIT-II: BIO ELECTRODES

Bio-potential electrodes – Micro electrodes, Skin surface electrodes, Needle electrodes, Reference electrodes, pH electrodes, Blood gas electrodes and Specific ion electrodes.

Electrical conduction system & mechanical function of heart, Cardiac cycle, Cardiac excitation and control, Relation between electrical & mechanical activities of the heart.

UNIT-III: CARDIAC INSTRUMENTATION

Blood pressure & blood flow measurement, ECG machine, Einthoven triangle, 12-lead configuration, Analysis & interpretation of ECG waveform, Pace maker, Defibrillator and Hemodialysis machine.

UNIT-IV: NEURO MUSCULAR INSTRUMENTATION

Specifications of EEG & EMG machines, Electrode placement for EEG & EMG recording and Interpretation of EEG & EMG signals.

RESPIRATORY INSTUMENTATION

The physiology of the respiratory system, Instrumentation for measuring the mechanics of breathing – Spirometry, Pnemuotachograph, Ventilators. Gas exchange and distribution.

UNIT-V: PATIENT SAFETY & MEDICAL IMAGING SYSTEM

Electric shock hazards, leakage currents, Precautions to minimize electric shock hazards, the elements of Intensive-Care-Monitoring and other instruments for monitoring patients.

Medical imaging systems – Ultrasonic imaging system, X-Ray instruments (CT), Magnetic Resonance Imaging and Nuclear Medical Imaging.

TEXT BOOKS:

1. Leslie Cromwell and F.J Weibell, E.A Pfeiffer, *Biomedical instrumentation and Measurements,* PHI, 2nd Ed, 1980
2. R S Khandpur, *Hand book of Biomedical instrumentation*, TMH, 2nd Ed., 2003
3. R.Anandanatarajan, *Biomedical Instrumentation and Measurements*, PHI.

REFERENCES:

1. John G.Webster, John Wiley, *Medical instrumentation*, Application and Design, 3rd Ed., 1998
2. L.A. Goddes and L.E. Basker, *Principles of Applied Biomedical Instrumentation*, John Wiley, 1975.

COURSE OUTCOMES: *Upon completion of the course, students will*

CO1: Understand the effective utilization of Bio-Instrumentation and its necessity

CO2: Analyze various technologies used in medical instrumentation

CO3: Analyze the different medical imaging systems and their respective applications in real time.