ELECTRONICS AND COMMUNICATION ENGINEERING

I SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AHE1101	English	4	0	0	4
ABM1101	Mathematics-I	4	1	0	4
ABP1101	Physics	4	1	0	4
ABC1101	Chemistry	4	1	0	4
AEE1101	Basic Network Analysis	4	1	0	4
AHE1102	*English Language Lab*	0	0	3	2
AMT1101	*Engineering Workshop*	0	0	3	2
ABP1102	*Physics and Chemistry Lab*	0	0	3	2
	Total	**20**	**4**	**9**	**26**

II SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ABM1102	Mathematics -II	4	1	0	4
AME1103	Engineering Mechanics	4	1	0	4
ABE1101	Environmental Studies	4	0	0	4
ACT1102	Computer Programming through C	4	1	0	4
AEC1101	Electronic Devices	4	1	0	4
AEC1102	*Electronic Devices Lab*	0	0	3	2
ACT1103	*Computer Programming Lab*	0	0	3	2
AME1102	*Engineering Drawing*	0	0	3	2
	Total	**20**	**4**	**9**	**26**

III SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ABM1104	Mathematics –III	4	0	0	4
AEC1103	Electronic Circuits	4	1	0	4
AEC1104	Signals & Systems	4	1	0	4
AEE1137	Electrical Technology	4	1	0	4
AEC1105	Pulse & Digital Circuits	4	1	0	4
AEC1106	Switching Theory and Logic Design	4	1	0	4
AEC1107	*Electronic Circuits Lab*	0	0	3	2
AEE1138	*Electrical Technology Lab*	0	0	3	2
	Total	**24**	**5**	**6**	**28**

IV SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ABM1107	Mathematics –IV	4	0	0	4
AEC1108	Digital IC Applications	4	1	0	4
AEC1109	Analog Communications	4	1	0	4
AEC1110	Linear IC Applications	4	1	0	4
ACT1104	Computer Organization	4	1	0	4
AEC1111	EM Waves and Transmission Lines	4	1	0	4
AEC1112	*IC and PDC Lab*	0	0	3	2
AEC1113	*Analog Communications Lab*	0	0	3	2
	Total	**24**	**5**	**6**	**28**

V SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AEE1109	Control Systems	4	0	0	4
AEE1106	Network Analysis & Synthesis	4	1	0	4
AEC1114	Digital Communications	4	1	0	4
AEC1115	Microprocessors and Interfacing	4	1	0	4
AEC1116	Antennas and Wave Propagation	4	1	0	4
AEC1117	VLSI Design	4	1	0	4
AEC1118	VLSI Design Lab	0	0	3	2
AEC1119	Digital Communications Lab	0	0	3	2
	Total	**24**	**5**	**6**	**28**

VI SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AHM1101	Managerial Economics & Financial Analysis	4	0	0	4
AEC1120	Telecommn.Switching Sys. & Networks	4	1	0	4
AEC1121	Microcontrollers and Applications	4	1	0	4
AEC1122	Microwave Engineering	4	1	0	4
AEC1123	Digital Signal Processing	4	1	0	4
AEC1124	Elec. Measurements & Instrumentation	4	1	0	4
AEC1125	Microprocessors & Microcontrollers Lab	0	0	3	2
AHE1103	Advanced Communication skills Lab	0	0	3	2
	Total	**24**	**5**	**6**	**28**

VII SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AHM1102	Management Science	4	0	0	4
AEC1126	Radar Engineering	4	1	0	4
AEC1127	Data Communications	4	1	0	4
AEC1128	Optical Communications	4	1	0	4
	Elective-I	4	1	0	4
AEC1129	Digital Image Processing				
AEC1130	Bio Medical Instrumentation				
AEC1131	Robotics				
AIT1114	Data structures for Engineering Applications				
AEE1142	Design Concepts for Engineers				
	Elective-II	4	1	0	4
AEC1132	Satellite Communication				
AEC1133	EMI/EMC				
ACT1108	Operating Systems				
ACS1114	Software Development Engineering				

AEE1125	Reliability Evaluation of Engineering Systems				
AEC1134	Microwave & Optical Communication Lab	0	0	3	2
AEC1135	Digital Signal Processing Lab	0	0	3	2
AEC11MP	Industry Oriented Mini-Project	-	-	-	2
	Total	**24**	**5**	**6**	**30**

VIII SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AEC1136	Computer Networks	4	1	0	4
	Elective-III	4	1	0	4
AEC1137	Digital Design through Verilog				
AEC1138	Embedded Systems				
AEC1139	Industrial Electronics				
	Elective-IV	4	1	0	4
AEC1140	DSP Processors and Architecture				
AEC1141	Wireless Communications				
AEE1112	Power Electronics				
AEC1142	Process Control and Automation				
AEC11SM	Seminar				
AEC11CV	Comprehensive viva	-	-	-	4
AEC11PW	Project work	0	0	9	12
	Total	**12**	**3**	**12**	**30**

SYLLABI FOR I SEMESTER

ENGLISH

Course Code : AHE1101

L	T	P	C
4	0	0	4

Reading and Writing skills

OBJECTIVES :

The primary objective of the course is to help students of engineering to achieve a sound foundation in communicational skills, basic grammar and vocabulary. It also enables them to become successful communicators in academic, professional and social areas of life.

The course aims to enable the students to use English effectively for the purpose of

- Understanding class room lectures in different subjects
- Reading technical and general materials
- Effective written communication in professional contexts

OUTCOMES :

- The learners develop adequate skills in skimming, scanning, intensive and extensive reading
- The learners also develop enough vocabulary to be clearly expressive in any group - Professional or Managerial or Social
- The learners can correspond and communicate in descriptive, analytical modes with ease.

COURSE WORK :

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles from newspapers, technical journals, magazines, industry materials etc. in classes and laboratory. Students will be given individual and holistic practice in LSRW skills.

Contents :

Reading :

- Reading with a purpose; Reading for understanding; skimming, scanning etc;
- Reading and interpreting charts and diagrams
- Vocabulary, synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes etc.

Writing :

- common errors, articles, prepositions, tenses, concord, phrasal verbs, modals, conditionals etc. (Remedial Grammar)
- Practice of writing- definition, description
- Paragraph writing with coherence, cohesiveness and clarity
- Essay, report and précis writing

Reference skills **:** Use of dictionary, thesaurus, library and internet materials.

UNIT - I

1. Around the House *(Language in Use)*
2. Education on Education *(English for Engineers)*

UNIT - II

1. On Holiday *(Language in Use)*
2. Vocabulary- synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes etc.

UNIT - III

1. Imagining *(Language in Use)*
2. Tenses & Concord, Articles & Prepositions

UNIT - IV

1. New Information Technology and Poverty Eradication (English for Engineers)
2. The media (Language in Use)

UNIT - V

1. What we must Learn from the West *(English for Engineers)*
2. Paragraph writing, Note-making and Minute writing

UNIT - VI

1. Essay writing
2. Value added Life *(English for Engineers)*

UNIT - VII

1. Breaking the Law *(Language in Use)*
2. Key item *(English for Engineers)*

UNIT - VIII

1. Letter and Précis writing
2. Dialogue writing

TEXT BOOKS :

1. "Language in Use(Intermediate)", Cambridge University Press India Pvt. Ltd.- Reprint-2008.
2. "English for Engineers", Regional Institute of English, Bangalore, Foundation Books Pvt. Ltd, 2006.

REFERENCES :

1. Eric H. Glendinning & Beverly Holmstorm,"Study reading- A course in Reading Skills for Academic Purposes"-CUP , 2004.
2. Liz Hamp Lyons, Ben Heasley, "Study writing", CUP, 2004.
3. Norman Lewis, "Word Power Made Easy", Lotus Press, 2006.
4. Michael Swan, "Practical English Usage", Oxford University Press, 3rd Edition, 2005.
5. Murphy "Murphy's English Grammar", CUP, 3rd Edition, 2004.

SUGGESTED READING : Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS – I

(Common to all Branches)

Course Code : ABM1101

L	T	P	C
4	1	0	4

AIM :

To impart the necessary fundamental principles that are essential to study the core courses of Engineering.

OBJECTIVE :

To motivate and inculcate the logical thinking and methodical approach to solve mathematical problems

UNIT - I

Sequences – Series – Convergence and divergence – Comparison test – Ratio test –Integral test –Alternating series, Leibniz's test
(9.1 to 9.9, 9.12).

Rolle 's theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem –Taylor's theorem and Maclaurin's series (all theorems without proof)
(4.3, 4.4).

UNIT - II

Differential equations of first order (linear, Bernoulli), Linear differential equations with constant coefficients, Method of Variation of parameters .
(11.9, 11.10, 13.1, 13.3-13.8(i), 13.9)

UNIT - III

Applications of Linear differential equations: orthogonal trajectories, Newton's law of cooling, Simple harmonic motion, Oscillatory electrical circuits (LC and LCR circuits).
(12.3, 12.6, 14.2, 14.5)

UNIT - IV

Laplace transform of elementary functions, properties, Transforms of derivatives and integrals – Unit step function – second shifting theorem, Periodic function.

(21.1-21.5, 21.7-21.11)

UNIT - V

Inverse transform –- Inverse transform of Derivatives and Integrals - Convolution theorem – Application of Laplace transforms to ordinary differential equations, Unit step function, Unit impulse function.

(21.12-21.15, 21.17, 21.18)

UNIT - VI

Partial differentiation: Total derivative, change of variables, Jacobians, Taylor's theorem for functions of two variables, maxima and minima of functions of two variables.

(5.5 – 5.9, 5.11)

UNIT - VII

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

(17.1 to 17.3, 17.5, 17.6)

UNIT - VIII

Method of separation of variables – Classification of second order linear Partial Differential Equations, solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions.

(18.1 to 18.7)

TEXT BOOK :

Dr.B.S.Grewal, "Higher Engineering Mathematics", 40th Edition, Khanna Publishers.

REFERENCES :

1. Kreyszig E, "Advanced Engineering Mathematics", 8th Ed. John Wiley, Singapore, 2001.
2. Greenberg M D, "Advanced Engineering Mathematics", 2nd Ed, Pearson Education, Singapore, Indian Print, 2003.

PHYSICS

Course Code : ABP1101

L	T	P	C
4	1	0	4

AIM :

To give prerequisites in understanding the advanced Physics leading to applications in engineering field.

OBJECTIVE :

To impart the students the concept and principles in Engineering to enable them to comprehend and take up the experimental work independently.

UNIT - I

VIBRATIONS & ACOUSTICS OF BUILDINGS :

i) Overview of vibrations with emphasis on damped and forced oscillations- resonance, coupled oscillators - two coupled pendulums and normal mode solutions.

(Engineering Physics - Gaur & Gupta Chap - 33, and Unified Physics, Vol-1, S L Gupta & Sanjeev Gupta, Chap-11 (coupled oscillators)

ii) Reverberation and Reverberation time – Sabine's formula for reverberation time – measurement of absorption coefficient of material- Basic requirements of acoustically good hall -Factors affecting the architectural acoustics and their remedies.

(Engineering Physics - Gaur & Gupta Chap - 14)

UNIT – II

PHYSICAL OPTICS :

INTERFERENCE: Superposition of waves, Young's double slit experiment, Interference in thin films by reflection, Newton's rings experiment with necessary theory.

DIFFRACTION: Fresnel and Fraunhoffer diffraction, Diffraction at single slit and diffraction grating, determination of wavelengths of various spectral lines, resolving power of grating.

Polarization: Types of Polarizations, Brewster's law, Double refraction, Nicol Prism, Polaroid's.

(Engineering Physics - Gaur & Gupta Chap - 26, 27, 28 & 29)

UNIT – III

CRYSTAL PHYSICS & SUPERCONDUCTIVITY :

i) Crystal Physics : Space lattice, basis and crystal structure, Unit cell, primitive cell, Seven crystal systems, Bravais lattices- SC, BCC, FCC crystal structures- crystal planes and Directions- Miller indices, Derivation of inter planar spacing.

(Applied Physics for Engineers - P K Palanisamy Chap - 2)

ii) Superconductivity: superconducting phenomenon, Meissner effect, Type I & Type II Super conductors, BCS theory, DC and AC Josephson effects, SQUIDS, High Temperature Super conductors- Applications.

(Applied Physics for Engineers - P K Palanisamy Chap - 9)

UNIT – IV

QUANTUM MECHANICS : Dual nature of matter, DeBroglie wave length, Time independent Schrödinger wave equation, Physical significance of wave function, particle in a potential well, rigid and non rigid walls, Tunneling effect

(Applied Physics for Engineers - P K Palanisamy Chap - 3)

UNIT – V

FREE ELECTRON THEORY : Introduction, Quantum free electron theory, Fermi-Dirac distribution and its dependence on temperature, Fermi energy, Electron scattering and resistance, motion of an electron in periodic potential, Kronig-Penney model (qualitative treatment), effective mass; classification of solids.

(Applied Physics for Engineers - P K Palanisamy Chap - 4 & 5)

UNIT – VI

DIELECTRICS : Basic definitions, relation between **P,D** and **E** vectors, Polarization mechanisms, expression for electronic polarizability, Internal fields in solids, Claussius-Mosotti equation, frequency and temperature

dependence of electronic polarization, Dielectric strength, Dielectric loss, Loss tangent and Dielectric breakdown, Applications.
(Applied Physics for Engineers - P K Palanisamy Chap - 6)

UNIT – VII

LASERS AND FIBER OPTICS :

i) Introduction, Characteristics of lasers, Induced absorption, spontaneous and stimulated emission of radiation, Population Inversion, Einstein's coefficients, Low and high power Lasers, Ruby laser, He-Ne laser, CO_2 and semiconductor laser, Applications of lasers.

(Applied Physics for Engineers - P K Palanisamy Chap - 10)

ii) Basic principle of propagation of light in optical fibers, Numerical aperture, acceptance angle, Derivation of Numerical aperture, Classification of optical fibers on the basis of refractive index profile, Fiber optic communication system, Applications.

(Applied Physics for Engineers - P K Palanisamy Chap - 2)

UNIT – VIII

FUNCTIONAL MATERIALS :

i) Bio materials, SMART materials, metallic glasses, metal matrix composites, Electrets – piezo and ferro electric matrerials.

(Engineering Physics by V Rajendran, Chap - 21, 24, 25, materials Science - M Armugam - Metal Matrix composites and Electrets, SMART Materials chap -11)

ii) Nanophase materials: Introduction to nano materials, types of nano materials, Fabrication Techniques: ball milling, nano lithography, CVD, carbon nano tubes (CNT's), Applications.

(Engineering Physics M R Sirnivasn, Chap - 15)

TEXT BOOKS :

1. R.K. Gaur and S.L.Gupta, "Engineering Physics", 8th Edition, Dhanpaat Rai, 2003.
2. P.K. Palanisamy, "Applied Physics", 2nd Edition, Scitech Publishers, 2010.

3. M.R. Srinivasan, "Engineering Physics", 1st Edition, New Age Publishers, 2009.
4. V. Rajendran, "Engineering Physics", TMH, 2009.

REFERENCES :

1. C.Kittel, "Introduction to Solid State Physics", 7th Edition, John Wiley, 2007.
2. M Ross, Lowrence, Shepard, J Wulff, "Structure and Properties of Materials", (Volume-4, Electronic properties), Wiley East Publishers, 2004.
3. Avadhanulu & Kshirasagar, "Engineering Physics", 9th Edition, S. Chand Publishers, 2008.
4. S.O. Pillai, "Solid State Physics", New Age Publishers, 2004.
5. Sulabh. K. Kulkarni, "Nano Technology - Principles and Practices", 2006.
6. V.Raghavan, "Material Science", 5th Edition, PHI, 2007.
7. R.L.Singhal, "Solid State Physics", 6th Edition, Kedarnadh, Ramnadh Publishers, 2003.
8. A. Beiser., "Perspectives in Modern Physics", 5th Edition, McGraw Hill Publishers, 2006.
9. A.J. Dekker, "Electrical Engineering materials", 1st Edition, Mac Millan, 2007.
10. M. Armugam, "Material Science",3rd Edition, Anuradha Publishers, 2009.
11. S.L. Gupta, & Sanjeev Gupta, "Unified Physics", Vol - 1, 16th Edition, Jaiprakash Nath & Co., 2007.

CHEMISTRY

Course Code : ABC1101

L	T	P	C
4	1	0	4

AIM :

The aim of the course is to provide basic chemistry background required for under graduate students of engineering.

OBJECTIVE :

The Objective of the course is to provide an over view of chemical properties of materials which the engineers are likely to use during their professional careers.

UNIT - I

ELECTROMOTIVE FORCE : Electrode potential, Nernest equation, EMF of electro chemical cell, calculation of cell potential, concentration cell, determination of P^H of solution.

BATTERIES - primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery.and lithium ion battery.

Fuel cells - hydrogen, oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells.

UNIT - II

CORROSION AND ITS CONTROL : Introduction-Dry or chemical corrosion, Wet or Electrochemical corrosion-Hydrogen evolution type, oxygen absorption type, Galvanic corrosion and concentration cell corrosion, pitting ,waterline, and stress corrosion; passivity; Galvanic series; factors influencing corrosion. Corrosion control-proper designing, cathodic protection, modifying the environment and using inhibitors. Protective coatings- anodic and cathodic coatings; Hot dipping-Galvanizing and Tinning, Metal cladding; Electroplating; Electro less plating; cementation or diffusion coatings.

UNIT - III

CHEMICAL KINETICS : Arrhenius theory-effect of temperature on reaction rates –concept of activated complex; collision theory of reaction rates; Lindeman's theory of unimolecular reactions, steady state approximation; Transition state theory.

UNIT - IV

BONDING IN COORDINATION COMPOUNDS : Valence bond theory- limitations, crystal field theory, ligand field theory- octahedral and tetrahedral complexes. Spectral properties of d^1 ions & magnetic properties of low spin and high spin complexes.Molecular orbital theory as applied to octahedral complexes not involving pi-bonding.

UNIT - V

PRINCIPLES AND MECHANISMS OF ORGANIC REACTIONS

Bond fission – homolysis and heterolysis-examples. Types of reagents-electrophilic and nucleophilic reagents -examples. Concept of aromaticity, Huckel's (4n+2) rule. Introduction to mechanistic aspect of electrophilic aromatic substitution- nitration, sulphonation. Friedel-Crafts alkylation and acylation.

UNIT - VI

POLYMER SCIENCE AND TECHNOLOGY : Nomenclature; Types of polymerization, Mechanism of addition and condensation polymerization, Effect of polymer structure on properties. Plastics- Thermo and thermosetting plastics, constituents of a plastic. Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, bakelite and silicones.

RUBBER - Natural rubber-structure-vulcanization, compounding of rubber; synthetic rubbers-Buna-Sand Buna-N.

UNIT - VII

SEMI CONDUCTING MATERIALS : Band theory of solids, Types-Intrinsic, extrinsic,(n-type, p-type,) non-elemental semi conducting materials- stoichiometric semi conducting compounds, defect semiconductors, controlled valency semiconductors. Preparation of semiconductors- Zone refining, Czochralski crystal pulling technique, Doping technique.

UNIT - VIII

CHEMISTRY OF ENGINEERING MATERIALS

Cement - classification; Portland cement- raw materials, manufacture of Portland cement, chemical constititution of Portland cement, setting and hardening of Portland cement.

REFRACTORIES - Classification and properties of refractories

FUELS - classification; calorific value and its determination using Bomb and Junker's gas calorimeter, theoretical calculation of calorific value-Proximate and ultimate analysis of coal; Refining of petroleum-, catalytic cracking; catalytic reforming, knocking, octane rating, improvement in anti knock characteristics, unleaded petrol; diesel engine fuels, cetane value

LUBRICANTS - Friction- mechanism of lubrication-Fluid film lubrication; thin or boundary lubrication and extreme pressure lubrication, classification-Lubricating oils, greases and solid lubricants.

TEXT BOOKS :

1. Jain& Jain, "A text book of Engineering Chemistry", Dhanapat Roy publishing company, 15th Edition, 2006.
2. Shiva Shankar, "Engineering Chemistry", Tata Mc Graw Hill, 2008.

REFERENCES :

1. Sashi chawala, "Engineering Chemistry", Dhanpath Rai Publications, 3rd Edition, 2010.
2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, "A Text Book of Engineering Chemistry", B.S. Publications, 1st Edition, 2006.
3. J.D.Lee, "Concise inorganic Chemistry", Black Well Science Publications, 5th Edition, 2005.
4. Arun Bahl & B.S.Bahl, "Advanced Organic Chemistry", S.Chand Publications, 2010.
5. Gurudeep Raj, "Physical Chemistry", Goel Publications, 3rd Edition, 2007.
6. S.S. Dara, "Text book of Engineering Chemistry", S. Chand Publications, 11th Edition, 2006.

BASIC NETWORK ANALYSIS

Course Code : AEE1101

L	T	P	C
4	1	0	4

AIM :

The aim of the course is to teach Principles of Electrical Network Analysis.

OBJECTIVES :

Network Analysis is a basic foundation course for the disciplines EEE and ECE .Hence this is introduced in I-Year –I Sem so that the students feel comfortable with various other Electrical and Electronics Courses they come across.

UNIT - I

Network elements , Active & passive elements, Volt- Ampere – Power relation in R,L,C with basic laws , Constant Flux linkage & Constant Charge theorems , Mutual Inductance and Dot Convention, Source Transformation.

UNIT - II

D-C Resistive Circuit Analysis, Branch variables, solving by direct application KCL & KCL, Mesh (loop)Analysis, Nodal Analysis, Super Mesh and Super Node, Star – Delta Transformation.

UNIT - III

Transient in R-L, R-C & RLC circuit with DC Excitation, using differential equations.
Concept of steady state.

UNIT - IV

Sinusoidal steady state: Effective value of an alternative current /voltage excitation to inductance and capacitance. Inductive and Capacitive reactances, Average Power, Phasor representation.

UNIT - V

RL , RC and RLC – Series , parallel and series parallel circuits, average power and power factor , Impedance , complex impedance , complex power , real and reactor powers, Response of RLC Networks to harmonic excitation, Locus diagrams.

UNIT - VI

Resonance in RLC Circuits: Series resonance, parallel resonance, bandwidth & quality factor. Implications with voltage and current excitation.

UNIT - VII

Three phase circuit analysis: 3 –phase sources & loads (balanced & unbalanced) 3-phase, 4 -wire and 3 phase 3-wire systems. Analysis of balanced and unbalanced circuits, 3-phase power.

UNIT - VIII

Network Theorems (with proofs) : Linearity and superposition, superposition theorem , reciprocity theorem , Thevenin and Norton theorem, compensation theorem, Millmann Theorem.

TEXT BOOK :

N.C.Jagan and C. Lakshmi Narayana, "Network Analysis", 2nd Edition B.S.Publications (From relevant chapters.), 2008.

REFERENCES :

1. M.E Van Valkenburg , "Network Analysis", Prentice Hall of India, PVT Ltd, New Delhi, 3rd Edition, 1994.
2. Hayt and Kemmerly, "Circuit Analysis", 6th Edition, TMH, 2003.

ENGLISH LANGUAGE LAB

Course Code: AHE1102

L	T	P	C
0	0	3	2

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

Objectives :

- To make students recognise the sounds of English through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while speaking in English and to build their confidence. *The focus shall be on fluency rather than accuracy.*
- To enable them to speak English correctly with focus on stress and intonation.

Syllabus :

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

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore/Speaking personally
5. 'Just A Minute' Sessions (JAM).
6. Describing things / Narration
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Suggested Software :

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library
- Clarity Pronunciation Power
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- 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
- Murphy's English Grammar, Cambridge with CD

References :

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. Daniel Jones, "English Pronouncing Dictionary", Current Edition with CD.
3. R. K. Bansal and J. B. Harrison, "Spoken English", Orient Longman 2006.
4. J. Sethi, Kamlesh Sadanand & D.V. Jindal, "A Practical course in English Pronunciation, (with two Audio cassettes)", Prentice-Hall of India Pvt. Ltd., New Delhi.
5. T.Balasubramanian (Macmillan), "A text book of English Phonetics for Indian Students", 18th Reprint, 2005.
6. English Skills for Technical Students**,** WBSCTE with British Council, OL

ENGINEERING WORKSHOP

Course Code : AMT1101

L	T	P	C
0	0	3	2

Aim : To provide hands on experience on basic Engineering and IT related skills.

Objectives :

* To train the student in the basics of computer components, maintenance, software(s) installation and office tools.
* To demonstrate and train the students in basic professional trades.

Compulsory Exercises :

- Identification of the peripherals of a computer, components in a CPU and its functions - Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.
- Installation of MS windows on the personal computer.
- One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp

Any Nine Exercises From The Following :

- **Carpentry**: Making a Cross-half lap joint using wooden pieces
- **Carpentry**: Making a Mortise and Tenon joint using wooden pieces
- **Fitting**: Preparation of a V-fit between mild steel flat pieces
- **Fitting**: Preparation of a Square-fit between mild steel flat pieces
- **Foundry**: Preparation of a sand mould using a single piece pattern
- **Foundry**: Preparation of a sand mould using a split piece pattern

- **Tin-Smithy**: Preparation of a sheet metal pipe-joint using tin-smithy tools
- **Tin-Smithy**: Preparation of a sheet metal funnel using tin-smithy tools
- **Welding**: Making a Lap joint through arc welding
- **Lathe Machine**: Demonstration of turning related activities on Lathe machine
- **Black smithy**: Demonstration of Black smithy trade
- **Plumbing**: Demonstration of Plumbing trade
- **Installation of Linux** on the computer wherein the windows was installed. The system should be configured as dual boot with both windows and Linux.
- **Hardware Troubleshooting :** Identification of the problem of a PC which does not boot (due to improper assembly or defective peripherals) and fixing it to get the computer back to working condition.
- **Software Troubleshooting :** Identification of the problem of a malfunctioning CPU (due to some system software problems) and fixing it to get the computer back to working condition.
- **Connectivity Boot Camp : C**onnectivity to the Local Area Network and accessibility to the Internet. TCP / IP setting.
- **Web Browsers, Surfing the Web : C**ustomization the web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
- **Using LaTeX and / word : C**reation of project certificate. Exposure to features like:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and / Word.
- **Creating project abstract :** Features to be covered are: Formatting Styles, Inserting table, Bullets and Numbering,

Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

- **Creating a Newsletter** : Features to be covered are : Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs
- **Creating a Feedback form** - Features to be covered are: Forms, Text Fields, Inserting objects, Mail Merge in Word.
- **Excel Orientation : Introduction of** Excel as a Spreadsheet tool, Using Excel –Accessing, overview of toolbars, saving excel files, Using help and resources
- **Creating a Scheduler -** Features to be covered are: Gridlines, Format Cells, Summation, auto fill, Formatting Text
- **Calculating GPA** - Features to be covered:- Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP
- **Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting
- **Power point presentation**
- Exposure to basic power point utilities and tools (PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts) .to create basic power point presentation.

PHYSICS AND CHEMISTRY LAB

Course Code : ABP1102

L	T	P	C
0	0	3	2

AIM :

To give prerequisites to understand the advanced Physics & Chemistry leading to applications in engineering field.

OBJECTIVES :

Training the students to understand the principles and concepts helpful in performing experiments in laboratory classes individually. To mould them to solve any technical problem in general.

LIST OF PHYSICS EXPERIMENTS

Any **SIX** of the following experiments are to be performed during the semester

01. Determination of rigidity modulus of the material of a given wire– Torsional pendulum
02. Verification of laws of vibration of stretched string - Sonometer
03. Determination of radius of curvature of a given convex lens - Newton's rings
04. Determination of wavelength of spectral lines of a mercury spectrum - Diffraction grating
05. Study of frequency response of LCR series and parallel resonant circuits
06. Study of variation of magnetic field along a circular current carrying conductor – Stewart & Gee apparatus
07. Determination of Hall coefficient and carrier concentration - Hall effect

08. Study of I-V characteristics of a solar cell
09. Optical Fibers – Determination of numerical aperture and losses in fibers
10. Measurement of dielectric constant of material by Waveguide method

LIST OF CHEMISTRY EXPERIMENTS

Any **SIX** of the following experiments are to be performed during the semester.

1. Preparation of standard potassium dichromate and determination of ferrous iron.
2. Determination of hardness of water by EDTA method.
3. Determination of dissolved oxygen in water.
4. Determination of chlorides in water.
5. Determination of iron-II by potentiometric method.
6. Determination of viscosity of lubricant by viscometer.
7. Determination of flash and fire points of oils.
8. Determination of percentage residue of carbon in oils.
9. Determination of calorific value of solid fuels.
10. Colorometric determination of iron in cement.

REFERENCES :

1. J.Mendham Et.al., "Vogel's text book of Quantitative Chemical Analysis", 6th Edn. Pearson Education.
2. Dr. K. B. Chandrasekhar, "Chemistry practical lab manual".
3. K.Sudha Rani, "Laboratory Manual on Engineering Chemistry"

SYLLABI FOR II SEMESTER

MATHEMATICS – II

(Common to all Branches)

Course Code : ABM1102

L	T	P	C
4	1	0	4

AIM :

To impart the necessary fundamental principles that are essential to study the core courses of Engineering

OBJECTIVE :

To motivate and inculcate the logical thinking and methodical approach to solve mathematical problems

UNIT - I

Matrices: Rank – Normal form - Echelon form – Consistency – Solution of system of simultaneous linear homogeneous and non-homogeneous equations.(Gauss Jordan)

(2.8, 2.11)

UNIT - II

Eigen values, Eigen vectors – properties – Cayley-Hamilton Theorem (only statement) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalisation of matrix. (2.14-2.17)

UNIT - III

Quadratic forms - Linear Transformation - Orthogonal Transformation. Reduction of quadratic form to canonical form, Nature of the quadratic form.

(2.12, 2.18 , 2.19).

UNIT - IV

Double and triple integrals, Change of order, change of variables

(7.1 – 7.3 , 7.5, 7.7).

UNIT - V

Vector Differentiation**:** Differentiation of vectors, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

(8.1, 8.4 – 8.8)

UNIT - VI

Vector Integration - Line integral – -Circulation-work done - surface and volume integrals Vector integral theorems: Green's theorem- Stoke's and Gauss's Divergence Theorem (Without proof). Verification of Green's - Stoke's and Gauss's Theorems. (8.10 – 8.17)

UNIT - VII

Fourier series: Euler's formulae, Conditions for Fourier expansion, Change of interval, even and odd functions, half range series.

(10.1 – 10.7)

UNIT - VIII

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – Finite Fourier transforms.

(22.1 – 22.4)

TEXT BOOK :

1. Dr.B.S.Grewal "Higher Engineering Mathematics", 40th Edition, Khanna Publishers

REFERENCES :

1. Kreyszig E, "Advanced Engineering Mathematics", 8th Edn. John Wiley, Singapore (2001)
2. Greenberg M D, "Advanced Engineering Mathematics", 2nd Edn, Pearson Education, Singapore, Indian Print (2003).

ENGINEERING MECHANICS

Course Code : AME1103

L	T	P	C
4	1	0	4

AIM & OBJECTIVES :

1. To develop logical thinking approach to engineering problems.
2. Calculation and estimation of fourses developed in various engineering structures.

UNIT - I

SYSTEMS OF FORCES : Introduction – parallelogram law – Forces and components - Resultant of coplanar concurrent forces - component forces in space - vector notation – moment of force – principle of moments – couples. Resultant of planar force systems and spatial concurrent force system.

UNIT - II

EQUILIBRIUM OF FORCE SYSTEMS : Equilibrium – free body diagrams – Equations of equilibrium – equilibrium of planar systems – graphical methods and analytical methods for equilibrium of planar systems – equilibrium of spatial concurrent force systems.

UNIT - III

FRICTION: Introduction – Theory of friction – Angle of friction – Laws of friction - static friction – Kinetic friction-friction in bodies moving up or down on an inclined plane-screw friction and screw jack.

UNIT - IV

CENTROIDS AND CENTERS OF GRAVITY : Centre of gravity – centroids of area and lines – determination of centroids by integration – centroids of composite figures – theorems of Pappus.

UNIT - V

AREA MOMENT OF INERTIA : Moment of inertia – polar moment of Inertia – Radius of gyration - Transfer theorem for moment of Inertia – Moment of inertia of composite areas – product of inertia – Transfer formula for product of Inertia.

MASS MOMENT OF INERTIA : Moment of inertia of masses – Radius of gyration – Transfer formula for mass moment of inertia – Mass moment of Inertia by Integration.

UNIT - VI

KINEMATICS : Rectilinear motion-curvilinear motion - Rectangular components of curvilinear motion - Normal and Tangential components of acceleration, Radial and transverse components - Kinematics of rigid bodies - angular motion – fixed axis rotation – Definition and analysis of plane motion.

UNIT - VII

KINETICS: Kinetics of rigid bodies – equation of planes motion – fixed axis rotation – rolling bodies (simple examples) - general plane motion (Simple examples).

UNIT - VIII

WORK ENERGY METHODS : Work energy equations for translation – applications to particle motion – connected systems – fixed axis rotation (Simple cases)

TEXT BOOKS :

1. I.B. Prasad, "Applied Mechanics", Khanna Publishers, 19th Edition, 2009.
2. Ferdinand L. Singer, "Engineering Mechanics", Harper Collins Publishers India, 3rd Edition, 2008.

REFERENCES :

1. Irving. H. Shames, "Engineering Mechanics", PHI Publishers, 4th Edition, 2008.
2. Timoshenko & Young , "Engineering Mechanics", MGH Publishers, 4th Edition, 2010.
3. A.K. Tayal, "Engineering Mechanics", Umesh Publishers, 13th Edition, 2008.
4. K.L. Kumar, "Engineering Mechanics", TMH Publishers, 3rd Edition, 2009.

ENVIRONMENTAL STUDIES

Course Code : ABE1101

L	T	P	C
4	0	0	4

AIM :

To create awareness on environmental hazards.

OBJECTIVE :

The student shall acquire knowledge regarding utilization of natural resources, and the imbalance in ecosystems, environmental pollution caused by various practices and safe guards to be taken.

UNIT - I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES : Definition, Scope and Importance – Need for Public Awareness.

UNIT - II

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

ECOSYSTEMS : Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems
(ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

BIODIVERSITY AND ITS CONSERVATION : Introduction - Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social,ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, manwildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT - V

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI

SOCIAL ISSUES AND THE ENVIRONMENT : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies - Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VII

HUMAN POPULATION AND THE ENVIRONMENT : Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. -Case Studies.

UNIT - VIII

FIELD WORK : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site-Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS :

1 Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", University Press, Reprint 2005.

2 R. Rajagopalan, "Environmental Studies", Oxford University Press, 2nd Edn. 2011..

REFERENCE :

1. M. Anji Reddy, B "Textbook of Environmental Sciences and Technology"

COMPUTER PROGRAMMING THROUGH C

Course Code : ACT1102

L	T	P	C
4	1	0	4

AIM :

To give the basic idea about programming.

OBJECTIVE :

To make the students capable of programming in high level computer languages as well as applications.

UNIT - I

Algorithm, Flow chart, Program development steps, Basic structures of C Language, C tokens, Data types and sizes, Declaration of variables, Assigning values, Arithmetic, Relational and Logical operators, Increment and decrement operators, Conditional operator, Bitwise operators, Type conversions, Expressions, evaluation, Input output statements, blocks.

UNIT - II

If and switch statements, while, do while and for statements. C programs covering all the above aspects.

UNIT - III

One dimensional and two dimensional arrays, Initialization, String variables declaration, reading, writing, basics of functions, parameter passing, String handling functions.

UNIT - IV

User defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, Example C Programs.

UNIT - V

Pointers and arrays: Pointers and addresses, Pointers and arrays, Pointers and function arguments, address arithmetic, character pointers and functions

UNIT - VI

Pointers to pointers, multi-dimensional arrays, initialization of pointer arrays, command line arguments, pointers to functions, function pointers.

UNIT - VII

Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self reference to structures, unions, type-defs, bit fields, C program examples.

UNIT - VIII

Console and file-I/O: Standard I/O, Formatted I/O, Opening and closing of files, I/O operations on files, command line arguments.

TEXT BOOKS :

1. Herbert Schild, "Complete Reference Using C", 4th Edition, Tata McGraw Hill, 2009.
2. Yashawanth Kanethkar, "Let us C", 9th Edition, BPB Publishers, 2009.

REFERENCES :

1. B.A.Fouruzan and R.F.Gilberg, "Computer Science, A structured Programming Approach using C", 3rd Edition, Thomson Publishers, 2008.
2. B.W.Kerninghan and Dennis M. Ritche, "C Programming Language", 2nd Edition, Pearson Education, 2009.
3. Stephen G.Kochan, "Programming in C" 3rd Edition, Pearson Education, 2005.
4. N. B. Venkateswarlu, E. V. Prasad, "C & Data structures", 1st Edition, S. Chand Publications, 2002.

ELECTRONIC DEVICES

Course Code : AEC1101

L	T	P	C
4	1	0	4

AIM & OBJECTIVES :

All electronic equipment in the world consist of various components Like Diodes , Transistors, SCR etc. The different combinations of these active components result in the development of new equipment for various applications.

In this course the fundamental characteristics of various devices (components) are studied. The applications of all these devices are discussed.

UNIT - I

ENERGY BANDS AND CHARGE CARRIERS IN SEMICONDUCTORS : Bonding forces in solids, energy bands, Metal, Semiconductor, Insulators, Direct & Indirect Semiconductor, Variation of energy bands with alloy composition, Electrons and holes, Effective mass, Intrinsic and Extrinsic material, Fermi level, carrier concentrations at equilibrium, temperature dependence of carrier concentrations, compensation and space charge neutrality, conductivity, mobility, hall effect.

UNIT - II

EXCESS CARRIERS IN SEMICONDUCTORS : Direct recombination, indirect recombination, Steady state carrier generation, diffusion processes, diffusion and drift of carriers, continuity equation, steady state carrier injection, diffusion length.

UNIT - III

PN JUNCTION : The contact potential , equilibrium Fermi levels, space charges at a junction, qualitative and quantitative description of current flow at a junction, carrier injection, majority and minority carrier current. Zener & Avalanche Breakdown, time variation of stored charge, reverse recovery transient, capacitance of PN Junction region, ohmic contacts.

UNIT - IV

SEMICONDUCTOR DIODE CHARACTERISTICS : V-I characteristics of diode, temperature dependence, Zener diode characteristics, Zener diode as series and shunt regulator, Varactor Diode, LED, Photodiode, Solar cells.

UNIT - V

RECTIFIERS, FILTERS & REGULATORS : Half-wave rectifier, ripple factor, full-wave rectifier, Bridge rectifier, harmonic components in a rectifier circuit, inductor filter, capacitor filter, L- Section filters, multiple L- section filter, PI filter, comparison of various filter circuits in terms of ripple factor and regulation, Introduction to Power Supply and regulators.

UNIT - VI

BJT CHARACTERISTICS : Junction transistor, transistor current components, transistor as an amplifier & switch, input and output characteristics of transistor in C-B, C-E, C-C configurations, α, β and γ relation, typical voltage values.

UNIT - VII

FET & UJT CHARACTERISTICS : JFET characteristics (qualitative & quantitative discussion), MOSFET characteristics.
(Enhancement and Depletion Type), Negative resistance, UJT characteristics and applications.

UNIT - VIII

SPECIAL DEVICES : Degenerate semiconductors, tunnel diode, Semiconductor Lasers, PNPN device, SCR, DIAC, TRIAC, LCD, Schottky diode.

TEXT BOOKS :

1. Millman Jacob Halkias C Christos, "Electronic Devices and Circuits", 2nd Edition, Tata Mcgrawhill Publications, 2007.
2. B.G. Streetman, "Solid State Electronic Devices", 5th Edition, Prentice Hall of India Publications, 2002.

REFERENCES :

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu, "Electronic Devices And Circuits", Pearson Publications, 2nd Edition, 2009.
2. Raju GSN, "Electronic Devices And Circuits", IK International Publishing House, 1st Edition, 2006.
3. Boylestad.Robert, "Electronic Devices And Circuits Theory", PHI Publications, 10th Edition, 2008.
4. Lal Kishore, "Electronic Devices & Circuits Vol I", BSP publications, 2nd Edition, 2005.
5. Sanjeev Gupta, "Electronic Devices And Circuits", Dhanpat Rai Publications, Reprint, 2003.
6. K.Satyaprasad, "Electronic Devices And Circuits", VGS Publications, 2006.

ELECTRONIC DEVICES LAB

Course Code: AEC1102

L	T	P	C
0	0	3	2

Aim and Objectives :

The lab is intended for the student to get the hands on experience in dealing with components. The experiments are conducted as per the circuits given to them. The students shall make an attempt to find the similarities and the dissimilarities between the text book data and the data observed during the experimentation in the lab.

Any ten of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS

1. PN Junction Diode Characteristics
2. Zener Diode Characteristics & Voltage Regulator
3. Rectifiers without Filters(Full wave & Half wave)
4. Rectifiers with Filters(Full wave & Half wave)
5. Bipolar Junction Transistor CB Characteristics
6. Bipolar Junction Transistor CE Characteristics
7. Bipolar Junction Transistor CC Characteristics
8. JFET Characteristics
9. MOSFET Characteristics
10. UJT Characteristics
11. LED Characteristics
12. TRIAC Characteristics
13. SCR Characteristics
14. DIAC Characteristics

COMPUTER PROGRAMMING LAB

Course Code : ACT1103

L	T	P	C
0	0	3	2

AIM :

To give basic knowledge with practical orientation of programming language.

OBJECTIVE :

To train the students to write programmes in C language for different applications.

LIST OF PROGRAMMES :

1. To write C programs for the following
   a) 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 to generate the first n terms of the Fibonacci sequence.

2
   a) To write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user
   b) To write a C program to calculate the following sum:
   Sum=$1+x^2/2!+x^4/4!$ ———————— upto given 'n' terms.
   c) To write a c program to find the roots of a quadratic equation.

3. To write C programs that uses both recursive and non-recursive functions
   i) To find the factorial of a given number.
   ii) To find the GCD(greatest common divisor) of two given integers.
   iii) To solve Towers of Hanoi problem.

4. The total distance traveled by vehicle in 't' seconds is given by distance=ut+1/2at^2 where 'u' and 'a' are the initial velocity (m/sec) and acceleration (m/sec^2). Write a C program to find the distance traveled at regular intervals of time given values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

5. Using switch-case statement, write a C program that takes two operands and one operator from the user, performs the operation and then prints the answer. (consider operators +, -, *, and %).

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

7. Write a C program that uses functions to perform the following
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices

8. Write a C program that uses functions to perform the following operations
   a. To insert a sub-string in to given main string from a given position
   b. To delete n characters from a given position in given string.

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

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 does not contain T.
   b) Write a C program to count the lines, words and characters in a given text.

11. To write a C program
   a) to generate Pascal's triangle
   b) to construct a pyramid of numbers

12. To write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression $1+x+x^2+x^3+\ldots x^n$
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 nest pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too..

13. To write a C program
    a) to find the 2's compliments of a binary number.
    b) to convert a Roman numeral to its decimal equivalent

14. To write a C program that uses functions to perform the following operations
    a. Reading a complex number
    b. Writing a complex number
    c. Addition of 2 complex numbers
    d. Multiplication of 2 complex numbers
    (Note: represent complex number using a structure)

15. To write a C program
    a) to copy the contents from one file to another.
    b) to reverse the first n characters in a file.

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

    c) to fine the no. of characters, no. of words, no. of lines in a given file.

16. To implement the algorithms for the below given iterative methods using C to find one root of the equation f(x)=x sinx + cosx=0

    a) Bisection b) False Position c) Newton-Raphson
    d) Successive approximation

17. To write C programs to implement the Lagrange interpolation
18. To implement the Newton- Gregory forward interpolation using C language.
19. To implement in C the linear regression algorithm.
20. To implement in C the polynomial regression algorithm.

TEXT BOOKS :

1. P. Dey & M. Ghosh, "Programming in C", Oxford Univ. Press
2. E. Balaguruswamy, "C and Data Structures", TMH publications
3. P. Padmanabham, "C Programming and Data Structures", 3rd Edition, BS publications.
4. M.K. Jain, S.R.K. Iyengar & R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International Publishers.
5. Aitkinson & Han, "Elementary Numerical Analysis", Wiely India, 3rd Edition 2006.

ENGINEERING DRAWING

Course Code : AME1102

L	T	P	C
0	0	3	2

AIM & OBJECTIVES :

1. To make the student familiar to the drawing practices and convention
2. To familiarize the student about various engineering curves used in industry
3. To enable the student draft simple engineering components.

LIST OF EXERCISES

1 Introduction to Engineering drawing & basics of Geometrical construction

2 Construction of parabola, ellipse, hyperbola

3 Construction of Involutes and Cycloidal curves

4 Projections of points and lines inclined to one plane

5 Projections of lines inclined to both the planes

6 Projections of planes in simple positions, planes inclined to one plane

7 Projections of planes inclined to both the planes

8 Demonstration & Practice: Computer aided drafting of lines, planes and dimensioning

9 Projections of solids in simple positions

10 Projections of solids inclined to both the planes

11 Isometric projections

12 Demonstration & Practice: Computer aided drafting of solids and dimensioning.

TEXT BOOKS :

1. N.D. Bhatt, V.M. Panchal, "Engineering Drawing", Charotar Publication House, 49th Edition, 2008.

2. R.B. Choudary "Engineering graphics with Auto CAD", Anuradha Publishes

3. Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. International, 3rd Edn. I.K. International, 2007

SYLLABI FOR III SEMESTER

MATHEMATICS – III

(Common to ECE, EEE)

Course Code: ABM1104

L	T	P	C
4	0	0	4

AIM:

To acquire basic knowledge in the theory of functions of complex variables and special functions.

OBJECTIVE:

The primary objective of this course is to introduce the special functions and to develop the theory that is prominent in applications of the subject. A special emphasis has been given to the application of residues and conformal mappings.

UNIT-I

BETA AND GAMMA FUNCTIONS: Beta-function and Gamma function, relation between Beta and Gamma functions, results and problems. (7.14 - 7.16)

UNIT-II

BESSEL'S AND LEGENDRE'S FUNCTIONS: Bessel's function, Recurrence formulae, Expansions for $J_0(x)$, $J_1(x)$, Generating function, Orthogonality of Bessel functions

Legendre's function, Rodrigue's formula, Recurrence formulae, Orthogonality of Legendre polynomials. (16.6 – 16.9, 16.11, 16.13 – 16.17)

UNIT – III

FUNCTIONS OF A COMPLEX VARIABLE: Complex function, Limit, Continuity and Derivative of a Complex function, Cauchy- Riemann equations in Cartesian and polar form, Analytic functions, Harmonic functions, Milne –Thomson method. (20.2 – 20.5)

UNIT- IV

ELEMENTARY FUNCTIONS OF A COMPLEX VARIABLE: Exponential and Circular functions of a Complex variable, Hyperbolic and Inverse Hyperbolic functions, Real and Imaginary parts of Circular and Hyperbolic functions, Logarithmic function of a complex variable. (19.8 - 19.13)

UNIT- V

COMPLEX INTEGRATION: Complex Integration, Cauchy's theorem, Cauchy's Integral Formula, Morera's theorem, Cauchy's inequality, Liouville's theorem, Poisson's integral formulae. (20.12 - 20.15)

UNIT-VI

COMPLEX POWER SERIES: Series of complex terms, Taylor's series, Laurent's series,Zeros of an analytic function (20.16 - 20.17)

UNIT-VII

RESIDUES: Residues, Residue theorem, Calculation of residues, Evaluation of real definite integrals. (20.18 - 20.20)

UNIT-VIII

CONFORMAL MAPPINGS: Geometrical representation of $w=f(z)$, Standard transformations, bilinear transformation, Conformal transformations: $w=z^2$, $w=z + 1/z$, $w=e^z$, $w=\sin z$, $w=\cos z$, $w=\sinh z$, $w=\cosh z$. (20.7, 20.8, 20.10)

TEXT BOOK:

Dr.B.S.Grewal, "Higher Engineering Mathematics", 40th Edition, Khanna Publishers

REFERENCE BOOKS:

1. James Ward Brown & Ruel V. Churchill, "Complex Variables and Applications", 7th Edition, McGraw-Hill, 2004.
2. Goyal JK , Gupta KP, "Functions Of A Complex Variable", Pragati Prakashan.

ELECTRONIC CIRCUITS
(Common to ECE, EEE)

Course Code: AEC1103

L	T	P	C
4	1	0	4

AIM & OBJECTIVES:

To introduce the basic design concepts of low frequency, high frequency amplifiers and oscillators circuits using various transistors for different applications.

UNIT-I

BIASING AND STABILIZATION: BJT biasing, DC equivalent model, criteria for fixing operating point, methods of Bias stabilization, Thermal runaway, Thermal stability, Compensation Techniques, Biasing of JFET and MOSFET.

UNIT-II

SMALL SIGNAL AMPLIFIERS : h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: A_V, A_I, R_i, R_o (CB, CE & CC), Small signal model of FET and MOSFET (CG, CD & CS configurations).

UNIT -III

MULTI STAGE AMPLIFIERS: Concept of Multi Stage Amplifiers, Methods of Inter Stage Coupling, Two Stage RC Coupled amplifier (CE configuration), n –Stage Cascaded Amplifiers, Equivalent Circuits, Miller's Theorem, Frequency Effects, High Input Resistance Transistor Circuits: Cascode Transistor Configuration, CE-CC Amplifiers, Frequency response of RC Coupled Amplifiers using BJT, Gain Bandwidth Product.

UNIT -IV

HIGH FREQUENCY TRANSISTOR CIRCUITS: Transistor at High Frequencies, Hybrid-ð Common Emitter Transconductance Model,

Determination of Hybrid- ð Conductances, Variation of Hybrid Parameters with $|I_C|$, $|V_{CE}|$ and Temperature, The Parameters $f_{\hat{o}}$, expression for $f_{\hat{a}}$, $f_{\hat{a}}$, Current Gain with Resistance Load, CE Short Circuit Current Gain.

UNIT- V

FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Analysis of negative feedback amplifiers.

UNIT-VI

OSCILLATORS: Condition for oscillations, RC and LC type Oscillators: Hartley, and Colpitts Oscillators, RC-phase shift and Wien-bridge oscillators using BJT and JFET, Frequency and amplitude stability of oscillators, Crystal oscillators.

UNIT -VII

POWER AMPLIFIERS: Class- A Power Amplifier, Maximum Value of Efficiency of Class- A Amplifier, Transformer Coupled Amplifier, Transformer Coupled Audio Amplifier, Push Pull Amplifier, Complimentary Symmetry Circuits (Transformer Less Class B Power Amplifier), Class C Power Amplifier, Phase Inverters, Class D Operation, Class S Operation, Heat Sinks.

UNIT -VIII

TUNED AMPLIFIERS: Single Tuned Capacitive Coupled Amplifier, Tapped Single Tuned Capacitance Coupled Amplifier, Single Tuned Transformer Coupled or Inductively Coupled Amplifier, CE Double Tuned Amplifier, Stagger Tuning, Stability Considerations, Tuned Class B and Class C Amplifiers, Wideband Amplifiers, Applications of Tuned Amplifiers.

TEXT BOOKS:

1. J.Millman and C.C.Halkias, "Electronic Devices and Circuits", 2nd Edition, Tata McGraw Hill, 2007.
2. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", Pearson/Prentice Hall, 10th Edition, 2008.

3. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu, "Electronic Devices and Circuits", Pearson Publications, 2nd Edition, 2009.

4. Raju GSN, "Electronic Devices and Circuits", IK International, 1st Edition, 2006.

REFERENCES:

1. T.F. Bogart Jr., J.S.Beasley and G.Rico, "Electronic Devices and Circuits", Pearson Education, 6th edition, 2004.

2. S.G.Burns and P.R.Bond, "Principles of Electronic Circuits", Galgotia Publications, 2nd Edn.,1998.

3. Millman and Grabel, "Microelectronics", 2nd Edition, Tata McGraw Hill, 2001.

4. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, "Electronic Devices and Circuits", 2nd Edition, TMH, 2007.

5. K. Lal Kishore, "Electronic Devices and Circuits", B.S. Publications, 2nd Edition, 2005.

SIGNALS AND SYSTEMS

Course Code: AEC1104

L	T	P	C
4	1	0	4

AIM & OBJECTIVES:

1. To introduce various signals & transforms that are involved in audio & video communications.
2. To make students familiar with signal operations & system analysis which are used in communications & signal processing.

UNIT-I

SIGNAL ANALYSIS: Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Classification of signals, Singularity functions, Concept of Impulse function, Unit step function, Signum function.

UNIT-II

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum.

UNIT-III

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, Properties of Fourier transforms, Fourier transforms involving impulse function and Signum function, Introduction to Hilbert Transform.

UNIT-IV

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function

of a LTI system, Filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT-V

CONVOLUTION AND CORRELATION OF SIGNALS: 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, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT-VI

SAMPLING: Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT-VII

LAPLACE TRANSFORMS: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC), constraints on ROC for various classes of signals, Properties of L.T's. Relation between L.T's, and F.T. of a signal, Laplace transform of certain signals using waveform synthesis.

UNIT-VIII

Z–TRANSFORMS: Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Concept of Z- Transform of a discrete sequence, Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

TEXT BOOKS:

1. B.P. Lathi, "Signals, Systems & Communication", BS Publications, 5th Reprint 2008.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", PHI, 2nd Edition, 1997.
3. K.Raja Rajeswari, B.Visvesvara Rao, "Signals & Systems", 1st Edition, PHI, 2009.
4. P.Rama Krishna Rao, "Signals & Systems", 1st Edition, TMH, 2008.

REFERENCES:

1. Simon Haykin and Van Veen, "Signals & Systems", Wiley, 2nd Edition, 2002.
2. M.E. Van Valkenburg, "Network Analysis", PHI Publications, 3rd Edn., 2000.
3. Robert, "Signals & Systems Analysis Using Transformation Methods & MATLAB", TMH, 2003.
4. C. L. Philips, J.M.Parr and Eve A.Riskin, "Signals, Systems and Transforms", Pearson Education. 3rd Edition, 2004.

ELECTRICAL TECHNOLOGY

Course Code: AEE1137

L	T	P	C
4	1	0	4

AIM:

To familiarize the student with the principles of Electro-Mechanical Energy Conversion with D.C, A.C Machines that find wide application in industry. The course covers construction, Principle of D.C, A.C Machines and Instruments.

OBJECTIVE:

In this course the different types of Instruments, DC generators, DC motors, Induction Motors, Alternators and Single Phase Motors which are widely used in industry are covered and their performance aspects will be studied.

UNIT-I

DC GENERATORS: Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators

UNIT-II

DC MOTORS: DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT-III

TRANSFORMERS: Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit

UNIT-IV

PERFORMANCE OF TRANSFORMERS: Losses and Efficiency of transformer and Regulation–OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT –V

THREE PHASE INDUCTION MOTOR: Principle of operation of three-phase induction motors –Slip ring and Squirrel cage motors – Torque equation-Slip-Torque characteristics – Efficiency calculation – Starting methods.

UNIT –VI

SYNCHRONOUS MACHINES: Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Armature parameters-armature resistance-synchronous reactance-phasor diagram-unity power factor-lagging power factor –leading power factor-Predetermination of regulation by Synchronous Impedance Method – OC and SC tests-principle of operation of synchronous motors.

UNIT- VII

SINCE PHASE INDUCTION MOTORS: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics.

UNIT-VIII

ELECTRICAL INSTRUMENTS: Types of instruments (Indicating, Integrating, Recording) - Basic Principles of indicating instruments – Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters) wattmeters and energy meters.

TEXT BOOKS:

1. M.S Naidu and S.Kamakshaiah, "Introduction to Electrical Engineering", TMH Pubications..
2. Vincent Del Toro, "Electrical Engineering Fundamentals", PHI Publishers 2nd Edition.

REFERENCES:

1. V.K Mehta, "Principles of Electrical Engineering", S.Chand Publications.
2. I.J. Nagrath and D.P Kothari, "Theory and Problems of Basic Electrical Engineering", PHI Publications.
3. David V. Kerns, JR. J. David Irwin, "Essentials of Electrical and Computer Engineering".

PULSE AND DIGITAL CIRCUITS

(Common to ECE, EEE)

Course Code: AEC1105	L	T	P	C
	4	1	0	4

AIM & OBJECTIVES:

1. To design Linear & Non Linear waveshaping Circuits.
2. To design Logic circuits using semiconductor devices.
3. Generation of various waveforms.

UNIT -I

LINEAR WAVESHAPING: Low pass &High pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs, RC network as differentiator and integrator, attenuators, its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT -II

NON-LINEAR WAVE SHAPING: Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT -III

SWITCHING CHARACTERISTICS OF DEVICES: Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

UNIT -IV

MULTIVIBRATORS: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT -V

TIME BASE GENERATORS: General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

UNIT-VI

SYNCHRONIZATION AND FREQUENCY DIVISION: Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

UNIT-VII

SAMPLING GATES: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates.

UNIT -VIII

REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS: AND, OR gates using Diodes, Resistor, Transistor Logic, Diode Transistor Logic.

TEXT BOOKS:

1. J. Millman and H. Taub, Pulse, "Digital and Switching Waveforms", McGraw-Hill, 2008.
2. A. Anand Kumar, "Pulse and Digital Circuits", PHI, 2nd Edition, 2005.

REFERENCES:

1. David A. Bell, "Solid State Pulse Circuits", PHI, 4th Edn., 2002
2. L. Strauss, "Wave Generation and Shaping", 2nd Edition, TMH, 1970.
3. R.Venkataraman, "Pulse, Digital Circuits and Computer Fundamentals", 3rd Edition, Dhanpat Rai Publications, Delhi 1994.

SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE)

Course Code : AEC1106	L	T	P	C
	4	1	0	4

AIM & OBJECTIVES:

1. To design combinational & sequential digital circuits used in digital systems.
2. To introduce programmable logic devices.

UNIT-I

NUMBER SYSTEMS & CODES: Philosophy of number systems, complement representation of negative numbers,binary arithmetic,binary codes,error detecting & error correcting codes, hamming codes.

UNIT-II

BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS: Fundamental postulates of Boolean Algebra, Basic theorems and properties, switching functions,Canonical and Standard forms,Algebraic simplification digital logic gates, properties of XOR gates,universal gates,Multilevel NAND/NOR realizations.

UNIT-III

MINIMIZATION OF SWITCHING FUNCTIONS: Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicants chart, simplification rules.

UNIT-IV

COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions, Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT -V

PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC: Basic PLD's-ROM, PROM, PLA, PAL Realization of Switching functions,

Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT -VI

SEQUENTIAL CIRCUITS - I: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters.

UNIT -VII

SEQUENTIAL CIRCUITS - II: Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector, Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

UNIT -VIII

ALGORITHMIC STATE MACHINES: Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, control implementations, examples of weighing machine and binary multiplier.

TEXT BOOKS:

1. Morris Mano, "Digital Design", PHI, 3rd Edition, 2006.
2. Zvi Kohavi, "Switching & Finite Automata theory", TMH, 2nd Edition, 2008.
3. R.P.Jain, "Modern Digital Electronics", TMH, 3rd Edition, 2006.

REFERENCES:

1. Fletcher, "An Engineering Approach to Digital Design", PHI, 1980.
2. Charles H. Roth, "Fundamentals of Logic Design", Thomson Publications, 5th Edition, 2004.
3. John M. Yarbrough, "Digital Logic Applications and Design", Thomson Learning Publications, 2001.

ELECTRONIC CIRCUITS LAB

Course Code: AEC1107

L	T	P	C
0	0	3	2

AIM & OBJECTIVE:

To design & implement various electronic circuits such as amplifiers and oscillators.Design and Simulation in Simulation Laboratory using Multisim or Pspice or Equivalent Simulation Software and Testing in the Hardware Laboratory.

EXPERIMENTS:

1. CE Amplifier
2. CC Amplifier (Emitter Follower).
3. Two stage R-C coupled Amplifier.
4. Feedback amplifier (Current Series).
5. Feedback amplifier (Voltage Series).
6. Feedback amplifier (Current Shunt).
7. Feedback amplifier (Voltage Shunt)
8. FET amplifier (Common Source)
9. Wien Bridge Oscillator
10. RC Phase Shift Oscillator
11. Colpitts Oscillator.
12. Crystal Oscillator
13. Class A Power Amplifier (Transformer less)
14. Class B Complementary Symmetry Amplifier
15. Series Voltage Regulator
16. Shunt Voltage Regulator
17. Tuned Amplifier

Note: Any TEN of the above experiments are to be conducted.

ELECTRICAL TECHNOLOGY LAB

Course Code: AEE1138

L	T	P	C
0	0	3	2

AIM:

To introduce the Network theorems and AC & DC Machines basic concepts.

OBJECTIVE:

The Lab is intended for the students to get hands on experience in dealing with Network theory, AC & DC Machines and their performance.

PART – A

1. Verification of Kirchhoff's laws.
2. Series Resonance – Resonant frequency, Bandwidth and Q-factor determination for RLC network.
3. Time response of first order R-L and R-C network for periodic Non-sinusoidal inputs – time constant and steady state error determination.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of Maximum power transfer theorem.
6. Experimental determination of Thevenin's equivalent circuits and verification by direct test.

PART – B

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance and critical speed.
2. Swinburne's Test on DC shunt machine.
3. Brake test on DC shunt motor.
4. OC & SC tests on Single-phase transformer.
5. Brake test on 3-phase Induction motor.
6. Regulation of alternator by synchronous impedance method.

Note: Any FIVE experiments from Part-A and FIVE experiments from Part-B are to be conducted.

SYLLABI FOR IV SEMESTER

MATHEMATICS – IV
(Common to ECE, EEE)

Course Code: ABM1107

L	T	P	C
4	0	0	4

AIM:

To acquire basic knowledge of probability and numerical computation.

OBJECTIVE:

The primary objective of this course is to introduce the Mathematical concepts of probability that are sufficiently general they can apply to any suitably defined random phenomena and also shall be able to apply methods of numerical computation for real time problems.

UNIT-I

PROBABILITY: Probability Introduced through Sets and Relative Frequency, Joint and Conditional Probability, Independent Events, Combined Experiments, (1.3 – 1.6 of [1])

UNIT-II

RANDOM VARIABLE-EXPECTATION: The Random Variable Concept, Distribution Function, Density Function, The Gaussian Random Variable, Conditional Distribution and Density Function, Expectation, Transformations of a Random Variable. (2.1 –2.4, 2.6, 3.1, 3.2, 3.4 of [1])

UNIT-III

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution and Its Properties, Joint Density and Its Properties, Conditional Distribution and Density, Statistical Independence, Distribution and Density of a sum of Random Variables, Central Limit Theorem (without proof). 4.1 – 4.7 of [1])

UNIT-1V

OPERATIONS ON MULTIPLE RANDOM VARIABLES : Expected Value of a Function of Random Variables, Jointly Gaussian Random Variables, Transformations of Multiple Random Variables.

(5.1, 5.3, 5.4 of [1])

UNIT- V

RANDOM PROCESS – TEMPORAL CHARACTERISTICS: The Random Process Concept, Stationarity and Independence, Correlation Functions, Measurement of Correlation Functions, Gaussian Random Processes, Poisson Random Process (6.1 – 6.6 of [1])

UNIT- VI

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, method of false position, Newton's method, Iteration method, Finite differences, Differences of a polynomial, Difference operators

(28.1, 28.2, 29.1, 29.2 & 29.4 of [2])

UNIT-VII

INTERPOLATION: Newton's interpolation formulae, Central difference interpolation formulae, Interpolation with unequal intervals – Lagrange's formula, Newton's divided difference formula, Inverse interpolation.

(29.5, 29.6, 29.8& 29.9 of [2])

UNIT-VIII

NUMERICAL DIFFERENTIATION AND INTEGRATION: Numerical differentiation, Numerical Integration – Newton-cote's formula, Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule, Weddle's rule. (29.10, 29.12 of [2])

TEXT BOOKS:

1. Peyton Z. Peebles, Jr., Ph.D. "Probability, Random Variables and Random Signal Principles", 4th Edition, Tata McGraw-Hill Publishing Company Limited, 2002.

2. Dr. B.S.Grewal "Higher Engineering Mathematics", 40th Edition, Khanna Publishers

REFERENCE BOOKS:

1. Athanasios Papoulis and S.Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", PHI, 4th Edition 2002.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain, "Numerical Methods for Scientific and Engineering Computation", New age International Publishers.
3. S. S. Sastry, "Introductory Methods of Numerical Analysis", Prentice Hall India Pvt., Limited.

DIGITAL IC APPLICATIONS

Course Code: AEC1108

L	T	P	C
4	1	0	4

AIM & OBJECTIVES:

1. Familiarization of various Digital Logic families
2. Design of digital circuits using VHDL Programming.

UNIT -I

LOGIC FAMILIES: Introduction to logic families, RTL, DCTL, DTL, HTL, IIL, TTL, Schottky TTL and Emitter coupled logic, NMOS, PMOS, CMOS logic, Comparison of logic families.

UNIT -II

CMOS INTERFACING: CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Familiarity with standard 74xx and CMOS 40xx series ICs—specifications.

UNIT -III

VHDL HARDWARE DESCRIPTION LANGUAGE: Design flow, program structure, types and constants, functions and procedures, libraries and packages.

UNIT -IV

VHDL DESIGN ELEMENTS: Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT -V

COMBINATIONAL LOGIC DESIGN: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, Basic Concepts of ALUs, Combinational multipliers, VHDL models for the above ICs.

UNIT -VI

DESIGN EXAMPLES: Design examples (using VHDL) - Barrel shifter, comparators, floating-point encoder, dual parity encoder.

UNIT -VII

SEQUENTIAL LOGIC DESIGN: Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT -VIII

MEMORIES: ROM - Internal structure, 2D-decoding commercial types, timing and applications.

Static RAM - Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS.

Dynamic RAM - Internal structure, timing, synchronous DRAMs.

TEXT BOOKS:

1. John F.Wakerly, "Digital Design Principles & Practices", PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. J.Bhasker, "VHDL Primer", Pearson Education, PHI, 3rd Edition, 1989.

REFERENCES:

1. Charles H. Roth Jr., "Digital System Design Using VHDL", PWS Publications, 1998.
2. Alan B. Marcovitz, "Introduction to Logic Design", TMH, 2nd Edition, 2005.
3. Stephen Brown and Zvonko Vramesic, "Fundamentals of Digital Logic with VHDL Design", McGraw Hill, 2nd Edition. 2005.
4. R.P.Jain, "Modern Digital Electronics", Mc Graw Hill, 3rd Edition, 2006.

ANALOG COMMUNICATIONS

Course Code: AEC1109

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To impart the knowledge about different modulation & demodulation techniques which are used in analog communication systems.

UNIT -I

INTRODUCTION: Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT -II

DSB MODULATION AND DEMODULATION: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT -III

SSB MODULATION AND DEMODULATION: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT -IV

ANGLE MODULATION: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave.

UNIT -V

GENERATION AND DETECTION OF FM: Generation of FM Waves: Direct (Parameter Variation) and Indirect (Armstrong) methods, Detection of FM Waves: Single slope detector, Stagger tuned detector, Foster-Seeley discriminator, Ratio detector, Zero crossing detector, Phase locked loop, Comparison of PM, FM & AM.

UNIT -VI

MODELING OF NOISE SOURCES: Resistive (Thermal) Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Effective Noise Temperature of cascaded networks, Antenna as a Noise Source, Modeling of Practical Noisy Networks: Average Noise Figures, Relationship between Average Noise Figure and Effective Noise Temperature, Average Noise Figure of cascaded networks.

UNIT -VII

NOISE IN MODULATION SYSTEM: Noise in Analog communication System, System Noise in AM System, Noise in DSB System & Noise in SSB System, Introduction to Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

UNIT -VIII

PULSE MODULATION: Time Division Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity), PWM: Generation & demodulation of PWM (Direct and Indirect methods), PPM, Generation and demodulation of PPM.

TEXT BOOKS:

1. Simon Haykin, John Wiley, "Principles of Communication Systems", 3rd Edition, 1994.
2. H Taub & D. Schilling, Gautam Sahe, "Principles of Communication Systems", TMH, 2007 3rdEdition.
3. B.P. Lathi, "Communication Systems", BS Publication, 2006.
4. George Kennedy and Bernard Davis, "Electronics & Communication System", TMH 2004.

REFERENCES:

1. R.P. Singh, SP Sapre, "Communication Systems", 2nd Edition, TMH, 2007.
2. John G. Proakis, Masond, Salehi, "Fundamentals of Communication Systems" PEA, 2006.

LINEAR IC APPLICATIONS

Course Code: AEC1110

L	T	P	C
4	1	0	4

AIM & OBJECTIVES:

1. Study of linear ICs for various applications.
2. To design the analog electronic circuits such as amplifiers, oscillators, filters using linear ICs.

UNIT -I

DIFFERENTIAL AMPLIFIERS: Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT - II

INTEGRATED CIRCUITS: Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supply requirements, Op-Amp Block Diagram, Characteristics of OP-Amps, ideal and practical Op-Amp specifications, DC and AC characteristics: 741 op-amp & its features, Op-Amp parameters & their measurements, Input & Output Offset voltages & currents, slew rate, CMRR, PSRR, Drift, Frequency Compensation techniques.

UNIT -III

LINEAR APPLICATIONS OF OP- AMPS: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, Voltage to current and current to Voltage converters, Buffers.

UNIT -IV

NON-LINEAR APPLICATIONS OF OP- AMPS: Comparators, Schmitt Trigger, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT -V

FILTERS AND OSCILLATORS: Introduction, Butter worth filters

– 1st order, 2nd order LPF, HPF filters, Band pass, Band reject and All pass filters, Oscillators – Introduction, classification: RC and Wien bridge oscillators, VCO (566).

UNIT -VI

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, 555 timer as Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT -VII

D to A & A to D CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, IC AD574 (12 bit ADC).

UNIT -VIII

VOLTAGE REGULATORS: Voltage Regulator Types, Fixed and Variable voltage regulators, IC723 voltage regulator, Three Terminal Voltage Regulators – IC 7805, Switching Regulator IC 1723, Balanced modulator IC 1496.

TEXT BOOKS:

1. Ramakanth A. Gayakwad, "Op-Amps & Linear ICs", 4th Edition, PHI, 2002.
2. D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (P) Ltd, 2nd Edition,2003.

REFERENCES:

1. Sergio Franco, "Design with Operational Amplifiers & Analog Integrated Circuits", McGraw Hill, 1988.
2. R.F.Coughlin & Fredrick Driscoll, "Operational Amplifiers & Linear Integrated Circuits", PHI, 5th Edition, 1998.
3. Millman, "Micro Electronics", McGraw Hill,2001.
4. C.G. Clayton, "Operational Amplifiers", 5th Edition, Newnes Publishers, 2003.

COMPUTER ORGANIZATION

(Common to ECE, CSE, IT)

Course Code: ACT1104

L	T	P	C
4	1	0	4

AIM:

To give detailed information about the structure of computers and internal organization of different units regarding memory I/O devices registers.

OBJECTIVE:

Student will get an idea about the internal organization of the computer system and its internal operations.

UNIT-I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Multicore processors, Data Representation. Fixed Point Representation & Arithmetic, Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS: Register Transfer language, Register Transfer Bus and memory transfers, 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. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT-III

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT-IV

COMPUTER ARITHMETIC: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – Point Representation, Floating – point Arithmetic operations, Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT-V

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID, Hierarchical memory features.

UNIT-VI

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT-VII

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII

MULTI PROCESSORS: Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", 5th Edition, McGraw Hill, 2009.
2. M.Moris Mano, "Computer Systems Architecture", 3rd Edition, Pearson Education, 2006.

REFERENCES:

1. William Stallings, "Computer Organization and Architecture", 6th Edition, Pearson Education 2006.
2. Andrew S. Tanenbaum, "Structured Computer Organization", 5th Edition, PHI/Pearson Education, 2006.
3. Sivaraama Dandamudi, "Fundamentals of Computer Organization and Design", Springer Int. Edition, Springer, 2009.
4. John L. Hennessy and David A. Patterson, "Computer Architecture a Quantitative Approach", 4th Edition Elsevier, 2009.
5. Joseph D. Dumas II, "Computer Architecture - Fundamentals and principles of Computer Design", 1st Edition, BS Publication, 2010.
6. John P. Hayes, "Computer Architecture and Organization", 3rd Edition, Tata McGraw hill, 2009.

EM WAVES AND TRANSMISSION LINES

Course Code: AEC1111

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To impart the fundamental knowledge about the Static & Time varying fields used in different media such as free space, transmission lines and wave guides.

UNIT -I

ELECTROSTATICS: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Related Problems, Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors.

UNIT -II

MAGNETOSTATICS: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy.

UNIT -III

MAXWELL'S EQUATIONS (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric, Dielectric-Conductor and conductor-free space Interfaces.

UNIT -IV

EM WAVE CHARACTERISTICS - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization.

UNIT -V

EM WAVE CHARACTERUISTICS – II: Reflection and Refraction of Plane Waves, Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications.

UNIT -VI

TRANSMISSION LINES - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Loss less ness /Low Loss Characterization, Distortion – Condition for Distortionless and Minimum Attenuation, Loading - Types of Loading.

UNIT -VII

TRANSMISSION LINES – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR, UHF Lines as Circuit Elements, ë/4, ë/2, ë/8 Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single and Double Stub Matching.

UNIT -VIII

WAVEGUIDES: Introduction, TE, TM, TEM Modes - Concepts and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Wave Impedances, Attenuation Factor – Expression for TE, TM and TEM Case, Circular waveguides (qualitative treatment).

TEXT BOOKS:

1. Matthew N.O. Sadiku, "Elements of Electromagnetics", Oxford Univ. Press, 3rd Edition, 2001.
2. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems", PHI, 2nd Edition, 2000.
3. Umesh Sinha, Satya Prakashan, "Transmission Lines and Networks", Tech. India Publications, New Delhi, 2001.
4. G.S.N. Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson Edn. Pte. Ltd., 2006.

REFERENCES:

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

IC and PDC LAB

CourseCode: AEC1112

L	T	P	C
0	0	3	2

AIM & OBJECTIVES:

1. To design analog circuits using linear ICs for various applications.
2. To design electronic circuits for generation of linear and non – linear wave forms using discrete components.

EXPERIMENTS:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers and Clampers.
3. Astable Multivibrator.
4. Monostable Multivibrator.
5. Schmitt Trigger.
6. Bootstrap sweep circuit.
7. Integrator and differentiator using IC 741
8. Band Pass and Band stop filters using IC 741.
9. Function Generator using IC 741.
10. Astable and Monostable Multivibrator using 555 Timer.
11. PLL Using IC 565.
12. Voltage regulator using IC 723.
13. Study of Logic Gates using Discrete components.
14. 4-bit D/A converter.

Note: Any TEN of the above experiments are to be conducted.

ANALOG COMMUNICATIONS LAB

Course Code: AEC1113

L	T	P	C
0	0	3	2

AIM & OBJECTIVES:

To design various modulation & demodulation processes using different methods used in analog communication systems.

1. Amplitude modulation and demodulation.
2. MATLAB Simulation of Amplitude modulation and demodulation
3. Frequency modulation and demodulation.
4. Balanced modulator.
5. MATLAB Simulation of DSB-SC Modulation and Demodulation
6. Pre-emphasis & de-emphasis.
7. Characteristics of mixer.
8. Digital Phase detector.
9. Phase locked loop.
10. Synchronous detector.
11. SSB system.
12. Spectral analysis of AM and FM signals using spectrum analyzer.
13. Squelch Circuit.
14. Frequency Synthesizer.
15. AGC Characteristics.

Note: Minimum TEN experiments should be conducted.

SYLLABI FOR V SEMESTER

CONTROL SYSTEMS

Course Code: AEE1109

L	T	P	C
4	1	0	4

AIM:

To study the Time frequency Response Analysis and various methods to find out stability of Control Systems.

OBJECTIVE:

In this course it is aimed to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT – I

MATHEMATICAL MODELLING: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, transfer functions - Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph – Reduction using Mason's gain formula.

UNIT II

TRANSFER FUNCTION REPRESENTATION: Translational and Rotational mechanical systems, Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, DC and AC position control systems

UNIT-III

TIME RESPONSE ANALYSIS AND STABILITY: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems

- Time domain specifications – Steady state response - Steady state errors and error constants.

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability

UNIT – IV

ROOT LOCUS ANALYSIS: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – V

FREQUENCY RESPONSE ANALYSIS-I: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – VI

Frequency Response Analysis-II

Polar Plots- Nyquist Plots- Stability Analysis

UNIT – VII

CLASSICAL CONTROL DESIGN TECHNIQUES: Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, – Effects of proportional derivative, proportional integral systems. PID Controllers.

UNIT – VIII

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

Text Books:

1. I.J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International (P) Limited, Publishers, 2nd Edition.
2. Norman. S. Nise, "Control Systems Engineering", 3rd Edition, John wiley & Sons.

REFERENCE BOOKS:

1. Katsuhiko Ogata, "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. N. K. Sinha, "Control Systems", New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. B. C. Kuo, "Automatic Control Systems", John wiley and son's.,8th edition, 2003
4. Narciso F. Macia George J. Thaler, "Modelling & Control Of Dynamic Systems", Thomson Publishers.

NETWORK ANALYSIS AND SYNTHESIS

Course Code: AEE1106

L	T	P	C
4	1	0	4

AIM:

This second course in Network Analysis can be treated both as complement and supplement to the basic course. This course opens for entry to wide range of advanced courses such as Systems Theory, Control Systems, Analog & Digital Networks etc.,

OBJECTIVE:

This course trains the student to think deep into the subject for analyzing the time – advance and frequency domain analysis of systems in general and prepare, the student for advanced learning and research.

UNIT – I :

NETWORK TOPOLOGY : Linear Graphs in Electrical Networks, Basic Definitions, Incidence, Loop and cut-set matrices,Fundamental Loop and Fundamental Cut-Set Matrices,GraphTheoretic version of KCL and KVL,Loop Impedance and Node Admittance Matrices.

UNIT – II :

A REVIEW OF LAPLACE TRANSFORMS: Laplace Transform of unit step,unit ramp,exponential and periodic signals,Laplace Transform of Impulse and Doublet Functions,Inverse Transform Shifting Theorems, Initial Value & Final Value Theorems, Convolution Theorem.

UNIT – III :

LAPLACE TRANSFORM APPLICATION TO NETWORK ANALYSIS: Solution of RLC Networks using Laplace Transforms,concept of complex frequency, Transform Impedance (or Operational Impedance) unit step and unit impulse responses, Impulse response and convolution,Embedding initial conditions as circuit elements,Evaluation of Initial State of a Network ,the special cases of

all inductor loops and all capacitor cut sets.

UNIT – IV :

NETWORK FUNCTIONS POLES AND ZEROS AND TWO-PORT NETWORKS: Driving Point Functions Poles and Zeros, O.C & S.C critical frequencies, Properties of Driving Point Functions,Two Port Networks,immittance,Transmission and Hybrid Parameters, Interconnection of 2 – Ports.

UNIT – V :

FOURIER TRANSFORMS: Fourier Series of Typical Wave Forms, Complex Fourier Series, Fourier Spectra Fourier Integral and Fourier Transforms of typical signals, Analysis of simple networks in steady state to Non-sinusoidal periodic signals,Power Spectrum of Periodic Signals.

UNIT – VI :

NETWORK SYNTHESIS (DRIVING POINT SYNTHESIS ONLY): Positive Real (PR) functions,Hurwitz Polynomials,Testing of PR functions, Elementary Synthesis Operations.

UNIT – VII :

LC NETWORK SYNTHESIS: Driving Point Functions of LC Networks Interlacing Properties of Poles & Zeros and Foster's Reactance Theorem, Synthesis by Foster's and Cauer Forms.

UNIT – VIII :

RC AND RL NETWORK SYNTHESIS: The driving Point Functions of RC & RL Networks derived from LC functions, Foster and Cauer forms of RC & RL driving Point Functions.

TEXT BOOKS:

1. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India Pvt. Ltd., New Delhi,2000.
2. Frankyln F.Kuo, "Network Analysis and Synthesis", Wiley International, 2006.
3. N.C.Jagan and C. Lakshmi Narayana, "Network Analysis", B.S. Publications, 2008.

REFERENCE BOOKS:

1. M.E. Van Valkenburg, "Introduction to Modern Network Synthesis", Wiley Eastern Limited, New Delhi,1993.
2. Charles K. Alexander, Mathew N.O Sadika, "Fundamentals of Electric Circuts", TMH Education Pvt. Ltd., New Delhi, 3rd Editions, 2008.
3. Umesh Sinha, "Network Analysis and Synthesis", Satya Publications, 2007.

DIGITAL COMMUNICATIONS

Course Code: AEC1114

L	T	P	C
4	1	0	4

AIM:

To introduce various concepts in digital communications and evaluation of digital channel performance in terms of resources. (Power, Bandwidth)

OBJECTIVE:

To impart the knowledge on Digital modulation and demodulation schemes of communication systems.

UNIT-I

PULSE DIGITAL MODULATION: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM).

UNIT-II

DELTA MODULATION: Delta modulation, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT-III

DIGITAL CARRIER MODULATION TECHNIQUES: Introduction, ASK, FSK, PSK, DPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT-IV

DIGITAL DATA TRANSMISSION: Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

UNIT-V

INFORMATION THEORY: Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties

UNIT-VI

SOURCE CODING: Introduction, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT-VII

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and error Correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT-VIII

CONVOLUTION CODES: Introduction, encoding of convolution codes, time domain approach, transform domain approach, Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS:

1. Simon Haykin, "Digital communications", John Wiley, 2005,1st Edn.
2. H. Taub and D. Schilling, "Principles of Communication Systems", TMH, 3rd Edn. 2003.

REFERENCES:

1. K.Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley, 2005,1st Edn.
2. John Proakis, "Digital Communications", TMH, 5th ed., 1983.
3. R.Singh and S.Sapre, "Communication Systems-Analog & Digital", TMH, 2nd ed., 2004.
4. B.P.Lathi, "Modern Analog and Digital Communication", Oxford reprint, 3rd edition, 2004.
5. George Kennedy and Bernard Davis, "Electronic Communication Systems", TMH, 4th edition, 2004.
6. Bernard Sklar and Pabitra Kumar Ray, "Digial Communications – Fundamentals and Applications", Pearson, 2nd Ed., 2001.

MICROPROCESSORS AND INTERFACING

Course Code: AEC1115

L	T	P	C
4	1	0	4

AIM:

To give an understanding of Microprocessor Architecture, programming and interfacing Techniques.

OBJECTIVE:

To familiarize with 8086 microprocessor architecture, assembly language programming, interfacing chips, advanced processors.

UNIT-I

8086 INSTRUCTION SET ARCHITECTURE : Architecture of 8086 Microprocessor, Functions of Different Registers-General purpose, flag register, segment & index registers, Addressing modes of 8086, Instruction set of 8086, Assembler directives.

UNIT-II

8086 PROGRAMMING : Assembly language programs involving logical, Branch & call instructions, Sorting, evaluation of arithmetic expressions, string manipulation, Procedures and macros.

UNIT-III

8086 PIN DIAGRAM AND MEMORY INTERFACING : Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagram, Memory interfacing to 8086 (Static RAM & EPROM).

UNIT-IV

8086 INTERRUPTS AND 8259 PIC : Interrupt structure of 8086, Vector interrupt table, Interrupt service routines, 8259 Programmable Interrupt Controller (PIC) - Architecture and interfacing, cascading of Interrupt controller and its importance.

UNIT-V

8255 PIO/PPI : 8255 PPI – various modes of operation and interfacing examples to 8086, Interfacing of 7-Segment LED, Keyboard, D/A and A/D converters, Stepper Motor.

UNIT-VI

8279 KEYBOARD/DISPLAY CONTROLLER & DMA: Keyboard/ Display Controller 8279, Need for DMA, DMA data transfer Method, 8237 (DMA Controller) - transfer modes.

UNIT-VII

8251 USART : Serial data transfer schemes, Asynchronous and Synchronous data transfer schemes, 8251 USART architecture and interfacing, TTL to RS 232C and RS232C to TTL conversion, Sample program of serial data transfer.

UNIT-VIII

ADVANCED PROCESSORS : The 80286 and 80386 architectures, Real Address Mode, Protected Mode, Paging and Segmentation, Salient features of Pentium, Branch Prediction.

TEXT BOOKS:

1. A.K.Ray and K.M.Bhurchandi, "Advanced Microprocessors and Peripherals", TMH, 2nd ed., 2006.
2. Douglas V. Hall, "Micro Processors & Interfacing", 2nd ed., 2007.

REFERENCES:

1. Barry B. Brey, "The Intel Microprocessors-Architecture, Programming & Interfacing", Pearson Education, 6th Edition, 2004.
2. Liu and GA Gibson, "Micro Computer System 8086/8088 Family Architecture, Programming and Design", PHI, 2nd Edition, 2006.

ANTENNAS AND WAVE PROPAGATION

Course Code: AEC1116

L	T	P	C
4	1	0	4

AIM:

Enable the student to study the various types of antennas and wave propagation.

OBJECTIVE: To study

- Radiation from a current element.
- Antenna arrays.
- Aperture antennas.
- Radio wave propagation.

UNIT-I

ANTENNA BASICS : Introduction, Radiation Mechanism, Antenna Parameters-Radiation Patterns, Patterns in Principle Planes, Main Lobe and Side Lobes, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height, Antenna Theorems- Applicability and Proofs for equivalence of directional characteristics.

UNIT-II

ELECTRIC DIPOLE AND THIN LINEAR ANTENNAS : Retarded Potentials, Small Electric Dipole, Quarter wave Monopole and Half wave Dipole Radiation characteristics.

UNIT-III

ANTENNA ARRAYS : 2 element arrays, Principle of Pattern Multiplication, N element Uniform Linear Arrays - Broadside, End fire Arrays, EFA with Increased directivity, Binomial Arrays, Methods of Array synthesis- Tchebyscheff Distribution and Fourier Transform Method.

UNIT-IV

LF, VLF, HF ANTENNAS: Introduction, Traveling wave radiators – basic concepts, Long wire antennas-field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Small Loop antennas- Concept of short magnetic dipole, Broadband Antennas: Helical Antennas-Significance, Geometry, basic properties, Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT-V

VHF, UHF AND MICROWAVE ANTENNAS: Folded Dipoles & their characteristics, Arrays with Parasitic Elements, Yagi Uda Arrays, Reflector Antennas: Flat Sheet and Corner Reflectors, Paraboloidal Reflectors, Cassegrain Feeds. Slot antennas-Babinets principle, Introduction to Microstrip antennas, Horn Antennas, Lens Antennas-Geometry, Features, Dielectric Lenses and Zoning, Applications (Qualitative Treatment).

UNIT-VI

ANTENNA MEASUREMENT THEORY: Antenna Measurements-Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3Antenna Methods).

UNIT-VII

WAVE PROPAGATION-I : Concepts of Propagation- frequency ranges and types of propagations. Ground Wave propagation - characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations, Sky Wave Propagation-Formation of Ionospheric Layers and their characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

UNIT-VIII

WAVE PROPAGATION-II: Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations, Space Wave Propagation - Mechanism, LOS and Radio Horizon, Tropospheric Wave

Propagation- Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-Curves and Duct Propagation, Troposphere Scattering.

TEXT BOOKS:

1. E. C. Jordan and K. G. Balmain, "Electromagnetic Waves and Radiating Systems", PHI, 2nd edition, 2000.
2. G.S.N Raju, "Antennas and Wave Propagation", 1st Edn Pearson Education, 2004.
3. John D. Kraus and Ronald J. Marhefka, "Antennas and Wave Propagation" TMH, 4th Edition, 2010.
4. K.D.Prasad, Satya Prakashan, "Antennas and Wave Propagation" Tech Publications, 3rd Edn, 2001.

REFERENCE:

1. C.A. Balanis, "Antenna Theory", 3rd Edn., John Wiley & Sons, 2009.

VLSI DESIGN

Course Code: AEC1117

L	T	P	C
4	1	0	4

AIM:

To familiarise student with the Concepts of VLSI Technology.

OBJECTIVE:

To acquire knowledge of fabrication process involved in MOS Devices and to introduce the basic electrical properties of MOS devices and VLSI Circuit Design Processes.

UNIT-I

INTRODUCTION TO MOS TECHNOLOGIES:

VLSI Design Flow, Introduction to IC Technology–MOS, PMOS, NMOS, CMOS & Bi-CMOS technologies.

UNIT-II

BASIC ELECTRICAL PROPERTIES: 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, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-III

VLSI CIRCUIT DESIGN PROCESSES: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-IV

GATE LEVEL DESIGN : Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT-V

SUBSYSTEM DESIGN: Sub system Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters, High Density Memory Elements.

UNIT-VI

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT-VII

CMOS DESIGN METHODS AND TESTING: Design methods, Design capture tools, Design Verification Tools, CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for Improved Testability.

UNIT-VIII

INTRODUCTION TO CMOS PROCESSING TECHNOLOGY: Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Dougles and A.Pucknell, "Essentials of VLSI circuits and systems", 3rd Edn, PHI, 2005.
2. Weste and Eshraghian, "Principles of CMOS VLSI Design", Pearson Education, 3rd edn 1999.
3. S.M. SZE, "VLSI Technology", 2nd Edition, TMH, 2003.

REFERENCES:

1. John .P. Uyemura, "Introduction to VLSI Circuits and Systems", 1st Edn., 2003. John Wiley
2. John M. Rabaey, "Digital Integrated Circuits" , PHI, EEE, 2nd Edn 1997.
3. Wayne Wolf, "Modern VLSI Design", Pearson Education, 3rd Edition, 1997.
4. Behzad Razavi,"Design of Analog CMOS Integrated Circuits", The McGraw Hill, 2001.

VLSI DESIGN LAB

Course Code: AEC1118

L	T	P	C
0	0	3	2

AIM & OBJECTIVE:

01. Design of digital IC's using VHDL on Xilinx platform and to simulate using Model-sim Simulator
02. Implementation on Xilinx Spartan kits.
03. Verification of digital ICs in Hardware Laboratory.

LIST OF EXPERIMENTS:

1) Logic gates
2) 3X8 Decoder-74X138
3) 8X1 Multiplexer-74X151
4) 16X1 Multiplexer-74X150
5) 4 bit comparator-74X85
6) D Flip-flop-7474
7) 4 bit counter- 7493
8) Decade counter-7490
9) Universal shift register-74194
10) serial In ,parallel out shift register
11) 4-bit ALU -74X381
12) Priority Encoder-74X148

Note: Any **TEN** of the above experiments are to be conducted.

DIGITAL COMMUNICATIONS LABORATORY

Course Code: AEC1119

L	T	P	C
0	0	3	2

AIM & OBJECTIVES:

To Design and compare the Modulation and De-modulation schemes of Digital Carrier Modulation techniques and multiplexing techniques.

LIST OF EXPERIMENTS:

1. Pulse Amplitude Modulation and Demodulation
2. Pulse Width Modulation and Demodulation
3. Pulse Position Modulation and Demodulation
4. Sampling Theorem –verification
5. Time Division Multiplexing
6. Digital Time Division Multiplexing
7. Pulse Code Modulation
8. Delta Modulation
9. Amplitude Shift Keying
10. Frequency Shift Keying
11. Phase Shift Keying
12. Differential Phase Shift Keying

Note: Any **TEN** of the above experiments are to be conducted.

SYLLABI FOR VI SEMESTER

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: AHM 1101

L	T	P	C
4	0	0	4

OBJECTIVE:

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among budding engineers.

OUTCOME:

To understand the economic environment and to give an idea on various accounting and financial management techniques for effective utilization of economic resources.

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics, Demand Analysis, Demand Determinants, Law of Demand and its exceptions

UNIT-II

ELASTICITY OF DEMAND AND DEMAND FORECASTING: Definition, Types, Measurement and Significance of Elasticity of Demand Demand Forecasting, Factors governing demand forecasting, Methods of demand forecasting (Survey method, Statistical method, Expert opinion method, Test marketing, Controlled experiment, Judgmental approach).

UNIT-III

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function – Isoquants and Isocosts, Laws of returns, Internal and External Economies of Scale Cost Analysis: Types of Costs, Break Even Analysis (BEA) – Determination of Break Even Point (Simple numerical problems) – managerial significance and limitations of BEA.

UNIT-IV

INTRODUCTION TO MARKETS: Market Structures: Types of competition, features of perfect competition, monopoly and monopolistic competition, price output determination in case of perfect competition and monopoly.

UNIT-V

FORMS OF BUSINESS ORGANIZATIONS: Features of Business, Advantages, Limitations of Sole Proprietorship, Partnership and Joint Stock Company, Types of companies – Features of Public and Private limited companies.

UNIT-VI

INTRODUCTION TO FINANCIAL ACCOUNTING: Accounting: Principles, concepts, conventions, double entry book keeping, Journal, Ledger Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments, international financial reporting standards (simple numerical problems).

UNIT-VII

FINANCIAL ANALYSIS THROUGH RATIOS: Introduction, Advantages and limitations, Computation, Analysis and Interpretation of Liquidity ratios, Activity ratios, Solvency ratios and Profitability ratios (simple numerical problems).

UNIT-VIII

BUDGETING AND CAPITAL BUDGETING: Introduction to Budgeting: Production budget, Flexible budget and Cash budget Definition, nature and scope of capital budgeting, features of capital budgeting proposals, methods of capital budgeting: Traditional and discounted methods (simple numerical problems).

TEXT BOOKS:

1. A R Aryasri, "Managerial Economics and Financial Analysis", 3rd Edition, Tata Mc Graw Hill, 2009.
2. Siddiqui & Siddiqui, "Managerial Economics and Financial Analysis", 1st Edition, New Age Publishers, 2005.

REFERENCES :

RL Varshney and KL Maheswari, "Managerial Economics", 19th Edition, Sultan Chand & Sons, 2007.

D Ragnunath Reddy & M V Narasimha Chary, "Managerial Economics and Financial Analysis", 1st Edition, SciTech Publishers , 2008.

Dwivedi , "Managerial Economics", 7th Edition, Vikas Publishers, 2009.

P K Sharma and Shashi K Gupta, "Management Accounting", 1st Edition, Kalyani Publishers, 2002.

S P Jain and K L Narang, "Financial Accounting", 1st Edition, Kalyani Publishers, 2002.

S N Maheswari & S K Maheswari, "Financial Accounting", 4th Edition, Vikas Publishers, 2006.

P L Mehta , "Managerial Economics", 15th Edition, Sultan Chand, 2010.

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

Course Code: AEC1120

L	T	P	C
4	1	0	4

AIM:

To familiarize students to various switching systems and data communication networks.

OBJECTIVE:

To understand the development of switching techniques and their operational maintenance for real time telecommunication in Telephone Exchanges.

UNIT-I

TELECOMMUNICATION SWITCHING SYSTEMS: Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching.

UNIT-II

Electronic space division switching, Time division switching, Combination switching.

UNIT-III

TELEPHONE NETWORKS: Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

UNIT-IV

SIGNALING TECHNIQUES: In channel signaling, common channel signaling. Network traffic load and parameters, grade of service and blocking probability.

UNIT-V

DATA COMMUNICATION NETWORKS : Introduction, layered network architecture, Data Communication Protocols, Data communication circuits, Public switched data networks, connection oriented & connection less service.

UNIT-VI

COMPUTER NETWORKS: OSI reference model, LAN, WAN, MAN & Internet, Circuit Switching, packet switching, Message switching and virtual circuit switching concepts, Repeaters, Bridges, Routers and gate ways.

UNIT-VII

INTEGRATED SERVICES DIGITAL NETWORK (ISDN) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT-VIII

DSL TECHNOLOGY : ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service, Broadband technology.

TEXT BOOKS:

1. Thyagarajan Viswanath, "Tele Communication Switching System and Networks", PHI, 1st Edn, 2000.
2. Wayne Tomasi, "Advanced Electronic Communications Systems", PHI, 6th Edn.2008.

REFERENCES:

1. J. Bellamy, "Digital Telephony" John Wiley, 3rd edition, 2004.
2. Achyut. S.Godbole, "Data Communications & Networks", TMH, 1st ed., 2002.
3. H. Taub & D. Schilling, "Principles of Communication Systems", TMH, 3rd Edition, 2003.
4. B.A. Forouzan, "Data Communication & Networking", TMH, 4th Edition, 2004.
5. J E Flood, "Telecommunication switching, Traffic and Networks", Pearson Education, 2002.

MICROCONTROLLERS AND APPLICATIONS

Course Code: AEC1121

L	T	P	C
4	1	0	4

AIM:

To provide an understanding of different architectures of microcontrollers and programming of 8051 microcontroller.

OBJECTIVE:

To familiarize students with 8051 architecture, instruction set and interfacing through assembly language programming. Introduce them to industrial applications and various other features like capture control, RTOS etc.

UNIT-I

8051 MICROCONTROLLERS: Microcontrollers and embedded processors, Overview of 8051 family, Pin description of the 8051, Program counter and ROM space in 8051, 256-byte on-chip RAM, 8051 flag bits and PSW register, 8051 register banks and stack.

UNIT-II

INSTRUCTION SET OF 8051: Data Transfer, arithmetic, logical and branching instructions - Arithmetic instructions, Logic and compare instructions, Rotate instructions, Call instructions, 8051 I/O programming, I/O bit manipulation programming, Immediate and register addressing modes, Accessing memory using addressing modes, Bit addresses for I/O and RAM.

UNIT-III

SFRs, TIMER PROGRAMMING, SERIAL PORT PROGRAMMING AND INTERRUPTS : Programming 8051 timers, counter programming, Basics of serial communication, 8051 connection to RS232, 8051 serial port programming in Assembly, 8051 interrupts, Programming timer interrupts, Programming external hardware interrupts, Programming serial communication interrupt, interrupt priority.

UNIT-IV

8051 INTERFACING TO MEMORYAND PERIPHERAL INTERFACING, PORT STRUCTURE : Interfacing with external ROM, Accessing internal RAM, Interfacing with external RAM, accessing external data memory space, LCD and keyboard interfacing, ADC and DAC interfacing, stepper motor interfacing.,

UNIT-V

INTERFACING TO EXTERNAL DEVICES: Programmable instruments interface using IEEE 488 bus, interfacing to High Power Devices, Analog input interfacing, Analog output interfacing, Optical shaft encoders interfacing, Industrial process control system and Prototype MCU based Measuring instruments, Interface to RF transreciever.

UNIT-VI

REAL TIME OPERATING SYSTEM FOR MICRO-CONTROLLERS: Real Time operating system, RTOS of Keil (RTX51), Use of RTOS in Design, Software development tools for Microcontrollers.

UNIT-VII

16-BIT MICROCONTROLLERS: Hardware Architecture - Memory map of Intel 80196 family MCU system, I/O ports, Programmable Timers and High-speed outputs and input captures, Interrupts, Instructions.

UNIT-VIII

ARM 32 Bit MCUs: Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set, Development tools.

TEXT BOOKS:

1. Mazidi and Mazidi, "The 8051 Microcontroller and Embedded Systems", 2nd Edn PHI, 2004.
2. Raj Kamal "Microcontrollers Architecture, Programming, Interfacing and System Design", Pearson Education, 1st Edn.2005.
3. Bendapudy Kanta Rao, "Embedded Systems", Prentice Hall India, 1st Edition, 2011.

REFERENCES:

1. A.V. Deshmukh, "Microcontrollers (Theory & Applications)", TMH, 1st ed., 2004.
2. John B. Peatman, "Design with PIC Microcontrollers", Pearson Education, 1st Edn, 2005.

MICROWAVE ENGINEERING

Course Code: AEC1122

L	T	P	C
4	1	0	4

AIM:

To familiarize Microwave components, terminology, tubes &Solid state Microwave Devices.

OBJECTIVES:

After the course students should be able to:

- Apply electromagnetic field theory to calculations regarding waveguides.
- Describe and analyze simple microwave circuits and devices e.g. matching circuits, couplers.
- Describe common devices such as microwave vacuum tubes and ferrite devices.
- Handle microwave equipment and be able to make measurements.

UNIT-I

WAVEGUIDES: Introduction, Microwave Spectrum and Bands, Applications of Microwaves, Rectangular Waveguides, Circular Waveguides, Cavity resonators.

UNIT-II

MICROWAVE COMPONENTS: Coupling Mechanisms – Probe, Loop, Aperture types, Waveguide joints, bends, corners, transitions, twists, Waveguide Discontinuities – Waveguide irises, Tuning Screws and Posts, Matched Loads, Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types.

UNIT-III

MICROWAVE JUNCTIONS: Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers

– Two Hole, Bethe Hole types, Ferrites– Composition and Characteristics, Faraday Rotation, Ferrite Devices – Gyrator, Isolator, Circulator, Scattering Matrix–Significance, Formulation and Properties, S Matrix Calculations for Multi port Junctions- E plane and H plane Tees, Magic Tee, Directional Coupler, Circulator and Isolator.

UNIT-IV

O-TYPE TUBES: Limitations and Losses of conventional tubes at microwave frequencies,

Microwave tubes – O type and M type classifications, O-type tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for o/p Power and Efficiency, Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics, Electronic and Mechanical Tuning, Related Problems.

UNIT-V

TWTS & BWO: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Nature of the four Propagation Constants, Gain Considerations, BWO- Operation, characteristics and Applications.

UNIT-VI

M-TYPE TUBES: Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and ð-Mode Operation, Separation of ð-Mode, o/p characteristics.

UNIT-VII

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications, Varactor Diodes, Parametric Amplifiers, PIN Diode, Tunnel Diode –Principle, Characteristics, Applications. TEDs – Introduction, Gunn Diode – Principle, Characteristics, Basic Modes of Operation,

Oscillation Modes. Avalanche Transit Time Devices – Introduction, IMPATT, TRAPATT and BARITT Diodes – Principle of Operation and Characteristics.

UNIT-VIII

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method, Measurement of Attenuation, Frequency, VSWR, Impedance Measurements.

TEXT BOOKS:

1. Samuel Y. Liao, "Microwave Devices and Circuits", PHI, 3rd Edition, 1996.
2. M. Kulkarni, "Micro Wave and Radar Engineering", Umesh Publications, 3rd Edn.1998.

REFERENCES:

1. R.E. Collin, "Foundations for Microwave Engineering", IEEE Press, John Wiley, 2nd Edition, 2002.
2. Annapurna Das and Sisir K Das, "Microwave Engineering", TMH, 2nd ed., 2008.
3. M.L. Sisodia and G.S.Raghuvanshi, "Microwave Circuits and Passive Devices", Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
4. Peter A. Rizzi, "Microwave Engineering Passive Circuits", PHI, 1999.
5. R. Chatterjee, "Elements of Microwave Engineering", Affiliated East-West Press Pvt. Ltd., New Delhi, 1988.
6. Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, "Microwave Principles", CBS Publishers and Distributors, New Delhi, 2004.

DIGITAL SIGNAL PROCESSING

Course Code: AEC1123

L	T	P	C
4	1	0	4

AIM:

To review signals and systems, study DFT and FFT, applications of z-transforms, discuss the design of IIR & FIR filters and study typical applications of digital signal processing.

OBJECTIVES:

- To have an overview of signals and systems.
  To study
- DFS, DFT & FFT.
- The applications of Z-transforms.
- The design of IIR filters.
- The design of FIR filters.
- The Multirate DSP & the applications of DSP.

UNIT-I

INTRODUCTION: Introduction to Digital Signal Processing, Review of discrete-time signals and systems, analysis of discrete-time linear time invariant systems, Frequency domain representation of discrete time signals and systems.

UNIT-II

DISCRETE FOURIER SERIES: DFS representation of periodic sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT, Relation between Z-transform and DFS.

UNIT-III

FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT.

UNIT-IV

REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Basic structures of FIR systems, System function.

UNIT-V

IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations.

UNIT-VI

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response, Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT-VII

MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT-VIII

APPLICATIONS OF DSP: Voice Synthesizers, Vocoders, Image processing. (Qualitative treatment only)

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing, Principles, Algorithms, and Applications", Pearson Education, 4th Edn. 2007.
2. A.V.Oppenheim and R.W. Schaffer, "Discrete Time Signal Processing", PHI.,2nd Edn ,2008

REFERENCE BOOKS:

1. Andreas Antoniou , "Digital Signal Processing", TATA McGraw Hill ,1st ed., 2006
2. MH Hayes, "Digital Signal Processing: Schaum's Outlines", TATA Mc-Graw Hill, 2nd ed., 2009.

3. C. Britton Rorabaugh, "DSP Primer", Tata McGraw Hill, 1st ed., 2005.
4. Robert J. Schilling, Sandra L. Harris, "Fundamentals of Digital Signal Processing using Matlab", Thomson, 2007
5. Alan V. Oppenheim, Ronald W. Schafer, "Digital Signal Processing" PHI 1st Ed., 2006.

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

Course Code: AEC1124

L	T	P	C
4	1	0	4

AIM:

To introduce the concept of measurement and the related instrumentation requirement as a vital ingredient of electronics and communication engineering.

OBJECTIVE:

To learn

- Basic measurement concepts
- Concepts of electronic measurements
- Importance of Signal analyzers in measurements
- Relevance of digital instruments in measurements.

UNIT-I

CHARACTERISTICS OF MEASUREMENT SYSTEMS:

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error, Grounding and earthing concepts.

UNIT-II

DIFFERENT TYPES OF MEASUREMENT METERS:

DC Voltmeters, Ammeters- Multi-range, Range extension, AC voltmeters-multi-range, range extension,-shunt. Thermocouple type RF ammeter, Ohm meters series type, shunt type, Voltage, Current, Resistance measurement using DMM, Auto zeroing, Auto ranging.

UNIT-III

TIME AND FREQUENCY MEASUREMENTS:

Phase and Magnitude Measurement at high frequency using instruments such as vector voltmeter, Frequency, Time and Period measurements.

UNIT-IV

CATHODE RAY OSCILLOSCOPES: Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO.

UNIT-V

ANALYZERS: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzer - FFT analyzer, Logic analyzer, Digital signal analyzer, Digital Fourier analyzer.

UNIT-VI

OSCILLOSCOPE: Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of phase measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator types.

UNIT-VII

BRIDGES: AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge, Measurement of capacitance -Schearing Bridge, Wheatstone bridge, Wien Bridge, Errors and precautions in using bridges. LCR-Q meter - principle of digital LCR-Q meter, specifications & applications.

UNIT-VIII

TRANSDUCERS : Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Acoustic Transducers ,Resistance Thermometers, Thermocouples, Measurement of physical parameters: force, humidity, speed.

TEXT BOOKS:

1. H.S.Kalsi, "Electronic Instrumentation", 3rd Edition - Tata McGraw Hill, 2010.
2. A.D. Helfrick and W.D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", PHI, 5th Edition, 2002.

REFERENCES:

1. David A. Bell, "Electronic Instrumentation & Measurements" PHI, 2nd Edition, 2003.
2. Robert A. Witte, "Electronic Test Instruments, Analog and Digital Measurements", Pearson Education, 2nd Ed., 2004.
3. K. Lal Kishore, "Electronic Measurements & Instrumentations", Pearson Education - 1st Edn, 2005.

MICROPROCESSORS AND MICROCONTROLLERS LAB

Course Code: AEC1125

L	T	P	C
0	0	3	2

AIM & OBJECTIVE:

To verify 8086 Microprocessor programming through MASM, interfacing peripherals to 8086 and simulate 8051 programming through KEIL.

I. Microprocessor 8086/Microcontroller 8051 :

1. Familiarization of MASM
2. 16-bit addition and subtraction, signed and unsigned multiplication and division operations.
3. Converting ASCII operands to packed BCD form, Converting packed BCD to unpacked BCD form.
4. Reversing string, Sorting, Scan a byte in a series of numbers.
5. DOS/BIOS Programming, reading keyboard(buffered with and without echo) -Display characters

II. INTERFACING :

1. 8259 – Interrupt Controller : Generate an interrupt using 8259 timer
2. 8279 – Keyboard interfacing to 8086: program to display a string of characters.
3. 8255– PPI: ALP to generate sinusoidal wave using PPI.
4. 8251 – USART: ALP to establish communication between two processors.

III. MICROCONTROLLER 8051:

1. Reading and Writing data on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

EQUIPMENT REQUIRED FOR LABORATORIES:

1. 8086 ìP Kits
2. 8051 Micro Controller kits
3. Interfaces/peripheral subsystems

i. 8259 PIC
ii. 8279-KB/Display
iii. 8255 PPI
iv. 8251 USART

4. Keil & MASM software

ADVANCED COMMUNICATION SKILLS LAB

CODE: AHE1103

L	T	P	C
0	0	3	2

INTRODUCTION :

The introduction of English Language Lab is considered essential at III/ IV B.Tech year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. This is an integrated theory and lab course to enable students use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research/technical reports
- Making oral presentations.
- Writing formal letters and essays.
- Transferring information from non-verbal to verbal texts and vice versa.
- Taking part in social and professional communication.

OBJECTIVES:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable them communicate their ideas relevantly and coherently in writing.

TEXT BOOK: LANGUAGE IN USE (Upper-Intermediate) ***by Adrian Doff and Christopher Jones, Cambridge University Publications.***

UNIT-I

- Reading and Listening comprehension – reading for facts, guessing meanings from context, scanning, skimming, inference, critical reading
- (Lesson 2: Communicating)

UNIT-II

- Vocabulary building, Creativity & Innovation, Using Advertisements and Music, Case studies
- Decision-Making, Time Management, Positive Thinking
- (Lesson 4: Sports and Games, Lesson 8: In The Market-Place)

UNIT-III

- Cross-Cultural Communication- Problems of Language, Lack of Language equivalency/difficulties in using English.
- Non-Verbal Communication across different Cultures.
- (Lesson 13: Right and Wrong)

UNIT-IV

- Literary reviews- reviewing the choicest genres like science fiction, autobiographies, travelogues, modern poetry etc.

UNIT-V

- Group Discussion – dynamics of group discussion , Lateral thinking, Brainstorming and Negotiation skills

(Lesson 10: Life, the universe and everything & Lesson 16: World Affairs)

UNIT-VI

- Resume writing – structure and presentation, planning, defining the career objective

- Interview Skills – concept and process, pre-interview planning, opening strategies, answering-strategies, interview through tele and video-conferencing

UNIT-VII

- Writing essays for competitive examinations
- Media writing-writing headlines, analyzing newspaper articles
- Analytical writing

UNIT-VIII

- Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Progress and Project Reports.

RECOMMENDED BOOKS:

COMMUNICATIONS SKILLS

1. M. Ashraf Rizvi, "Effective Technical Communication", Tata McGraw-Hill Publishing Company Ltd., 2005.
2. Bhanu Ranjan, "An Approach to Communication Skills", DhanpatRai &Co, 2010.
3. Raymond V. Lesikar, Marie E. Flatley, "Basic Business Communication: Skills for Empowering The Internet Generation", 11th Edition, Tata McGraw-Hill. 2006.
4. Stephen Bailey, "Academic Writing- A Practical guide for students", Routledge Falmer, London & New York, 2004.
5. Dr A. Ramakrishna Rao, Dr G.Natanam & Prof S.A. Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.
6. Dr. Shalini Verma, "Body Language- Your Success Mantra", S. Chand, 2006.
7. Barron's, "DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice", New Age International (P) Ltd., Publishers, New Delh, Books on TOEFL/GRE/GMAT/CAT, 2011.
8. "IELTS series with CDs", CUP, 2010.

9. Daniel G. Riordan & Steven E. Pauley, "Technical Report Writing Today", Biztantra Publishers, 2005.
10. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.
11. Sunita Mishra & C. Muralikrishna, "Communication Skills for Engineers", Pearson Education, 2007.
12. Jolene Gear & Robert Gear, "Cambridge Preparation for the TOEFL" Test, 2010.
13. Meenakshi Raman & Sangeeta Sharma, "Technical Communication", OUP, 2010.
14. Nick Ceremilla & Elizabeth Lee, "Cambridge English for the Media", CUP, 2010

General Reading

1. A Reader's Digest Selection, "Classic Short Stories" (India Today group), 2004.
2. Saros Cowasjee, "More Stories from the Raj and After", HarperCollins Publishers India, 1986.
3. Girish Karnad, "Hayavadana", OUP 1976.
4. A.P.J. Abdul Kalam "Wings of Fire", Universities Press, 1999.
5. Bernard Shaw, "Apple Cart/Arms and the Man", Orient Longman, 2010.
6. Khalil Gibran, "The Prophet" - Rajapal & Sons, 2008.

SYLLABI FOR VII SEMESTER

MANAGEMENT SCIENCE

Course Code: AHM 1102

L	T	P	C
4	0	0	4

AIM :

To familiarize with the process of management and to provide basic insights to select contemporary management practices.

OBJECTIVE :

To understand the management processes and evolve management levels for effective decision making

UNIT-I

INTRODUCTION TO MANAGEMENT : Concepts of Management and Organization – Nature, Importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne experiments, Maslow's Theory of human needs, Douglas Mc Gregor's Theory X and Theory Y, Hertzberg's Two factor Theory of motivation, Systems approach to Management, Leadership styles

UNIT-II

DESIGNING ORGANIZATIONAL STRUCTURES : Basic concepts related to Organization, Departmentation and Decentralization, Types of Mechanistic and Organic Structure of Organization (Line Organization, Line and staff Organization, Functional Organization, Committee Organization, Matrix Organization, Virtual Organization, Cellular Organization, Team Structure, Boundary less Organization, Inverted Pyramid Structure, Lean and Flat Organization Structure) and their merits, demerits and suitability

UNIT-III

OPERATIONS MANAGEMENT : Principles and Types of Plant Layout, Methods of Production (Job, Batch and Mass Production), Work Study, Basic procedure involved in Method Study and Work

Measurement, Statistical Quality Control: R chart, P chart, C chart (Simple numerical problems)

UNIT-IV

MATERIALS MANAGEMENT :

Objectives, Need for Inventory control, EOQ, ABC & VED Analysis, Purchase Procedure, Stores Management and Stores Records (simple numerical problems)Just in Time System (JIT)

UNIT-V

MARKETING MANAGEMENT : Functions of Marketing, Marketing mix, marketing strategies based on product life cycle, Channels of distribution, Consumer behavior and Customer relationship management

UNIT-VI

HUMAN RESOURCES MANAGEMENT : Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager : Manpower planning, Recruitment, Selection, Training and Development, Placement, Performance Appraisal, Job Evaluation and Merit Rating Grievance handling and Welfare Administration

Introduction to Social Security Laws: Payment of Gratuity Act (1972), Employees Provident Fund & Miscellaneous Provisions Act (1958), Employees State Insurance Act (1948)

UNIT-VII

PROJECT MANAGEMENT (PERT / CPM) : Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, probability of completing the project within given time, project cost analysis, project crashing (simple numerical problems)

UNIT-VIII

STRATEGIC MANAGEMENT : Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Steps in strategy formulation and implementation, value Chain Analysis, SWOT Analysis

Corporate social responsibility, business ethics and corporate governance

TEXT BOOKS :

1. A R Aryasri, "Management Science", Tata McGraw Hill, 2nd Edition, 2007.
2. O P Khanna, Industrial Engineering and Management, Dhanpat Rai Publishers, 2nd Edition, 2007.

REFERENCE BOOKS :

1. Azhar Kazmi, "Business Policy and Strategic Management", Tata McGraw Hill, 3rd Edition, 2008.
2. S D Sharma, "Operations Research", Kedarnath Ramnath& Co
3. Philip Kotler & Keller, "Marketing Management", Pearson Education, 13th Education, 2008.
4. C B Mamoria & C B Mamoria, "Personnel Management", Himalaya Publishers, 12th Edition, 1996.
5. B S Goel, "Production and Operations Management", Pragati Prakasan, 2nd Edition, 1979.
6. R Srinivasan, "Strategic Management", Eastern Economy Edition, PHI, 3rd Edition, 2008.
7. L M Prasad, "Principles and Practice of Management", Sultan Chand & Sons, 7th Edition, 2008.

RADAR ENGINEERING

Course Code: AEC1126

L	T	P	C
4	1	0	4

AIM:

To impart basic principles of Radar Engineering that are essential for defense and core industry.

OBJECTIVE:

To impart the students with basic principles of Radar, types of radars, Tracking techniques, basic radar receiver, noise and signal processing.

UNIT-I

INTRODUCTION : Nature of Radar, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications.

UNIT-II

RADAR EQUATION : 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-III

CW AND FREQUENCY MODULATED RADAR : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

UNIT-IV

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, Staggered PRFs. Range Gated Doppler Filters.

MTI Radar Parameters, Limitations to MTI Performance, Non-coherent MTI, MTI versus Pulse Doppler Radar.

UNIT-V

TRACKING RADAR : Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse, Target Reflection Characteristics and Angular Accuracy, Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT-VI

DETECTION OF RADAR SIGNALS IN NOISE : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-VII

RADAR RECEIVERS : Noise Figure and Noise Temperature, Displays – types, Duplexers – Branch type and Balanced type, Circulators as Duplexers, Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

UNIT-VIII

RADAR STUDIES OF THE ATMOSPHERE: Introduction, Scattering mechanisms, MST radar, meteor wind radar, other radar studies of the atmosphere.

TEXT BOOKS :

1. Merrill I. Skolnik, "Introduction to Radar Systems", 3rd Edition, McGraw-Hill, 1981.
2. Simion. Kingsley, "Understanding Radar Systems", Standard Publishing,1999.

REFERENCES :

1. Byron. Edde, "Radar Principles, Technology, Applications" Pearson Education, 2007.

DATA COMMUNICATIONS

Course Code: AEC1127

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To make the students understand the Data Networks in order to analyze different modulation techniques and transmission media.

UNIT-I

INTRODUCTION : Basics of Digital Communication, Communication channel, Measure of information, Communications Circuits, Serial and parallel Transmission, Circuit Arrangements and Networks, Bit Rate, Baud rate, Entropy.

UNIT-II

MODULATION TECHNIQUES : Baseband, Baseband pulse shaping, PCM, FSK, MSK, BPSK, QPSK, 8 & 16-PSK, 8 & 16 QAM, Band width efficiency, carrier recovery, clock recovery, Bit recovery, Probability of error, Inter Symbol Interference (ISI), Performance Analysis and Comparison.

UNIT-III

CODES, ERROR CONTROL & DATA FORMATS : Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

UNIT-IV

PROTOCOLS: Data Link Protocol Functions, Character and Bit - Oriented Protocols, Transmission Modes, Data Link Protocols-Synchronous & Asynchronous, Synchronous Data Link Control, High Level Data Link Control.

UNIT-V

DIGITAL MULTIPLEXING: TDM, CODECS, COMBO CHIPS , Line Encoding, Frame Synchronization, Frequency Division Multiplexing,Wave length Division Multiplexing, T1 Carrier .

UNIT-VI

COMMUNICATION EQUIPMENT : Serial and Parallel Interfaces, Voice Networks and Circuits, Digital Service Unit and Channel Service Unit, LCU, Voice- Band Data Communication Modems, Asynchronous & Synchronous Voice-Band Modems, Modem Synchronization, Cable Modems, Wireless Local loops.

UNIT-VII

NETWORKS : Topologies, Ethernet- Traditional, Fast and GIGA bit Ethernet, FDDI Public Data Networks, ISDN, B-ISDN.

UNIT-VIII

MULTI MEDIA: Digitization of Video and Audio, Compression, Streaming, Stored and Live Video and Audio, Real Time Interactive Video and Audio, VOD.

TEXT BOOKS:

1. Wayne Tomasi, "Electronic Communication Systems", Pearson 5th Edition, 2004.
2. William Stallings, "Data and computer communications", Pearson Education India, 8th edition 2007.

REFERENCES.

1. N B Chakrabarti, "An Introduction to The Principles of Digital Communication", New Age International, 2007.
2. Behrouz A Forouzan, "Data Communication & Networking", Tata McGraw-Hill Education, 4th Edition.
3. Taub and schilling, "Principles of Communication Systems", 3rd Edition McGraw-Hill, 2008.
4. Simon Haykin, "Digital Communications", Reprint-2009 John Wiley & Sons, 1988.

OPTICAL COMMUNICATIONS

Course Code: AEC1128

L	T	P	C
4	1	0	4

AIM:

To teach basic concepts of Fiber Optic communications.

OBJECTIVE:

To give an exposure to the design of simple fiber optic networks.

UNIT-I

OVERVIEW OF OPTICAL FIBER COMMUNICATION : Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V number, Mode coupling, Step Index fibers, Graded Index fibers.

UNIT-II

FIBER MATERIALS : Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index, Fiber materials— Glass, Halide, Active glass, Plastic optical fibers, Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT-III

TYPES OF DISPERSION : Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion, Pulse broadening, Fiber Splicing- Splicing techniques, Splicing single mode fibers.

UNIT-IV

OPTICAL SOURCES AND OPTICAL FIBER CONNECTORS : Connector types, Single mode fiber connectors, Connector return loss, Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints Optical sources- LEDs, Structures, Materials, Quantum efficiency, LED Power, Modulation, Power bandwidth product.

Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies, LD structure and radiation patterns, single mode lasers, temperature effects, Reliability of LED & ILD.

UNIT-V

OPTICAL DETECTORS : Physical principles of PIN and APD, detector response time, temperature effect on Avalanche gain , Comparison of Photo detectors.

UNIT-VI

OPTICAL RECEIVER OPERATION : Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit.

UNIT-VII

OPTICAL SYSTEM DESIGN : Considerations, Component choice. Point-to-point links, System considerations, Link power budget with examples, Rise time budget with examples.

UNIT-VIII

LINE CODING AND MEASUREMENTS : Line coding in Optical links, WDM, Necessity , Principles, Types of WDM, Measurement of Attenuation and Dispersion, Introduction to Synchronous digital hierarchy.

TEXT BOOKS

01. John M. Senior, "Optical Fiber Communications", PHI, 2nd Edition, 2002.

02. Gerd Keiser , "Optical Fiber Communications ", Mc Graw-Hill International Edition, 4th Edition, 2000.

REFERENCES:

1. Joseph C. Palais, "Fiber Optic Communications" 5th Edition, Pearson Education, 2004.

2. D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner , "Fiber Optic Communications", Pearson Education,2005.

DIGITAL IMAGE PROCESSING

(ELECTIVE – I)

CODE: AEC1129

L	T	P	C
4	1	0	4

AIM:

Digital Image Processing is a rapidly evolving field with growing applications in science and engineering. The aim of this course is to cover the basic theory and algorithms that are widely used in digital image processing and expose students to current technologies and issues that are specific to image processing systems.

OBJECTIVE:

- To understand theoretical foundations of digital image processing;
- To appreciate modern applications; and,
- To implement algorithms for image enhancement, filtering, restoration etc.

UNIT-I

INTRODUCTION : Digital image fundamentals, Concept of gray levels, Image sensing and Acquisition, Gray level to binary image conversion, Sampling and Quantization, Relationship between pixels.

UNIT-II

IMAGE TRANSFORMS : 2-D DFT, Properties, Walsh transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT-III

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN : Point processing, Histogram processing, Spatial filtering.

UNIT-IV

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN : Image smoothing, Image sharpening, Homomorphic Filtering.

UNIT-V

COLOR IMAGE PROCESSING: Pseudo color image processing, full color image processing.

UNIT-VI

IMAGE RESTORATION : Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-VII

IMAGE COMPRESSION: Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

UNIT-VIII

IMAGE SEGMENTATION: Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

TEXT BOOK:

1. R.C. Gonzalez & R.E. Woods, "Digital Image Processing" Addison Wesley/ Pearson Education, 2nd Edition, 2002.
2. A.K.Jain , "Fundamentals of Digital Image Processing", PHI, 5th ed.

REFERENCES:

1. Rafael C. Gonzalez, Richard E Woods and Steven L. Eddins, "Digital Image Processing using MAT LAB" , Pearson Education, 2004.
2. William K. Pratt, " Digital Image Processing", John Wilely, 3rd Edition, 2004.
3. Arthur R. Weeks, Jr., "Fundamentals of Electronic Image Processing", 3rd ed., SPIE Optical Engineering Press, 1996.
4. Jagadeesh Bandi, "Optimization Between Image Quality and Compression Ratio", LAP LAMBERT Academic Publishing, Germany, 2012, ISBN:978-3-8484-1095-8.

BIO MEDICAL INSTRUMENTATION

(ELECTIVE – I)

Course Code: AEC1130

L	T	P	C
4	1	0	4

AIM:

To give a complete exposure of various recording mechanisms and physiological parameters measured for diagnostic application.

OBJECTIVE:

- To study different types of electrodes used in bio-potential recording.
- To understand the characteristics of bio-amplifiers and different types of recorders.
- To understand how to measure various biochemical and nonelectrical parameters of human system.
- To study the instrumentation concerned with measuring the blood flow
- To study the latest developments in medical imaging systems.

UNIT-I

COMPONENTS OF MEDICAL INSTRUMENTATION SYSTEMS : Bio-amplifier, Static and dynamic characteristics of medical instruments, Bio-signals and characteristics, Problems encountered with measurements from human beings, Organization of cell, Nernst equation and Goldman's Equation for membrane Resting Potential Generation, Propagation of Action Potential.

UNIT-II

BIO-POTENTIAL ELECTRODES & TRANSDUCERS: Electrode potential, Electrode equivalent circuit, Types of Electrodes-Surface Electrodes, Needle Electrodes, Micro Electrodes, Transducers for measuring the physiological parameters.

UNIT-III

BIO-SIGNAL ACQUISITION : Electrical Conduction system of the heart, ECG leads, Einthoven triangle, ECG amplifier, EEG 10-20 lead system, EEG amplifier, Specifications and Interpretation of ECG,EEG,EMG, ERG, EOG.

UNIT-IV

BIO-SIGNAL MEASUREMENTS: Blood flow meters- Electromagnetic blood flow meter, Ultrasonic Doppler blood flow meter. Blood pressure measurement- Ultrasonic blood pressure monitoring, Phonocardiograph- Heart sound Microphone and preamplifier, TMT Machine.

UNIT-V

PHYSIOLOGICAL ASSIST DEVICES & THERAPEUTIC EQUIPMENT : Pacemakers- External & internal, Defibrillators- External & internal, Different types of Hemodialyser and Hemodialysis machine, Heart-Lung machine – Oxygenators and Blood pumps, Audio meter, Opthalmoscope, Shortwave Diathermy, Microwave Diathermy and Ultrasound Diathermy.

UNIT-VI

OPERATION THEATRE EQUIPMENT AND MONITORING EQUIPMENT: Spiro meter, Pnemuotachography using strain-gauge, Plethysmography, Anesthesia machine, Ventilators, Surgical diathermy, Humidifiers, Neubilisers, Arrthmia Monitor, Holter monitor, Ambulatory Monitor, Fotal Monitor, Incubator.

UNIT-VII

CLINICAL LABORATORY EQUIPMENT : Colorimeter, Flame photometer, Spectrophotometer, Conductivity meter, Electrophoresis, Chromatography, Blood cell Counter, Blood gas analyzer: pH-pCO_2, pO_2, Auto-analyzer, Glucometer.

UNIT-VIII

MEDICAL IMAGING EQUIPMENT: X-ray generation, X-ray tube, X-ray machine, Computed Tomography (CT), Endoscope, Ultrasound Imaging system, Magnetic resonance Imaging (MRI), Nuclear Imaging

systems- Positron Emission Tomography (PET), Single Photon Emission Tomography (SPECT).

TEXT BOOKS:

1. Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, "Biomedical Instrumentation and Measurements", PHI, 2nd ed, 1980.
2. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", 4th Edition, Pearson Education Asia, 2001.

REFERENCES:

1. R.S. Khandpur, "Hand-book of Biomedical Instrumentation", TMH, 2nd Ed., 2003.
2. John Enderle, Susan Blanchand and John Bronzino, "Introduction to Biomedical Engineering", Elsvier Publications ,2005.
3. John G. Webster, "Medical Instrumentation, Application and Design", John Wiley, 3rd ed., 2009.

ROBOTICS

(ELECTIVE-I)

Course Code: AEC1131

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To inculcate the student to understand the components of a robotics and capability for designing from a system approach.

UNIT-I

INTRODUCTION: Automation and Robotics, An overview of Robotics–current and future applications – classification by coordinate system and control method.

UNIT-II

CONTROL OF ACTUATORS IN ROBOTIC MECHANISMS: Closed loop control in a position servo, effect of friction and gravity, frequency domain considerations, control of robotic joints, stepper motors, hydraulic actuators and pneumatic systems, servo amplifiers.

UNIT-III

ROBOTIC SENSORY DEVICES: Non-optical position sensors, velocity sensors, accelerometers, proximity sensors, noncontact proximity sensors, Touch and slip sensors, force and torque sensors, Speaker and microphone.

UNIT-IV

VISION FOR ROBOTIC SYSTEM : Imaging components, Image representation, hardware considerations, picture coding, object reorganization and categorization, software considerations, need for vision training and adaptation, Review of existing systems.

UNIT-V

COMPUTER CONSIDERATIONS FOR ROBOTIC SYSTEMS : Architectural considerations, hardware considerations, computational

elements in robotic applications, real time considerations, Robot programming, path planning, the robot's computer system.

UNIT-VI

TRANSFORMATIONS AND KINEMATICS: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT-VII

COMPONENTS OF THE INDUSTRIAL ROBOT : Functional line diagram representation of robot arms, common types of arms, Components, Architecture, number of degrees of freedom – requirements and challenges of end effectors, determination of end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices, Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems.

UNIT-VIII

ROBOT APPLICATION: Material Transfer - Material handling, loading and unloading-Processing - spot and continuous arc welding – Electronic Assembly, Inspection and testing.

TEXT BOOKS:

1. Richard D. Klafter, Thomas A.Chmielewski, Michael Negin, "Robotic Engineering: An Integrated Approach", Prentice- Hall, lnc., Englewood cliffs, NJ, USA, April, 2004.
2. Robert J. Schilling , "Fundamentals of Robotics : Analysis and Control", Prentice Hall, 1990.

REFERENCES:

1. Groover M P, "Industrial Robotics", McGraw-Hill, 1986.
2. Haruhiko Asada, Jean-Jacques E. Slotine, "Robot Analysis and Intelligence", Wiley-IEEE, 1986.
3. John J Craig, "Introduction to Robotics", 3rd ed., Pearson, Prentice Hall, 2005.

DATA STRUCTURES FOR ENGINEERING APPLICATIONS

(ELECTIVE-I)

Course Code: AIT1114

L	T	P	C
4	1	0	4

AIM:

To empower students to build efficient software applications with suitable data structures.

OBJECTIVE:

To make students understand the software design techniques for solving engineering applications of their discipline

UNIT-I

RECURSION AND LINEAR SEARCH : Preliminaries of algorithm, Algorithm analysis and complexity, Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi. (Chapters 1, 2 from Text Book 1)

UNIT-II

SEARCHING TECHNIQUES : Introduction, Linear Search, Transpose Sequential, Search, Interpolation Search, Binary Search, Fibonacci Search.

(Chapter 15 from Text Book 2)

UNIT-III

SORTING TECHNIQUES: Basic concepts, insertion sort, selection sort, bubble sort, quick sort, merge sort. (Chapter 12 from Text Book 1)

UNIT-IV

STACKS : Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, In-fix-

to postfix Transformation, Evaluating Arithmetic Expressions. (Chapter 3 from Text Book 1)

UNIT-V

QUEUES : Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack. (Chapter 4 from Text Book 1)

UNIT-VI

APPLICATIONS OF QUEUES : Applications of Queues- Enqueue, Dequeue, Circular Queues, Priority Queues. (Chapter 4 from Text Book 1)

UNIT-VII

LINKED LISTS : Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, merging two single linked lists into one list, Reversing a single linked list, Circular linked list, Double linked list. (Chapter 6 from Text Book 2)

UNIT-VIII

TREES : Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree, Binary Tree Traversals (recursive), Creation of binary tree from in-order and pre(post)order traversals.

(Chapter 8 from Text Book 2)

TEXT BOOKS:

1. Richard F, Gilberg & Behrouz A. Forouzan, " Data Structures", 2nd Edition, Thomson, 2007.
2. GAV PAI, "Data Structures and Algorithms", 1st Edition, Tata McGraw-Hill, 2010.

REFERENCES:

1. Seymour Lipschutz, "Data Structure with C", 1st Edition, TMH, 2009.
2. Debasis ,Samanta "Classic Data Structures", 2nd Edition, PHI,2009.

3. Horowitz,Sahni, Anderson "Fundamentals of Data Structure in C", 2nd Edition, Freed, University Press, 2009.

Note

A small application may be implemented in software from their respective disciplines at the end of the course.

DESIGN CONCEPTS FOR ENGINEERS

(ELECTIVE – I)

Course Code: AEE 1142

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To teach the principles of design, and how they apply to engineering design projects and future job activities. It teaches the design process, rather than the technical details of any one engineering field. Basic design principles of and design tools, are introduced.

UNIT-I

What is engineering? Definition. Various fields of engineering. Engineering professional bodies.

UNIT-II

What is design? Difference between analysis , design, and replication. Good design versus bad design. The design cycle. Overall objectives.

UNIT-III

Modeling and analysis. Gathering information. Build document and test. Revise. Informal brain storming. Examples.

UNIT-IV

Project management and team work skills. Working in a team . Building a team. Job description. Team meetings. Working with other teams.

UNIT-V

Time line. Pert. Documentation. Logbook. Technical reports. Electronic documentation. Case studies.

UNIT-VI

Engineering tools. Estimation. Significant figures. Plots.Prototyping. Reverse engineering. Computer analysis.

UNIT-VII

The human machine interface. How people interact with machines.

Ergonomics. Societies view of engineering. Learning from mistakes. Role of failure. Case studies.

UNIT-VIII

Learning to speak, write, and make presentations. Importance of good communication. Preparing for meetings. Preparing a formal presentation. Technical papers. Proposals. Instructional manuals.

TEXT BOOK:

1. N Horenstien, "Design Concepts for Engineers Mark", Prentice Hall, 4th Edition, 2009.

REFERENCE BOOK:

1. Balbir S. Dillon, "Advanced Design Concepts for Engineers", Technology Publishing Company, 1st Edition, 1998.

SATELLITE COMMUNICATION

(ELECTIVE – II)

Course Code: AEC1132

L	T	P	C
4	1	0	4

AIM:

Students will learn Satellite Systems and Communications applications comprehensively and apply this knowledge for understanding the existing Modern Satellite Applications.

OBJECTIVE:

The flow of the syllabus enables students to understand the subject from basics to advanced technologies on Satellite Communications and get prepared for Industry and will not be needing extensive training on these aspects.

UNIT-I

SATELLITE ORBITS : Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT-II

SPACE SEGMENT : Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command.

UNIT-III

EARTH SEGMENT : Earth Station Technology— Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT-IV

SATELLITE LINK DESIGN : Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT-V

SATELLITE ACCESS : Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption.

UNIT-VI

SATELLITE APPLICATIONS-COMMUNICATIONS : INTELSAT Series, INSAT, VSAT, Mobile satellite services : GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Specialized services : E –mail, Video conferencing, Internet.

UNIT-VII

PRINCIPLES OF TV & BROADCASTING: Gross structure, Image continuity, Scanning, flicker, interlaced scanning, number of scanning lines, Fine structure, Tonal Gradation. Video signal dimensions, Horizontal sync. details, Vertical sync. details, Scanning sequence details, Functions of vertical pulse train, Channel bandwidth, vestigial side band transmission, bandwidth allocations for colour transmission.

UNIT-VIII

SATELLITE APPLICATIONS-BROADCAST : Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT.

TEXT BOOKS:

1. Tri T. Ha, 'Digital Satellite Communication", 2nd Edition, McGraw-Hill, 1990.
2. R R Gulati, "Monochrome and Colour Television", New Age International, 2007.

REFERENCES:

1. M. Richharia, "Satellite Communication Systems-Design Principles", Macmillan 2003.
2. N.Agarwal, "Design of Geosynchronous Space Craft", Prentice Hall, 1986.
3. Bruce R. Elbert, "The Satellite Communication Applications Hand Book", Artech House Bostan London, 1997.
4. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering", Prentice Hall, Pearson, 2007.

EMI/EMC

(ELECTIVE-II)

Course Code: AEC1133

L	T	P	C
4	1	0	4

AIM:

To impart the fundamentals that are essential for electronics industry in the field of EMI AND EMC

OBJECTIVE:

- To understand EMI sources and its measurements.
- To understand the various techniques for electromagnetic compatibility.

UNIT-I

Introduction: History and concept of EMI, Definitions of EMI/EMC, Electromagnetic environment, Practical experiences and concerns, frequency spectrum conservation, mechanisms of EMI generation, EMI testing, Methods of elimination of EMI and Biological effects of EMI.

UNIT-II

NATURAL AND MANMADE SOURCES OF EMI/EMC: Sources of Electromagnetic noise, typical noise paths, modes of noise coupling, designing for EM compatibility, lightening discharge, electro static discharge (ESD), electromagnetic pulse (EMP).

UNIT-III

EMI FROM APPARATUS / CIRCUITS AND OPEN AREA TEST SIDES: Electromagnetic emissions, noise form relays and switches, non-linearities in circuits, passive inter modulation, transients in power supply lines, EMI from power electronic equipment, EMI as combination of radiation and conduction, Open area test sides: OATS measurements, measurement precautions.

UNIT-IV

RADIATED INTERFERENCE MEASUREMENTS: Anechoic chamber, TEM cell, reverberating chamber, GTEM cell, comparison of

test facilities.

UNIT-V

CONDUCTED INTERFERENCE MEASUREMENT: Characterization of conduction currents / voltages, conducted EM noise and power line, conducted EMI from equipment, immunity to conducted EMI, characteristics of EMI filters and power line filter design.

UNIT-VI

GROUNDING AND CABLING: Safety and signal grounds, low and high frequency grounding methods, grounding of amplifiers and cable shields, isolation, neutralizing transformers, shield grounding at high frequencies, digital grounding, types of cables, mechanism of EMI emission / coupling in cables.

UNIT-VII

SHIELDING AND BONDING: Effectiveness of shielding, near and far fields / impedances, methods of analysis, total loss due to absorption and reflection effects, composite absorption and reflection losses for electric fields / magnetic fields, magnetic materials as a shield, shield discontinuities, slots and holes, seams and joints, conductive gaskets Electrical Bonding, Shape and Material for Bond straps, General Characteristics of good bonds.

UNIT-VIII

COMPONENTS FOR EMI /EMC STANDARDS : Choice of capacitors, inductors, transformers and resistors, EMC design components National / International EMC standards, military and civilian standards.

TEXT BOOKS:

1. Dr. V.P. Kodali, " Engineering Electromagnetic Compatibility", IEEE Publication, S. Chand & Co. Ltd., New Delhi, 2000.
2. Electromagnetic Interference and Compatibility IMPACT series, IIT-Delhi, Modules 1-9.

REFERENCES:

1. C.R. Pal , "Introduction to Electromagnetic Compatibility", Ny John Wiley, 1992.

OPERATING SYSTEMS

(ELECTIVE-II)

Course Code:ACT1108

L	T	P	C
4	1	0	4

AIM:

Gives the idea about the CPU scheduling and memory scheduling and now they implemented using respective algorithms.

OBJECTIVE:

Student may have the idea about resource sharing, multitasking, multiprocessing etc.

UNIT-I

COMPUTER SYSTEM AND OPERATING SYSTEM OVERVIEW : Overview of computer operating systems, operating systems functions, protection and security distributed systems, special purpose systems operating systems structures and systems calls, operating systems generation

UNIT-II

PROCESS MANAGEMENT : Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling, case studies UNIX, Linux, Windows

UNIT-III

CONCURRENCY : Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic ransactions, Case studies UNIX, Linux, Windows.

UNIT-IV

MEMORY MANAGEMENT : Swapping, contiguous memory allocation, paging, structure of the page table ,segmentation, virtual memory, demand paging, page-Replacement, algorithms, case studies UNIX, Linux, Windows.

UNIT-V

PRINCIPLES OF DEADLOCK : system model, deadlock characterization,deadlock prevention, detection and Avoidance, recovery form deadlock, I/O systems, Hardware, application interface, kernel I/O subsystem, Transforming I/O requests, Hardware operation, STREAMS, performance.

UNIT-VI

FILE SYSTEM INTERFACE : The concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection. File System implementation- File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows

UNIT-VII

MASS-STORAGE STRUCTURE : overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT-VIII

PROTECTION : Protection, Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection, Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer–security classifications, case studies UNIX, Linux, Windows.

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", 7th Edition, John Wiley & Sons, 2006.
2. D.M.Dhamdhere, "Operating systems - A Concept Based Approach", 2nd Edition, TMH, 2010.

REFERENCES:

1. William Stallings, "Operating Systems", Internal and Design Principles, 6th Edition, Pearson Education, PHI, 2009.
2. Charles Crowley, "Operating Systems - A Design Approach", 1st Edition, TMH, 2009.
3. Andrew S Tanenbaum, "Modern Operating Systems", 3rd edition Pearson, PHI, 2008.

SOFTWARE DEVELOPMENT ENGINEERING

(ELECTIVE -II)

Course Code: ACS1114

L	T	P	C
4	1	0	4

AIM :

- The aim of this course is to provide general background on the Engineering of Software Development process to students in non computer science departments such as civil, chemical, mechanical, electrical engineering, etc.

OBJECTIVES:

- To provide an understanding of the various processes software engineers may employ in developing contemporary software systems
- To examine all phases of the software development life cycle, from initial planning through implementation and maintenance.
- To develop an understanding of the tools and techniques employed in contemporary software engineering.
- To develop an understanding of the skills required to analyze and design software systems.
- To demonstrate an appreciation of good practices in software engineering.
- To demonstrate the application of software quality concepts.

UNIT-I

INTRODUCTION TO SOFTWARE ENGINEERING: The evolving role of software, Changing Nature of Software, Software Myths.

A GENERIC VIEW OF PROCESS: SOFTWARE ENGINEERING: A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), process patterns, process assessment, personal and team process models.

UNIT-II

PROCESS MODELS: The waterfall model, Incremental process models, Evolutionary process Models, The Unified process, agile methodology.

SOFTWARE REQUIREMENTS : Functional and non-functional requirements, user requirements, System requirements, Interface specification, the Software Requirements document.

UNIT-III

REQUIREMENTS ENGINEERING PROCESS : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

SYSTEM MODELS : context models, Behavioral models, Data models, object models, structured Methods.

UNIT-IV

DESIGN ENGINEERING : Design process and Design quality, Design concepts, the design model.

CREATING AN ARCHITECTURAL DESIGN : Software Architecture, Data design, Architectural styles and

Patterns, Architectural Design.

UNIT-V

OBJECT ORIENTED DESIGN : Objects and Object classes, An Object Oriented design process,Design

Evolution.

PERFORMING USER INTERFACE DESIGN: Golden rules, User interface analysis and design, interface Analysis, interface design steps, Design evaluation,

Unit-VI

TESTING STRATEGIES: A strategic approach to software testing, the strategies for conventional

Software, Verification Testing and Validation Testing, Different Types of Testing, the art debugging.

UNIT-VII

Client Server Systems - Meaning, Architecture and Design

Web based Systems - Meaning, Architecture and Design

Data warehouse System - Meaning, Architecture and Design

Introduction to RAD Tool (3-4 lab sessions included)

UNIT-VIII

Write Software Development Specifications that include System Analysis and System design for

a) A Web Based Application System

b) A Data warehouse Application system

TEXT BOOKS:

1. Rojer S Pressman, Roger S., "Software Engineering, A Practitioner's Approach", 7th Edition, TMH, 2008.

2. Han, Jiawel and Kamber Micheline, "Data Mining – Concepts and Techniques", 2nd Edition, Morgan Kaufmann Publishers, 2008.

RELIABILITY EVALUATION OF ENGINEERING SYSTEMS

(ELECTIVE - II)

Course Code: AEE1125

L	T	P	C
4	1	0	4

AIM :

This is a basic course on Reliability in application to Engineering Systems in general. This course, as an elective can be taken by other branches also in general, by Mechanical, Chemical and Electronics and Communication branches in particulars.

OBJECTIVE :

The subject introduces concepts of reliability after reviewing concepts of Probability and Random Variables. The course is helpful in System Analysis and Design.

UNIT-I

INTRODUCTION AND PRELIMINARIES : Introduction to the subject, Review of basic Probability Theory: Probability concepts, Venn Diagrams, Combining Probabilities, Random Variables, distribution and Density Functions, Expectation, Variance, Standard Deviation, Binomial Distribution and properties.

UNIT-II

NETWORK MODELING AND EVALUATION OF SIMPLE SYSTEMS: Network Modeling Concepts, Series, Parallel and Series Parallel Systems, Redundant Systems.

UNIT-III

NETWORK MODELING AND EVALUATION OF COMPLEX SYSTEMS : Modeling and Evaluation, conditional Probability approach, Cutset Method, Tie-set Method, Connection Matix Techniques, Event trees, Fault trees, Failure Models.

UNIT-IV

PROBABILITY DISTRIBUTION AND RELIABILITY EVALUATION : Distribution concepts, General reliability functions and evaluation, Poisson, Normal and Exponential Distribution, Reliability functions, A-posteriori failure probability, Mean Value and standard deviation, Different other distributions , Data Analysis.

UNIT-V

SYSTEM RELIABILITY EVALUATION USING PROBABILITY DISTRIBUTIONS : Series and Parallel Systems, Partially Redundant and Systems, Mean Time to Failure, Standby Systems, Wear out and Component Reliability, Maintenance and Component Reliability.

UNIT-VI

DISCRETE MARKOV CHAINS : Modeling concepts, Stochastic transitional probability Matrix, Time dependant probability evaluation, Limiting State Probability Evaluation, Absorbing States, Applications.

UNIT-VII

CONTINUOUS MARKOV CHAINS : General Modeling Concepts, State Space diagrams, Stochastic Transitional Probability Matrix.

UNIT-VIII

CONTINUOUS MARKOV CHAINS (CONTINUED) : Evaluating Limiting State Probabilities and Time dependant Sate Probabilities, Reliability Evaluation in Repairable Systems, Mean time to failure, Applications.

TEXT BOOKS :

1. Roy Billington, Ronald N. Allan, "Reliability Evaluation of Engineering Systems (Concepts and Techniques)" , 2nd edition Springer, 2010.

REFERENCE BOOK :

1. Charles Ebelling, "An Introduction to Reliability & Maintainability Engineering", Tata Mc. Graw Hill Science, 1st edition, 2000.

MICROWAVE & OPTICAL COMMUNICATIONS LAB

Course code: AEC1134

L	T	P	C
0	0	3	2

AIM AND OBJECTIVE:

The main objective of this lab is to gain the practical hands on experience by exposing the students to various microwave components and optical fibres. The students will have an understanding of the concepts involved in transmission and reception of the microwave signals, characteristics of components.

MINIMUM TEN EXPERIMENTS TO BE CONDUCTED:

1. To verify Reflex Klystron Characteristics and to determine the frequency and tuning range of reflex klystron.
2. To verify Gunn Diode Characteristics.
3. To analyze the fixed and variable attenuator and plot the micrometer reading Vs attenuation.
4. To determine the coupling factors and directivity of directional coupler.
5. To measure the power distribution of various wave guide Tee i.e. E plane, Hplane, Magic Tee.
6. VSWR Measurement and load impedance calculations using smith chart.
7. Scattering parameters of Circulator.
8. Characterization of LED.
9. Characterization of Laser Diode.
10. Intensity modulation of Laser output through an optical fiber.
11. Measurement of Data rate for Digital Optical link.
12. Measurement of Numerical Aperture of fiber cable.
13. Measurement of losses for Analog Optical link.

DIGITAL SIGNAL PROCESSING LABORATORY

Course Code: AEC1135

L	T	P	C
0	0	3	2

AIM & OBJECTIVE:

Design, Simulation and Implementation of various discrete time signals and verification of various digital signal processing operations using Code Composer Studio and MATLAB.

LIST OF EXPERIMENTS:

1. To study the features and architecture of DSP chips – TMS 320C6713 DSK.
2. To verify linear convolution between two sequences.
3. To verify the circular convolution between two sequences.
4. Implementation of 4-point and 8-point FFT.
5. Implementation of 4-point and 8-point IFFT.
6. To generate various discrete time signals.
7. To generate sum of sinusoidal signals and to find the frequency response.
8. To find the FFT of given 1-D signal and plot.
9. To design IIR Butterworth and Chebyshev filters(LP/HP).
10. To design FIR filter (LP/HP) using windowing technique.

a) Using rectangular window

b) Using triangular window

c) Using hamming window

11. Filter Design and Analysis using FDA Tool.
12. To compute power density spectrum of a sequence.

*Note: Any **TEN** of the above experiments are to be conducted*

SYLLABI FOR VIII SEMESTER

COMPUTER NETWORKS

Course Code: AEC1136

L	T	P	C
4	1	0	4

AIM:

To understand data networks applications, protocols and applications for design of all generation data networks.

OBJECTIVE:

Capability to understand updated technologies for future applications.

UNIT-I

INTRODUCTION : OSI, TCP/IP and other networks models, Examples of Networks, Arpanet, Internet, Network Topologies, PAN ,LAN,MAN,WAN.

UNIT-II

PHYSICAL LAYER : Transmission media: copper twisted pair, Optical Fiber, wireless: switching and encoding, asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT-III

DATA LINK LAYER : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT-IV

MEDIUM ACCESS SUB LAYER : ALOHA, MAC addresses, Carrier sense multiple access, IEEE 802.X Standard Ethernet, wireless LANS. Bridges.

UNIT-V

NETWORK LAYER : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broadcast, Multi cast, distance vector routing.

UNIT-VI

DYNAMIC ROUTING : Broadcast routing, Rotary for mobility, Congestion, Control Algorithms – General Principles of Congestion prevention policies, Internet working: The Network layer in the internet and in the ATM Networks.

UNIT-VII

TRANSPORT LAYER : Transport Services, Connection management, TCP and UDP protocols; ATM, AAL Layer Protocol.

UNIT-VIII

APPLICATION LAYER : Network Security, Domain name system, SNMP, Electronic Mail; the Worldwide WEB.

TEXT BOOKS:

1. Andrew S Tanenbaum, "Computer Networks" 4th Edition. Pearson, Education, PHI, 2003.
2. Behrouz A. Forouzan., "Data Communications and Networking" 3rd Edition, TMH.

REFERENCES:

1. S.Keshav, "An Engineering Approach to Computer Networks: ATM networks, the internet, and the telephone network", Pearson Education India, 1997, 2nd Edition.
2. W.A.Shay, "Understanding Communications and Networks", PWS, 1995.

DIGITAL DESIGN THROUGH VERILOG

(ELECTIVE – III)

Course Code: AEC1137

L	T	P	C
4	1	0	4

AIM AND OBJECTIVES:

To learn the concepts of modeling a digital system using Verilog hardware description Language.

UNIT-I

INTRODUCTION TO VERILOG : Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks.

UNIT-II

GATE LEVEL MODELING : Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flipflops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits.

UNIT-III

BEHAVIORAL MODELING : 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. i*f* and i*f*-else constructs, assign-deassign construct, repeat construct, for loop, the

disable construct, whileloop, forever loop, parallel blocks, force-release construct, Event.

UNIT-IV

MODELING AT DATA FLOW LEVEL : Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING : Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets.

UNIT-V

SYSTEM TASKS, FUNCTIONS AND COMPILER DIRECTIVES : Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations.

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines).

UNIT-VI

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.

UNIT-VII

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.

UNIT-VIII

VERILOG MODELS : Static RAM Memory, A simplified 486 Bus Model, UART Design.

TEXT BOOKS :

1. T.R. Padmanabhan and B. Bala Tripura Sundari, "Design through Verilog HDL'', WSE, IEEE Press2004.
2. Charles H.Roth, "Digital System Design using VHDL",Jr. Thomson Publications,2004.

REFERENCES :

1. Samir Palnitkar, "Verilog HDL", Pearson education, 2nd edition,2003.
2. Thomas and Moorby, "The Verilog Hardware Description Language", Kluwer academic publishers 5th edition,2002.
3. Stephen Brown and Zvonko Vranesic, "Fundamentals of Logic Design with Verilog", TMH publications, 2005.
4. J. Bhaskar, "A Verilog Primer'', BSP, 2003.

EMBEDDED SYSTEMS

(ELECTIVE – III)

Course Code: AEC1138

L	T	P	C
4	1	0	4

AIM:

To familiarize student with the various hardware and software technologies used in the embedded system design.

OBJECTIVES:

1. To provide overview of embedded systems and their design challenges and digital design of single and general purpose processors.
2. To introduce advanced state machine models popular in embedded system modeling and various communication interfaces.
3. To introduce RTOS concepts with reference to task synchronization in embedded systems
4. To discuss hardware/software codesign, synthesis and design based on intellectual property and implementation of digital camera with practical orientation.

UNIT-I

INTRODUCTION : Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT-II

GENERAL PURPOSE PROCESSORS: Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) , Microcontrollers and Digital Signal Processors.

UNIT-III

STATE MACHINE AND CONCURRENT PROCESS MODELS: Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT-IV

COMMUNICATION INTERFACE : Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth, Serial Peripheral Interface

UNIT-V

EMBEDDED / RTOS CONCEPTS : Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals

UNIT-VI

EMBEDDED / RTOS CONCEPTS : Timers, Memory Management, Priority inversion problem, Embedded operating systems, Embedded Linux, Real-time operating systems, RT Linux, Handheld operating systems, Windows CE.

UNIT-VII

DIGITAL CAMERA EXAMPLE : Introduction, Introduction to a Simple Digital Camera, Requirement Specification, Design

UNIT-VIII

DESIGN TECHNOLOGY : Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS :

1. Raj Kamal, "Introduction to Embedded Systems" , TMH, 2002.
2. Frank Vahid, Tony D. Givargis, "Embedded System Design A Unified Hardware/Software Introduction", John Wiley, 2002.
3. KVKK Prasad , "Embedded / Real Time Systems", Dreamtech Press, 2005.

REFERENCES :

1. Jonathan W. Valvano, "Embedded Microcomputer Systems: Real Time Interfacing "3rd ed., Brooks Cole, 2011
2. David E. Simon, "An Embedded Software Primer", Pearson Ed., 2005.
3. Sri Ram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", TMH, 2004.

INDUSTRIAL ELECTRONICS

(ELECTIVE – III)

Course code : AEC1139

L	T	P	C
4	1	0	4

AIM:

To familiarize students with the electronics associated with industries for the improvement of quality and productivity.

OBJECTIVE:

To make students aware of

- nomenclature
- notations
- existing standard practices
- the developments of industrial automation over a number of years.

UNIT-I

POWER SUPPLIES : DC-DC Converters, Block diagram, Design Parameters, Power loss, Power dissipation, Accuracy, Resolution, Principle of MTBF.

UNIT-II

TRANSDUCERS : Introduction : Classification of Transducers, selection criteria of a Transducer, Types of Transducers, Strain gauge as a transducer, Capacitive Transducer, Inductive Transducer, Piezoelectric Transducers, Thermistors, Thermocouples, Pyrometers, Accelerometers.

UNIT-III

ANALOG TRANSMITTERS : Transmitters in Instrumentation and Control systems, 0-5V, 0-10V, 0-20mA, 4-20mA output Analog Transmitters.

UNIT-IV

DIGITAL TRANSMITTERS : RS232, RS485, SPI, USB, Serial Synchronous Interface (SSI) Digital Transmitters.

UNIT-V

DISTRIBUTED MANAGEMENT SYSTEMS : Evolution, Different architectures, Local Control Unit, Operator Interface, Displays, Engineering Interface, Alarms and Alarm management, DCS case study, Study of any one popular DCS available in market, Factors to be considered in selecting DCS, case studies in DCS.

UNIT-VI

PLCs-I : Introduction: PLC Definition, Advantages, Characteristic function of a PLC, Evolution of PLC, Types of PLC, Elements of functional Block diagram of PLC.

UNIT-VII

PLCs-II : Basic design of a PLC, Areas of Application of PLC, Programming of a PLC – Resources of a PLC, Elements of Ladder diagram.

UNIT-VIII

INDUSTRIAL APPLICATIONS: Digital Shaft encoder, Pyrometer, Roll gap adjustment, Furnace Heat Control, Rolling Schedules, Supervisory Control and Data Acquisition (SCADA) systems: case studies.

TEXT BOOKS:

1. S K Bhattacharya, S Chatterjee, "Industrial Electronics and Control", TMH Publishing Company Limited, 2002.
2. Helen Beecroft, Jim Cahill, "Fundamentals of Industrial Control-Distributed Control Systems/Digital Automation Systems", ISA Publishers.
3. David Bailey, Edwin Wright , "Practical SCADA for Industry'', Newnes publications, 2003.

REFERENCES :

1. R. Bliesener, F. Ebel, C. Loffler, B. Plagemann, H. Regber, E.V.Terzi, A. Winter, TP301.Festo Didactic.,08/2002 edition.
2. http://en.wikipedia.org/wiki/List_of_PLC_manufacturers.
3. David Bailey, Edwin Wright , "Practical SCADA for Industry" Newnes publications, 2003.
4. John W. Webb, Ronald A. Reis, "Programmable logic controllers: principles and applications", Prentice Hall, 2003.
5. Madhuchhandra Mitra and Samarjit Sen Gupta, "Programmable Logic Controllers And Industrial Automation", Penram International Publishing (India) Pvt.Ltd.

DSP PROCESSOR AND ARCHITECTURE

(ELECTIVE – IV)

CODE: AEC1140

L	T	P	C
4	1	0	4

AIM:

This course aims to introduce the architechture required for Signal Processing applications with practical implementation issues. The necessary interaction between hardware and software, architecture issues will be studied in the context of TMS320C54XX DSP Processor.

OBJECTIVES:

1. To understand the issues involved in implementing DSP algorithms on processors.
2. To understand and appreciate the features provided by various architectures in supporting common DSP tasks.
3. To understand the implementation of common DSP tasks on processors.

UNIT-I

INTRODUCTION TO DIGITAL SIGNAL PROCESING:

Introduction, Digital signal-processing system, Sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, DSP using MATLAB.

UNIT-II

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS :

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-III

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-IV

EXECUTION CONTROL AND PIPELINING: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT-V

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.

UNIT-VI

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-VII

IMPLEMENTATION 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.

UNIT-VIII

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Multichannel buffered serial port (McBSP), McBSP Programming, CODEC interface circuit, CODEC programming, CODEC-DSP interface example.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, "Digital Signal Processing", Thomson Publications, 2004.
2. Phil Lapsley, "DSP Processor Fundamentals", Architectures & Features, S. Chand & Co, 2000.

REFERENCES:

1. B. Venkata Ramani and M. Bhaskar, "Digital Signal Processors, Architecture", Programming and Applications, TMH, 2004.
2. Jonatham Stein, "Digital Signal Processing", John Wiley, 2005.

WIRELESS COMMUNICATIONS

(ELECTIVE – IV)

Course Code: AEC1141

L	T	P	C
4	1	0	4

AIM:

To Study the Wireless Communication Techniques, Channel Properties and Standards of Wireless Systems.

OBJECTIVE:

Familiar about methods to improve the capacity of the Wireless Communications.

UNIT-I

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS : Evolution of Mobile Radio Communications, Mobile radio telephony in the U.S., Mobile radio systems around the world, Examples of Wireless Communication systems, Trends in cellular radio and Personal Communications, Second generation (2G) Cellular Networks, Third generation (3G) Wireless Networks, Wireless Local Loop (WLL) and LMDS, Wireless Local Area Networks (WLANs), Bluetooth and Personal Area Networks(PANs).

UNIT-II

THE CELLULAR CONCEPT-SYSTEM DESIGN FUNDAMENTALS : Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems.

UNIT-III

MOBILE RADIO PROPAGATION : Three Basic Propagation Mechanisms, Reflection, Diffraction, Scattering, Small-Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading, Fading in Wireless Communications.

UNIT-IV

MODULATION TECHNIQUES FOR MOBILE RADIO : Frequency Modulation vs. Amplitude Modulation, Amplitude Modulation, Angle Modulation, Digital Modulation-an Overview, Line Coding, Pulse Shaping Techniques, Geometric Representation of Modulation signals, Linear Modulation Techniques, Constant Envelope Modulation, Combined Linear and Constant Envelope Modulation Techniques, Spread Spectrum Modulation Techniques, Modulation performance in Fading and Multipath channels.

UNIT-V

EQUALIZATION, DIVERSITY, CHANNEL CODING, AND BASEBAND CODING : Fundamentals of Equalization, Generic Adaptive Equalizer, Equalizers in a Communications Receiver, Survey of Equalization Techniques, Linear Equalizers, Nonlinear Equalization, Algorithms for Adaptive Equalization, Fractionally Spaced Equalizers, Diversity Techniques, RAKE Receiver, Interleaving, Channel Coding, Block Codes and Finite Fields, Convolutional Codes, Coding gain, Trellis Coded Modulation, Turbo Codes, Characteristics of Speech Signals, Quantization Techniques, PCM, Differential Pulse Code Modulation(DPCM), Delta Modulation (DM), Adaptive Delta Modulation(ADM), Frequency Domain Coding of Speech, Vocoders, Linear Predictive Coders, Choosing Speech Codecs for Mobile Communications, GSM Codec, USDC Codec, Performance evolution of Speech Coders.

UNIT-VI

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATIONS : Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, CDMA (Code Division Multiple Access) Space Division Multiple Access (SDMA), Packet Radio, Capacity of Cellular Systems.

UNIT-VII

WIRELESS NETWORKING : Difference Between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks, Wireless

Data Services, Common Channel Signaling(CCS), Integrated Services Digital Network(ISDN), Signaling System No.7(SS7), Example of SS7-Global Cellular Network Interoperability, Personal Communication Services/Networks(PCS/PCNs), Protocols for Network Access, Network Databases, Universal Mobile Telecommunication Systems(UMTS).

UNIT-VIII

WIRELESS SYSTEMS AND STANDARDS : Global Systems for Mobile(GSM), CDMA Digital Cellular Standard(IS-95), PACS-Personal Access Communication Systems, Pacific Digital Cellular(PDC), System(PHS), US PCS and ISM Bands, US Wireless Cable Television, 2G and 3G Network Applications.

TEXT BOOKS:

1. S.Rappaport, "Wireless Communications-Theodore", Pearson education, 2nd Edn., 2002.
2. W.C.Y.Lee, "Mobile Cellular Telecommunications", Tata McGraw Hill, 2nd edition, 2006.

REFERENCES:

1. Andrea Gold Smith, "Wireless Communications", Cambridge University Press, 2005
2. Lee "Wireless and Mobile Communications", McGraw Hills, 3rd Edition, 2006.
3. Jon W. Mark and Weihua Zhqung, Wireless Communication and Networking", PHI, 2005.
4. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

POWER ELECTRONICS

(ELECTIVE – IV)

Course Code: AEE1112

L	T	P	C
4	1	0	4

AIM:

To familiarize the student with different power semiconductor devices, converter circuits that find wide application in industry.

OBJECTIVE:

With the advent of semiconductor devices, revolution is taking place in the power transmission, distribution and utilization. This course introduces the basic concepts of power semiconductor devices, converters and their analysis.

UNIT-I

POWER SEMICONDUCTOR DEVICES: Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics– Basic principle of operation of SCR – Static characteristics – Two transistor analogy of SCR - Turn on and turn off methods- Dynamic characteristics of SCR – Turn on and Turn off times -Salient points .

UNIT-II

TRIGGERING AND COMMUTATION CIRCUITS: Series and parallel connections of SCR's – Thyristor Protection-di/dt protection-dv/dt protection-over voltage protection-over current protection-gate protection-(Principle of operation only)– Specifications and Ratings of SCR - Gate triggering circuits, Line Commutation and Forced Commutation circuits- Numerical problems.

UNIT-III

SINGLE PHASE FULLY CONTROLLED CONVERTERS: Fully controlled converters, Mid point and Bridge connections with Resistive, RL loads and RLE load– Derivation of average load voltage and current

for continuous load current only– Effect of freewheeling diode- Line commutated inverters -Active and Reactive power inputs to the converters without and with Freewheeling Diode, Effect of source inductance – Derivation of load voltage and current – Numerical problems.

UNIT-IV

SINGLE PHASE HALF CONTROLLED CONVERTERS: Half controlled bridge converter with R, RL and RLE load- Derivation of average load voltage and current for continuous load current operation only-Active and Reactive power inputs to the converters–Numerical problems

UNIT-V

THREE PHASE LINE COMMUTATED CONVERTERS : Three phase converters – Three pulse and six pulse converters – Mid point and bridge connections- derivation of average load voltage With R and RL loads-Three phase half controlled bridge converter-derivation of average load voltage – Effect of Source inductance–Dual converters (both single phase and three phase) - Numerical Problems.

UNIT-VI

AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS: AC voltage controllers – Single phase two SCR's in anti parallel – With R and RL loads, Derivation of RMS load voltage, current and power factor -wave forms –numerical problems - Cyclo converters – Single phase mid point cyclo converters with Resistive and inductive load (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms

UNIT-VII

CHOPPERS : Choppers – Time ratio control and Current limit control strategies – Step down choppers- Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage Expression ,Morgan's chopper, Jones chopper (Principle of operation only) Waveforms — AC Chopper – Problems.

UNIT-VIII

INVERTERS: Inverters – Single phase inverter – Basic series inverter – Basic parallel Capacitor inverter, Bridge inverter – Waveforms - Voltage control techniques for inverters -Pulse width modulation techniques.

TEXT BOOKS:

1. M. D. Singh & K. B. Kanchandhani, "Power Electronics", Tata Mc Graw – Hill Publishing company, 2nd Edition, 1998.
2. P. S. Bimbra, "Power Electronics", Khanna Publishers, 4th Edition, 2000.

REFERENCES:

1. M. H. Rashid, "Power Electronics: Circuits, Devices and Applications", Prentice Hall of India 2nd Edition, 1998.
2. P.C.Sen, "Power Electronics", Tata Mc Graw-Hill, 1st Edition, 2001.
3. Vedam Subramanyam, "Power Electronics", New Age International (P) Limited, Publishers, 2003.
4. B. K. Bose, "Modern Power Electronics and AC Drives", Pearson Education, 2nd Edition, 2003.

PROCESS CONTROL AND AUTOMATION

(ELECTIVE – IV)

Course Code: AEC1142

L	T	P	C
4	1	0	4

AIM:

To familiarize engineers of all disciplines with the knowledge of computers and electronics.

OBJECTIVES :

1. To make a student comprehensive engineer.
2. To make the student understand the importance of automation and control for improvement of quality and productivity.
3. This knowledge should make every engineer to understand the importance ofproper specifications to be defined for making the automation successful.

UNIT-I

INTRODUCTION TO COMPUTER CONTROL : Role of computers in the control of Industrial processes (plants). Elements of Computer Controlled Process Plant. Classification – Batch, Continuous, Supervisory and Direct Digital Controls, Architecture – Centralized, Distributed and Hierarchical Systems, Man Machine or Human Computer Interface (HCI).

UNIT-II

BUILDING BLOCKS : Process Control Requirements of Computers, Process related variables, Computer Network, Communications in Distributed control Systems, Smart Sensors and Field bus, Wireless sensor networks and control, Data Acquisiton system.

UNIT-III

CONTROL SYSTEM DESIGN : Control System Design – Heuristics, Structural Controllability and Relative Gain Array. Controller Design –

Regulator design and other design considerations, Controller Tuning – P, PI, PID, and Ziegler-Nicholas method, Computer aided Control System Design.

UNIT-IV

PROGRAMMABLE LOGIC CONTROLLERS (PLCS): Introduction - principles of operation - Architecture of Programmable Logic controllers - programming the programmable controllers- software - configurations - applications.

UNIT-V

DESIGN OF FEED FORWARD CONTROLLER : Block Diagram, Feed Forward control algorithms – dynamic, static, Deadbeat

UNIT-VI

CASCADE, PREDICTIVE AND ADAPTIVE CONTROL: Cascade Control – Dynamic response, Types, Implementation, Predictive Control – Model based and Multivariable System, Adaptive Control – Adjustment, Schemes, and Techniques.

UNIT-VII

INDUSTRIAL CONTROL APPLICATIONS: Automation of thermal power plant - Automation strategy - distributed system structure - Automatic boiler controller - diagnostic function and protection - automatic start-up system - thermal stress control - man - machine interface – software system - communication system - variable pressure control - combined plant control.

UNIT-VIII

DISTRIBUTED CONTROL SYSTEMS: Introduction - Functional requirements of distributed control system - system architecture -

Distributed control systems - configuration - Applications of distributed control systems.

TEXT BOOKS

1. S.K.Singh, " Computer Aided Process Control", PHI Learning Pvt. Ltd., 2004.

2. M.Chidambaram, “Computer Control of Processes”, Narosa 2003.

REFERENCES:

1. Seborg, D.E., T.F. Edgar, and D.A. Mellichamp, “Process Dynamics and Control”, John Wiley, 2004.
2. Johnson D Curtis, “Instrumentation Technology”, 7th Edition, Prentice Hall India, 2002.
3. Krishna Kanth, “Computer-based Industrial Control”, PHI 1997.
4. S. Bennett, “Real Time Control : An Introduction”, 2nd Edition, Pearson Education India, 2003 Reference http: //jntu.ac.in/dap/syl.html.