Note: This is an auto generated page. Formatting of this page may be different from the website.

EVALUATION SCHEME

&

SYLLABI

FOR

B. TECH.

IN

ELECTRONICS & COMMUNICATION ENGINEERING

(Effective from the session: 2012-2013)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

G B PANT ENGINEERING COLLEGE

PAURI GARHWAL (UTTARAKHAND) INDIA

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
I-YEAR (I-SEMESTER)
(Effective from session: 2012-13)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TCS-111	Basic Computer Engineering	3	1	0	30	20	50	100	150
2.	TME-111	Basic Mechanical Engineering	3	1	0	30	20	50	100	150
3.	TAH-111	Engineering Chemistry	3	1	0	30	20	50	100	150
4.	TAH-112	Environmental Science	3	0	0	30	20	50	100	150
5.	TAH-113	Engineering Mathematics-I	3	1	0	30	20	50	100	150
PR ACTICAL										
6.	PCS-111	Basic Computer Engineering Lab	0	0	2	10	15	25	25	50
7.	PME-111	Basic Mechanical Engineering Lab	0	0	2	10	15	25	25	50
8.	PAH-111	Engineering Chemistry Lab	0	0	2	10	15	25	25	50
9.	PME-112	Workshop Practice	1	0	2	10	15	25	25	50
10.	GPP-111	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**16**	**4**	**8**	**190**	**210**	**400**	**600**	**1000**

TCS-111 BASIC COMPUTER ENGNEERING

UNIT-1: AN INTRODUCTION OF COMPUTER SYSTEM: Anatomy of a digital Computer, Different Units of Computer System, Classification of Computer Systems, Radix Number systems. Binary codes: BCD, Gray, EBCDIC, ASCII.
OPERATING SYSTEM: Operating System Concepts, Operating System services, Types of Operating Systems. Introduction to PC Operating Systems: Unix/Linux, DOS, Windows.

UNIT-2: PROGRAMMING LANGUAGES AND ALGORITHMS: Machine, Assembly and High Level Language; Assembler, Linker, Loader, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flowcharts and their symbols.

UNIT-3: COMPUTER NETWORKS: Basic concepts of Computer Networks, Working of Internet and its Major features. Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular; Types of Networks: LAN, MAN and WAN.
ELECTRONIC MAIL: advantages and disadvantages, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms.

UNIT-4: BASICS OF 'C' LANGUAGE: C Fundamentals, Basic data types, local and external variables and scope, formatted input/ output, expressions, selection statements, loops and their applications; arrays, functions, recursive functions, pointers and arrays. Strings literals, arrays of strings; applications, Structures, Unions and Enumerations.

UNIT-5: ADVANCED FEATURES OF 'C' LANGUAGE: Preprocessor directives, macro definition, conditional compilation, storage classes, type's qualifiers, Low level programming (Bitwise operators, Bit fields in structures, other low level techniques), error handling, file operations(low level/high level).

BOOKS:

1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
2. Fundamentals of Computing and C Programming, R. B. Patel, Khanna Publications, 2010, New Delhi.
3. Computer Fundamentals and Programming in C, Reema Theraja, Oxford
4. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998 , TMH
5. Theory and problem of programming with C, Byron C Gottfried, TMH
6. Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.
7. C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

TME-111 BASIC MECHANICAL ENGINEERING

UNIT-1: FUNDAMENTAL CONCEPTS AND DEFINITIONS: Definition of thermodynamics, System, Surrounding and Universe, Phase, Concept of continuum, Macroscopic & microscopic point of view, Thermodynamic equilibrium, Property, State, Path, Process, Cyclic and non cyclic processes, Reversible and irreversible processes, Quasi static process, Energy and its forms, Enthalpy.

UNIT-2: Zeroth law, First law: First law of thermodynamics. Processes - flow and non-flow, Control volume, Flow work and non-flow work, Steady flow energy equation, **Second law:** Limitations of first law of thermodynamics, Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator. Statements of second law and their equivalence, Carnot cycle, Carnot theorem, Clausius inequality, Concept of entropy.

UNIT-3: PROPERTIES OF STEAM: Properties of steam, Phase transformation process and its graphical representation on p-V, T-V, p-T &T-s diagram, Mollier diagram and Steam Tables, Processes involving steam in closed and open systems.
INTRODUCTION TO I.C. ENGINES: Two & four stoke S.I. and C.I. engines, Efficiency and mean effective pressure of Otto cycle, Diesel cycle and Dual cycle.

UNIT-4: FORCE SYSTEM AND ANALYSIS: BASIC CONCEPT: Review of laws of motion, transfer of force to parallel position, resultant of planer force system, Free Body Diagrams, Equilibrium.
FRICTION: Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry fiction.
STRUCTURE ANALYSIS: BEAMS: Introduction to shear force and bending moment, Shear force and bending moment diagram for statically determinate beams.
TRUSSES: Introduction, Simple Trusses, Determination of forces in simple truss members, Method of joints and Method of section.

UNIT-5: STRESS AND STRAIN ANALYSIS
SIMPLE STRESS AND STRAIN: Introduction, Normal shear stresses, Stress-strain diagrams for ductile and brittle materials, Elastic constants, one dimensional loading of members of varying cross section, Strain energy, Thermal stresses.
COMPOUND STRESS AND STRAINS: Introduction, State of plane stress, Principal stress and strain, Mohr's circle for stress.
PURE BENDING OF BEAMS: Introduction, Simple bending theory, Stress in beams of different cross sections.
TORSION: Introduction, Torsion of Shafts of circular section, Torque and Twist, Shear stress due to Torque.

BOOKS:

1. Agarwal: Basic Mechanical Engineering, Wiley India
2. Holman, J.P.: Thermodynamics, Mc Graw Hill book Co. NY.
3. Singh Onkar, Bhavikatti S.S., Chandra Suresh : Introduction to Mechanical Engineering: Thermodynamics, Mechanics and Strength of Materials, New Age International Publishers
4. Yadav R.: Thermodynamics and Heat Engines, Vol I & II (SI Edition) Central Publishing House Allahabad.

TAH-111 ENGINEERING CHEMISTRY

UNIT–1: GENERAL & ORGANIC CHEMISTRY: Molecular orbital diagram of diatomic molecules, valence bond theory & molecular orbital Theory linear combination of atomic orbitals, hybridization, hydrogen bonding, band theory of solids, liquid crystals with their classification applications, Bragg's Law, Fullerenes & their application , organic name reactions (cannizzaro's reaction, aldol condensation, Pinnacol-pinnacolon rearrangement, Beckmann's rearrangement, Hoffmann's rearrangement, Rimmer-Timmer reaction), Optical isomerism & confirmations, E-Z nomenclature, R-S configuration.

UNIT-2: PHYSICAL & WATER CHEMISTRY: Rate of reaction, order & molecularity of reaction, Zero order, First Order, Second order reaction, concept of activation energy, energy barrier, conductance & its variation with dilution, Transport no., Kohlraush's Law and its application, pH, buffer solution, calculation of pH of buffer mixture solubility & solubility Product, Nernst distribution law & its application, corrosion, its type, Mechanism & control, Theory of Electrochemical corrosion. Hardness of water, boiler feed water, softening of water (Calgon Process, Zeolite process, Lime Soda process & Ion exchange process), Reverse osmosis, treatment of boiler feed water.

UNIT-3: CHEMISTRY OF ENGINEERING MATERIALS: Introduction & classification of polymers, Types of Polymerization, bulk solution, suspension & emulsion, copolymers, vulcanization, PVC, Polyamides, Polyurethane, Polyethylene, Poly propylene, PET, Resins (Phenol Formaldehyde), PMMA, PAN, Rubber, Conducting and Biodegradable polymers, pyroceramics, Toughened glass, Strengthening of glass, Protective Coatings.

UNIT-4: FUELS & COMBUSTION AND ENVIRONMENTAL POLLUTION: Classification of Fuels, calorific value of fuel, gross & net calorific value, determination of calorific value using Bomb calorimeter, Coal, Biomass and Biogas, Bio Fuel, Esterification & Transesterification, Introduction of Lubricants, Mechanism of Lubrication, Classification of Lubricant, Bio Lubricant, Flash and Fire Point, Pour Point, Cloud Point, Aniline point, Viscosity index. **Environmental pollution:** Types of pollution & pollutants, Air Pollution. Formation and depletion of ozone, smog and Acid rain, **Toxic chemicals in Environment**: Basic concepts, Brief idea about the environmental impact of toxic chemicals specially, CO, NxOx, SOx, O_3, Pesticides, environmental management

UNIT-5: ANALYTICAL METHODS AND APPLICATIONS: Titrimetric analysis with reference to acid-base, redox, precipitation and complexometric titrations, Elementary ideas and simple applications of UV, visible, mass and HNMR spectral techniques.

BOOKS:

1. Text book of Engineering Chemistry by R.N. Goyal and Harmendra Goel, Ane publication Delhi
2. Engineering Chemistry by R.P. Mani & K.N. Mishra, Cengage learning India Pvt. Ltd
3. Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co., New Delhi.
4. Physical Chemistry by Atkin's, Oxford University Press.
5. Organic Chemistry by Morrisson & Boyd, Pearson Publication.
6. Organic Chemistry by Loudon, Oxford University Press.
7. Concise Inorganic Chemistry by J.D. Lee, Wiley – India.
8. Chemistry concepts and applications by Steven S.Zumdahl from Cengage Learning India Pvt. Ltd., New Delhi.

TAH-112 ENVIRONMENTAL SCIENCE

UNIT-1: 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 their 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 over-grazing, 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-2: 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 Forest ecosystem; Grassland ecosystem; Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT-3: BIODIVERSITY AND ITS CONSERVATION: Introduction – Definition: genetic, species and ecosystem diversity, Biogeographical 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 mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situconservation of biodiversity.

UNIT-4: ENVIRONMENTAL POLLUTION & SOCIAL ISSUES: Definition, cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, disaster management: floods, earthquake, cyclone and landslides, from unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed management, 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.

BOOK:

1. M Ajni Reddy, Text book of environmental Science, BS Publication, Hyderabad
2. Environmental Studies by Daniel, Wiley India
3. Environmental Studies by Erach Bharucha, University Press.
4. Fundamental of Ecology, E.P.Odum, Cengage Learning.

TAH-113 ENGINEERING MATHEMATICS-I

UNIT-1: MATRICES: Elementary row and column transformations Rank of matrix, linear dependence, Consistency of linear system of equations, Characteristic equation, CayleyHamilton theorem, Eigen values and Eigen vectors, Complex and unitary matrices.

UNIT-2: DIFFERENTIAL CALCULUS-I: Leibnitz theorem, Partial Differentiation, Euler‘s theorem, Change of variables, Expansion of functions of several variables.

UNIT-3: DIFFERENTIAL CALCULUS-II: Jacobian, Approximations and errors, extrema of functions of several variables, Lagrange method of undetermined multipliers.

UNIT-4: MULTIPLE INTEGRALS: Double and triple integrals, Change of order, Change of variables, beta and gamma functions, application to area, volume, Drichlet integral and applications.

UNIT-5: VECTOR CALCULUS: Gradient, divergence and curl of a vector and their physical interpretation, Line, surface and volume integrals, Green, Stokes and Gauss divergence theorem.

BOOKS:

1. Matrics by V.N. Kala and R.Rana, University Press New Delhi.
2. Advanced Engineering Mathematics, Kreyszig, Wiley India
3. A Text book of Engineering Mathematics (Vol.1) by Peter V. O‘ Neil, Cengage Learning
4. B. S. Grewal: higher Engineering Mathematics, Khanna Publications.
5. N. Piskunov: Differential & Integral Calculus, Moscow Peace Publications.
6. G Shankar Rao, Text book of engineering mathematics,BS Publication, Hyderabad

PCS-111 BASIC COMPUTER ENGINEERING LAB

1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices.
7. Write a program to sort numbers using Sorting Algorithm.
8. Represent a deck of playing cards using arrays.
9. Write a program to check that the input string is a palindrome or not.
10. Write a program to read a string and write it in reverse order.
11. Write a program to concatenate two strings.
12. Write a program which manipulates structures (write, read, and update records).
13. Write a program which creates a file and writes into it supplied input.
14. Write a program which manipulates structures into files (write, read, and update records).

PME-111 BASIC MECHANICAL ENGINEERING LAB

1. Study of Steam engine and steam turbine models.
2. Study of 2-stroke and 4 -stroke I.C.E. models.
3. Study of Fiat engine and/ or Diesel engine prototype.
4. Study of a vapour compression Refrigeration unit tutor/refrigerator.
5. Study of a window type air conditioner.
6. To conduct the tensile test on a UTM and determine ultimate Tensile strength, percentage elongation for a steel specimen.
7. To conduct the compression test and determine the ultimate compressive strength for a specimen.
8. To conduct the Impact test (Izod / Charpy) on the Impact testing machine and to find the impact strength.
9. To determine the value of acceleration due to gravity by Atwood's Machine apparatus.
10. To verify the principle of moment by Bell Crank Lever Apparatus
11. To determine the moment of inertia of a flywheel apparatus about its axis of rotation
12. To verify Newton's second law o f motion by Fletcher's Trolley apparatus
13. To find out coefficient of friction by combined inclined plane & friction slide apparatus

14. To determine the velocity ratio, mechanical advantage & efficiency of a single purchase crab apparatus & draw graph between load vs effort, mechanical advantage and efficiency.
15. To determine the velocity ratio, mechanical advantage & efficiency of a double purchase crab apparatus.

PAH-111 ENGINEERING CHEMISTRY LAB

1. To determine the percentage of available chlorine in the supplied sample of Bleaching powder.
2. To determined the Ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using $K_3Fe(CN)_6$ as external indicator.
3. To determine the chlorine content in the supplied water sample using Mohr's method.
4. To determine the constituents and amount of alkalinity of the supplied water sample.
5. To determine the Temporary and Permanent hardness of water sample by Complexometry.
6. To find out the Chemical oxygen demand of a wastewater sample using Potassium dichromate.
7. To determine the iron concentration in the sample of water by Spectro- Photometric method.
8. To find out the velocity constant for the inversion of cane sugar in acidic medium and to show that inversion follows the first order kinetics.
9. To determine the Molecular weight of a Polystyrene sample by using Viscometric Method.
10. To determine the pH of a solution using a pH meter and titration of such a solution pHmetrically.
11. To determine the calorific value of a fuel sample by using a Bomb Calorimeter.
12. Analysis of a coal sample by proximate analysis method.
13. Determination of flash & fire point of lubricating oil.
14. Determination of heat of neutralization of Hydrochloric acid & Sodium hydroxide.

PME-112 WORKSHOP PRACTICE

CARPENTRY SHOP:

1. Study of tools and operation and carpentry joints.
2. Simple exercise using jack plain.
3. To prepare half- lap corner joint, mortise and tennon joints.
4. Simple exercise on woodworking lathe. **FITTING BENCH WORKING SHOP:**

1. Study of tools and operations
2. Simple exercises involving filling work.
3. Making perfect male-female joint

4. Simple exercise involving drilling/tapping/dieing.

BLACK SMITHY SHOP:

1. Study of tools and operations
2. Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

WELDING SHOP:

1. Study of tools and operations
2. Simple butt joint.
3. Lap joint.
4. Oxy acetylene welding. **SHEET METAL SHOP:**

1. Study of tools and operations.
2. Making funnel complete with soldering.
3. Fabrication of tool box, tray, electrical panel box etc

MACHINE SHOP:

1. Study of tools and operations 2.

Plane turning.

3. Step turning.
4. Taper turning
5. Threading.
6. Single point cutting tool grinding.

BOOKS:

1. Hajra, Bose, Roy: Workshop Technology Vol 1 & 2, Media Promotors
2. Raghuvanshi B.S.: Workshop Technology, Vol 1 & 2, Dhanpatrai

EVALUATION SCHEME

B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING

I-YEAR (II-SEMESTER)

(Effective from session: 2012-13)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TEC-121	Basic Electronics Engineering	3	1	0	30	20	50	100	150
2.	TEE-121	Basic Electrical Engineering	3	1	0	30	20	50	100	150

3.	TAH-124	Engineering Physics	3	1	0	30	20	50	100	150
4.	TAH-125	Professional Communication	3	2	0	30	20	50	100	150
5.	TAH-126	Engineering Mathematics-II	3	1	0	30	20	50	100	150
PR ACTICAL										
6.	PEC-121	Basic Electronics Engineering Lab	0	0	2	10	15	25	25	50
7.	PEE-121	Basic Electrical Engineering Lab	0	0	2	10	15	25	25	50
8.	PAH-124	Engineering Physics Lab	0	0	2	10	15	25	25	50
9.	PCE-121	Engineering Graphics	1	0	2	10	15	25	25	50
10.	GPP-121	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**16**	**6**	**8**	**190**	**210**	**400**	**600**	**1000**

TEC-121 BASIC ELECTRONICS ENGINEERING

SEMICONDUCTOR MATERIALS AND PROPERTIES: Group-IV materials, Covalent bond, electron-hole concepts, Basic concepts of energy bands in materials, concepts of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors impurities.
JUNCTION DIODE: p-n junction, depletion layer, V-I characteristics, diode resistance, capacitance diode ratings (average current, repetitive peak current, non-repetitive current, peak-inverse voltage).

UNIT-2: DIODE APPLICATIONS: Rectifiers (half wave and full wave), calculation of transformer utilization factor and diode ratings, filter (C – filter), calculation of ripple factor and load regulation, clipping circuits, clamping circuits, voltage multipliers.
BREAKDOWN DIODES: Breakdown mechanisms (zener and avalanche), breakdown characteristics, zener resistance, zener diode ratings, zener diode application as shunt regulator.

UNIT-3: BIPOLAR JUNCTION TRANSISTORS: Basic construction, transistor action, CB, CE and CC configurations, input/output Characteristics, concept of Biasing of transistors- fixed bias, emitter bias, potential divider bias.
TRANSISTOR AMPLIFIER: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model (low frequency), computation of A_i, A_v, R_i, R_o of single transistor CE and CC amplifier configurations.

UNIT-4: FIELD EFFECT TRANSISTORS: JFET: Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristics equation CG, CS and CD configurations, Introduction to self and fixed biasing. MOSFFT: depletion and enhancement type MOSFET-construction, operation and characteristics. Computation of A_v, R_i, R_o, of single FET amplifiers using all the three configurations

UNIT-5: SWITCHING THEORY AND LOGIC DESIGN: Number systems, conversions of bases, Boolean algebra, logic gates, concept of universal gate, and concept of K- Map.
OPERATIONAL AMPLIFIERS: Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non- inverting and unity gain amplifiers, adders.

BOOKS:

1. Boylestad and Nashelsky, 'Electronic Devices and circuits' PHI.
2. A Mottershead, 'Electronic Devices and Circuits' PHI.
3. R.K. Singh & Ashish, Basic Electronics Engg. Laxmi Publication.
4. Milman & Halkias, Integrated Electronics, PHI.
5. D.C. Kulshrestha, 'Electronic Devices and Circuits' PHI.

TEE-121 BASIC ELECTRICAL ENGINEERING

CIRCUIT ELEMENTS AND NETWORK THEOREMS: Circuit Elements (R, L and C), Active and Passive elements, star – delta transformation, voltage and current sources, source transformation, concept of linearity and linear network, unilateral and bilateral elements Kirchhoff's Law, mesh and nodal analyses (including super-mesh and super-node).
NETWORK THEOREMS FOR DC CIRCUITS: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.

UNIT-2: AC FUNDAMENTALS: Single Phase AC Circuits: Sinusoidal, Square and Triangular waveforms – average and effective (r.m.s.) values, form and peak factors; concept of phasor, phasor representation of sinusoidally varying voltage and current. Analyses of series, parallel, and

series – parallel RLC Circuits: Apparent, Active & Reactive Powers, Definition and Importance of Power factor.
THREE PHASE AC CIRCUITS: Meaning of phase sequence and star and delta connections, balanced supply and balanced load, line and phase voltage/current relations, three phase power and its measurement by using one, two and three watt-meters.

UNIT-3: INTRODUCTION TO POWER SYSTEM: General layout of Electrical Power system and functions of its elements, standard transmission and distribution voltages, and concept of grid.
MEASUREMENTS AND MEASURING INSTRUMENTS: Construction and principle of operation of voltage and current measuring instruments; introduction to power and energy meters.

UNIT-4: MAGNETIC CIRCUIT AND TRANSFORMER: Magnetic Circuit: Magnetic circuit concepts, analogy between Electric & Magnetic circuits. B-H curve, Hysteresis and Eddy Current looses.
SINGLE PHASE TRANSFORMER: Principle of Operation, Construction, e.m.f. equation, equivalent circuit, Losses, efficiency, O.C. and S.C. tests.

UNIT-5: ELECTRICAL MACHINES: DC MACHINES: Types of dc machines, e.m.f. equation of machines and torque equation of motor, characteristics and applications of dc motors.
THREE PHASE INDUCTION MOTOR: Principle of Operation, Torque- Slip Characteristics.
SINGLE PHASE INDUCTION MOTOR: Principle of Operation and Methods of starting.
THREE PHASE SYNCHRONOUS MACHINES: Principle of Operation of alternator and synchronous motor.

BOOKS:

1. V. Del Toro, “Principles of Electrical Engineering” Prentice Hall International.
2. I. J. Nagarath, “Basic Electrical Engineering” Tata Mc - Graw Hill.
3. D. E. Fitzgerald & A. Grabel Higginbotham, “Basic Electrical Engineering” Mc - Graw Hill
4. Sunil T. Gaikwad, Basic Electrical Engineering, Wiley India.

TAH-124 ENGINEERING PHYSICS

RELATIVISTIC MECHANICS: Inertial and Non-inertial Frames, Postulates of Special Theory of Relativity, Galilean and Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass Energy Equivalence and Variation of Mass with Velocity. **RADIATION:** Kirchoff‘s Law, Stefan‘s law (only statement), Energy spectrum of Blackbody Radiation, Compton Effect.

UNIT-2: INTERFERENCE: Coherent Sources, Conditions of Interference, Fresnel‘s Biprism Experiment, Displacement of Fringes, Interference in Thin Films – Wedge Shaped Film, Newton‘s Rings. **Diffraction:** Single and n-Slit Diffraction, Diffraction Grating, Raleigh‘s Criterion of Resolution, resolving Power of Grating.

UNIT-3: POLARIZATION: Phenomenon of Double Refraction, Ordinary and Extra-ordinary Rays, Nicol Prism, production and Analysis of Plane, Circularly and Elliptically Polarized Light, Fresnel Theory, Optical Activity, Specific Rotation, Polarimeter.
LASER: Principle of Laser Action, Einstein‘s Coefficients, Construction and Working of He-Ne and Ruby Laser.

UNIT-4: ELECTROMAGNETIC: Ampere‘s Law and Displacement Current, Maxwell‘s Equations in Integral and Differential Forms, Electromagnetic Wave Propagation in Free Space and Conducting Media, Pointing Theorem.

MAGNETIC PROPERTIES OF MATERIALS: Basic Concept of Para-, Dia and Ferro-Magnetism, Langevin's Theory of Diamagnetism, Phenomenon of Hysteresis and Its Applications.

UNIT-5: SUPERCONDUCTIVITY: Essential properties of superconductors (zero resistivity) , London equations, penetration depth and coherence length, Meissner effect, critical field, critical current Isotope effect, heat capacity, Type I and Type II superconductors, Characteristics of superconductors in superconducting state, applications of superconductors.
WAVE MECHANICS: Wave Particle Duality, de Broglie Concept of Matter Waves, Heisenberg Uncertainty Principle, Schrödinger Wave Equation and Its Applications: Particle in a Box.

BOOKS:

1. Introduction to Special theory of Relativit y Robert Resnick – Wiley India
2. Physics of Atoms ,Wehr Richards & Adia
3. Fundamentals of Physics, Halliday, Wiley India
4. Engineering Electromagnetics,William Hayt, 7t h Ed.(TMH)
5. Ashutosh Asthana, Engg. Physics, BS Publication, Hyderabad

TAH-125 PROFESSIONAL COMMUNICATION

UNIT-1: COMMUNICATION: Meaning, Definition and importance of communication, Process of communication, types of communication, levels of communication, communication network, language as a tool of communication, barriers to effective communication, technical communication, meaning, origin and development of technical communication, features of technical communication, difference between technical and general writing.

UNIT-2: COMMUNICATIVE GRAMMAR: Spotting the errors pertaining to parts of speech, gender, infinitive, participle, form of tenses, use of articles, concord, idioms and phrases, words often confused, one word substitution, foreign words, antonyms, synonyms, homophones, formation of words (suffixes, prefixes and derivatives), sentence structure and requisites of sentences construction, paragraph development, its techniques and methods.

UNIT-3: BUSINESS COMMUNICATION: Principles, features, types, format and layout of business letter, different types of letters- enquiry, quotation, order, sales, complaint, credit etc., job application letter, covering letter, difference between biodata, resume and CV, notice, agenda, minutes and memorandum.

UNIT- 4: FORMS OF WRITING: Technical proposal- meaning, purpose, features, types, format, importance, process of preparation and writing technical proposal; Report- meaning, features, types, style, format, structure and importance; technical paper, project, synopsis, dissertation and thesis writing.

UNIT-5: PRESENTATION: Purpose, audience, locale, organizing contents, preparing outline, audio visual aids, nuances of delivery, body language, space, voice dynamics, time dimension.

BOOKS:

1. Daniel Joans, English Pronouncing Dictionary**.**
2. Wren & Martion, English High School Grammar.
3. P. Chandra, Word Power Mode Easy.

TAH-126 ENGINEERING MATHEMATICS-II

UNIT-1: DIFFERENTIAL EQUATIONS: Ordinary differential equations of first order, Exact differential equations, Linear differential equations of first order, Linear differential equations of nth order with constant coefficients, complementary functions and particular integrals, Simultaneous linear differential equations.

UNIT-2: LAPLACE TRANSFORM: Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Laplace transform of periodic function, Unit step function, Convolution theorem, Applications to solve simple linear and simultaneous liner differential equations.

UNIT-3: INFINITE SERIES: Introduction, Sequences, Series: Convergence, Series of positive terms, Comparison tests, Integral tests, Comparison of ratio‘s, D’Alembert ratio test, Raabe’s test, Cauchy root test, Alternating series: Lebnitz rule.

UNIT-4: FOURIER SERIES AND PARTIAL DIFFERENTIAL EQUATIONS: Periodic functions, Trigonometric series, Fourier series of periodic function, Euler‘s formula, Even and odd functions,

Half range sine and cosine series, Introduction to partial differential equations, linear partial differential equations with constant coefficients of second order.

UNIT-5: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS: Method of separation of variables for solving partial differential equations, One dimensional wave equation, Laplace equation in two dimensions, Heat conduction equations of one dimension and two dimension.

BOOKS:

1. A Text book of Engineering Mathematics by Peter V. O' Neil, Cengage Learning.
2. B. S. Grewal: Higher Engineering Mathematics, *Khanna Publications.*
3. C. Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya.
4. E. Kreyszij: Advanced Engineering Mathematics, Wiley Eastern.
5. M.D. Raisinghania: Ordinary & Partial Differential Equations, S. Chand Publication.

PEC-121 BASIC ELECTRONICS ENGINEERING LAB

1. To determine the energy band gap of a semiconductor material.
2. To determine and plot V-I characteristics of P-N junction in both forward bias and reverse bias.
3. To determine and plot the wave shapes of a clipping and champing circuits.
4. To determine the ripple in output of a half wave and a full wave rectifiers at different loads.
5. To determine and plot V-I characteristics of Zener diode in both forward bias and reverse bias.
6. To determine and input and output characteristics of an npn & pnp bipolar junction transistor in common emitter and common base mode.
7. To determine and plot input and output characteristics of a field-effect transistor.
8. To determine and plot input and output characteristics of a metal-oxidesemiconductor field-effect transistor.
9. To determine and plot the frequency response of an amplifier.
10. Realization and verification of the truth table of various logic gates.
11. Realization and verification of the basic logic gates using NAND and NOR gates.

PEE-121: BASIC ELECTRICAL ENGINEERING LAB

1. Verification of KCL and KVL.
2. Verification of Thevenin's and Norton's Theorems.
3. Verification of Maximum power transfer and Superposition theorems.
4. Measurement of power in a three phase circuit by two wattmeter method.
5. Measurement of efficiency of a single phase transformer by load test.
6. Determination of parameters and losses in a single phase transformer by OC and SC test.
7. Load characteristics of DC generator.
8. Speed control of dc shunt motor.
9. Study of running and reversing of a three phase induction motor.
10. Calibration of a single phase energy meter.

****Additional or any other experiment may be added based on contents of syllabi.

PAH-124 ENGINEERING PHYSICS LAB

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.
3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.
4. To determine the specific rotation of cane sugar solution using half shade polarimeter.
5. To determine the wavelength of spectral lines using plane transmission grating.
6. To determine the specific resistance of the material of given wire using Carey Foster's bridge.
7. To determine the variation of magnetic field along the axis of a current carrying coil and then to estimate the radius of the coil.
8. To verify Stefan's Law by electrical method.
9. To calibrate the given ammeter and voltmeter.
10. To study the Hall Effect and determine Hall coefficient, carnier density and mobility of a given semiconductor material using Hall-effect set up.
11. To determine energy bank gap of a given semiconductor material.
12. To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.
13. To draw hysteresis curve of a given sample of ferromagnetic material and from this to determine magnetic susceptibility and permeability of the given specimen.
14. To determine the balistic constant of a ballistic galvanometer.
15. To determine the viscosity of a liquid.

PCE-121 ENGINEERING GRAPHICS

UNIT-1: INTRODUCTION: Graphics as a tool to communicate ideas, Lettering and' dimensioning, Construction of geometrical figures like pentagon and hexagon.

UNIT-2: ORTHOGRAPHIC PROJECTION: Principles of orthographic projections, Principal and auxiliary planes, First and Third angle projections, Projection of points, Pictorial view, Projection of lines parallel to both the planes. Parallel to one and inclined to other, Inclined to both the planes. Application to practical problems, Projection of solid in simple position, Axis or slant edge inclined to one and parallel to other plane, Solids lying on a face or generator on a plane, Sectioning of solids lying in various positions, True shape of the section, Development of lateral surfaces, sheet metal drawing.

UNIT-3: ISOMETRIC PROJECTION: Principles of isometric projection, Isometric projection using box and offset methods.

BOOKS:

1. Bhatt. N.D.: Elementary Engineering Drawing, Charothar Publishing.
2. Laxmi Narayan V & Vaish W. : A Text Book of Practical Geometry on Geometrical drawing.

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
II-YEAR (III-SEMESTER)
(Effective from session: 2012-13)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-231	Analog Electronics Circuits	3	1	0	30	20	50	100	150
2.	TEC-232	Digital Electronics	3	1	0	30	20	50	100	150
3.	TEC-233	Measurement & Instrumentation	3	1	0	30	20	50	100	150
4.	TEC-234	Signals & Systems	3	1	0	30	20	50	100	150
5.	TEC-235	Network Analysis & Synthesis	3	1	0	30	20	50	100	150
PRA CTICAL										
6.	PEC-231	Analog Electronics Circuits Lab	0	0	2	10	15	25	25	50
7.	PEC-232	Digital Electronics Lab	0	0	2	10	15	25	25	50
8.	PEC-233	Measurement & Instrumentation Lab	0	0	2	10	15	25	25	50
9.	PEE-233	Network Lab	0	0	2	10	15	25	25	50
10.	GPP-231	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

IRC

circ

π –

TEC-231 ANALOG ELECTRONICS CIRCUITS

UNIT 1: TRANSISTOR MODELS: Review of BJT biasing circuits, biasing stabilization techniques, Thermal runaway, thermal stability, Ebers-Moll model, _ model and T-model, Early effect, Analysis of low frequency bipolar transistor amplifiers.
MULTISTAGE AND TUNED AMPLIFIERS: Cascade amplifiers, coupling of amplifiers, RC coupled, direct coupled, and transformer coupled amplifiers, differential amplifier, Darlington amplifier, bootstrapping, tuned and double tuned amplifiers.

UNIT 2: FEEDBACK AMPLIFIERS: Classification, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifiers, Analysis of voltage-series voltage-shunt, current-series and current-shunt feedback amplifiers, Stability criterion.

ablsis

IG

π -π -

alt h**UNIT 3: OSCILLATORS:** Classification, Criterion for oscillations, Hartley, Colpitts, Clapp, RC Phase shift, Wien Bridge and crystal oscillators, astable, monostable and bistable multivibrators using transistors.

UNIT 4: HIGH FREQUENCY AMPLIFIERS: Hybrid ... model, conductances and capacitances of hybrid ...model, high frequency analysis of CE amplifier, gain-bandwidth product, Emitter follower at high frequencies, High frequency analysis of common source, common gate and drain amplifiers.

UNIT 5: POWER AMPLIFIERS: Power amplifier circuits, Class A, class B and class AB and, class C amplifiers, push pull amplifiers with and without transformers, Complementary symmetry amplifiers, Distortion, thermal consideration and power dissipation of power amplifiers.

BOOKS:

1. Integrated Electronics, Millman & Parekh, TMH
2. Electronic Devices And Circuits, Salivahanan, TMH
3. Electronic Devices And Circuits, Millman & Halkias, TMH
4. Analysis And Design Of An Analog Integrated Ckt, Gray, Wiley
5. Electronic Devices And Circuit Theory, Boylested, Pearson
6. Electronic Devices, Floyd, Pearson
7. Electronic Devices And Integrated Circuits, Singh, Pearson
8. Electronic Devices And Circuits, 5e, Bell, Oxford
9. Microelectronic Circuits, 5e (Intl. Version), Sedra, Oxford

TEC-232 DIGITAL ELECTRONICS

UNIT 1: MINIMIZATION OF LOGIC FUNCTION: Review of logic gate and Boolean algebra, Standard representation of logical functions, K-map representation and simplification of logical functions, Quinn-McClusky's Algorithm, Don't care conditions, XOR & X-NOR simplification of K-maps.

UNIT 2: COMBINATIONAL CIRCUITS: Combinational circuit design, adders, subtractor, code converters, magnitude comparators, decoders, encoders, multiplexers, de-multiplexer, parity checker.

UNIT 3: SEQUENTIAL CIRCUITS: R-S, J-K, D, T Flip-flops, race around condition, Master–Slave flip-flops, Edge triggered Flip Flop, Excitation table of a flip-flop, Analysis and design procedure to a synchronous sequential circuit, Conversion of flip flops from one to another.
SHIFT REGISTERS: Buffer register, shift operations, SISO, SIPO, PISO, PIPO, and universal shift registers and applications**.**
COUNTERS: Ripple counter, Decade counter, Design of Synchronous counters, Programmable, down, Up, mod-m counters, difference between synchronous and asynchronous counters, ring, Johnson, cascade counters and application.

UNIT 4: LOGIC FAMILIES: Diode and transistor as a switch, type and specification of digital logic family, RTL, DCTL, DTL, ECL, TTL and its various types, MOS, CMOS, BiCMOS logic families, Characteristics and comparison of logic families.

UNIT 5: SEMICONDUCTOR MEMORIES: Memory organization, Classification and characteristics of memories, sequential memories, RAM – static and dynamic, ROM, PROM, EPROM, EEPROM and Programmable logic arrays.
D/A AND A/D CONVERTERS : Weighted register D/A converter, binary ladder D/A converter, steady state accuracy test, D/A accuracy and resolution, parallel A/D converter, Counter type A/D converter Successive approximation A/D converter, Single and dual slope A/D converter A/D accuracy and resolution.

BOOKS:

1. Digital Principle and applications Malvino, TMH
2. Modern digital electronics R. P. Jain, PHI
3. Digital electronics principle Malvino, THM
4. Digital Electronics R J Tocci, PHI
5. Digital Electronics Dr A K Gautam, Khanna Publication

TEC-233 MEASUREMENT & INSTRUMENTATION

UNIT 1: THEORY OF ERRORS and BRIDGES: Accuracy & precision, Repeatability, Limits of errors, Systematic & random errors, Modeling of errors, Probable error & standard deviation, Gaussian error analysis, Combination of errors.
Method of measuring low, medium and high resistance – sensitivity of Wheat stones bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance.
A.C. BRIDGES–Measurement of inductance, Maxwell's bridge, Hay's bridge, Anaderson's bridge, Owen's bridge – Heaviside Bridge and its modifications, Measurement of capacitance, equivalent circuit of an imperfect capacitor – Desauty bridge, Wien's bridge, Schering Bridge.

UNIT 2: ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS: Electronic Voltmeter, Electronic Multimeters, Digital Voltmeter, Component Measuring Instruments, Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Measurement of frequency, Introduction to shielding & grounding.

UNIT 3: OSCILLOSCOPES: CRT Construction, Basic CRO circuits, CRO Probes, Oscilloscope Techniques of Measurement of frequency, Phase Angle and Time Delay, Multibeam, multi trace, storage & sampling Oscilloscopes. Curve tracers.

UNIT 4: SIGNAL GENERATION: Sine wave generators, Frequency synthesized signal generators, Sweep frequency generators. Signal Analysis **–** Measurement Technique, Wave

Analyzers, Frequency- selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion analyzer, Spectrum analyzer.

UNIT 5: TRANSDUCERS: Classification, Selection Criteria, Characteristics, Construction, Working principles, Application of following Transducers- RTD, Thermocouples, Thermistors, LVDT, RVDT, Strain Gauges, Bourdon Tubes, Bellows. Diaphragms, Seismic Accelerometers, Tachogenerators, Load Cell, Piezoelectric Transducers, Ultrasonic Flow Meters, Instrument transformers – CT and PT – Ratio and phase angle errors–design considerations–Testing of CT's –Silsbee's method – Variable mutual inductance methods.

BOOKS:

1. Electronic Instrumentation, H S Kalsi, TMH
2. Electronic Measurements & Instrumentation, Bernard Oliver, TMH
3. Instrumentation Measurement & Analysis, B.C.Nakra, K.K. Chaudhry, TMH
4. Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
5. Electronic Measurements And Instrumentation, Lal Kishore, Pearson
6. Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
7. Electronic Instrument And Measurment, Bell, Oxford
8. Electronic Measurements And Instrumentation, Dally, Wiley
9. Theory And Design For Mechanical Measurements, Figliola, Wiley
10. Electronic Instrumentation And Measurements, David A. Bell, PHI
11. Introduction To Measurements And Instrumetation, Arun K. Ghosh, PHI
12. A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpatrai

TEC-234 SIGNALS AND SYSTEMS

UNIT-1: SIGNALS AND SYSTEMS: Continuous-time and discrete-time signals, transformations of the independent variable, Exponential and Sinusoidal signals, Continuous-Time and discreteTime LTI Systems and their properties, convolution sum and convolution integrals, LTI System described by differential and difference equation.

UNIT-2: FOURIER SERIES AND FOURIER TRANSFORM: The response of LTI systems to complex exponentials, Fourier series representation of continuous-time, periodic signals and their properties, continuous time and discrete time Fourier transforms and their properties, system, characterized by linear constant coefficient differential equations and difference equation.

UNIT-3: TIME AND FREQUENCY CHARACTERIZATION OF SIGNALS AND SYSTEMS: magnitude phase representation of the Fourier transform, magnitude phase representation of the frequency response of LTI systems, time domain properties of ideal frequency selective filter, time domain and frequency domain aspects of non ideal filters, first order and second order continuous time and discrete time systems.

UNIT-4: LAPLACE TRANSFORM: Laplace transform, region of convergence, inverse Laplace transform, analysis and characterization of LTI system, block diagram representation, unilateral Laplace transform.

UNIT-5: SAMPLING AND Z-TRANSFORM: Signal representation by samples, sampling theorem, impulse train sampling, sampling of discrete time signals, discrete time processing of continuous time signals., Z-Transform, Region of convergence, Inverse Z-transform, analysis and characterization of LTI system, block diagram representation, Unilateral Z-transform.

BOOKS:

1. Signal and Systems by Oppenheim and Willsky.
2. Fundamental of Signals and systems by Michael J. Roberts, McGraw Hill.
3. Communication Signal and Systems by Simon Haykin

TEC-235 NETWORK ANALYSIS AND SYNTHESIS

UNIT 1: CIRCUITS CONCEPTS: Independent and dependent sources, signals and wave forms; periodic and singularity voltages, step, ramp, impulse, Doublet. Loop currents and loop equations, node voltage and node equations.
AC NETWORK THEOREMS: Super-position theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity theorem, Millman's theorem, Compensation theorem, Tellegen's theorem.

UNIT 2: GRAPH THEORY: Graph of a network, definitions, tree, co-tree, link, basic loop and basic cut set, incidence matrix, cut set matrix, Tie set matrix duality, Loop and Node methods of analysis.

UNIT 3: TWO PORT NETWORKS: Characterization of LTI two port networks, Z, Y, ABCD and h-parameters, reciprocity and symmetry. Interrelationships between the parameters, interconnections of two port networks, Ladder and Lattice networks. T and representation.

UNIT 4: NETWORK SYNTHESIS: Network functions, Impedance & Admittance function, Transfer functions, Relationship between transfer and impulse response, poles and zeros and restrictions, Network function for two terminal pair network, Sinusoidal network in terms of poles & zeros, Real liability condition for impedance synthesis of RL & RC circuits, Network synthesis techniques for 2-terminal network, Foster and Cauer forms.

UNIT 5: FILTER SYNTHESIS: Classification of filters, characteristics impedance and propagation constant of pure reactive network, Ladder network, T section, _section, terminating half section, Pass bands and stop bands, Design of constant-K, m-derived filters, Composite filters.

BOOKS:

1. Network & Systems by D R Choudhury
2. Network Analysis & Synthesis by Van Valkenberg
3. Network Analysis and Synthesis by Sudhakar Sham Mohan
4. Network Synthesis by IVS Iyer
5. Electric Circuits by JA Administer
6. Circuit Theory by Chakraborty

PEC-231 ANALOG ELECTRONICS CIRCUITS LAB

1. To verify the configuration of various biasing techniques for BJTs.
2. To determine voltage gain output impedance and output power of a Darlington pair compound amplifier.
3. To determine “h” parameters of a PNP transistor in common emitter mode.
4. To determine the frequency response of an IFT amplifier.
5. To determine voltage gain and plot the frequency response of a FET amplifier in common source mode.
6. To study the effect of negative feedback on voltage gain & bandwidth in a two stage amplifier
7. To determine frequency of a Hartley Oscillator circuit with change in the capacitor of the tank circuit.
8. To determine frequency and wave shape of a Colpitt’s oscillator circuit.
9. To determine frequency and wave shape of a crystal oscillator circuit.
10. To determine frequency and wave shape of a phase shift oscillator circuit.
11. To determine voltage gain and plot the frequency response of a single stage, two stage RC coupled and direct coupled amplifiers.

PEC-232 DIGITAL ELECTRONICS LAB

1. To verify the De-Morgan’s theorems using NAND/NOR gates.
2. To design the full adder and half adder using AND, OR and X- OR gates.
3. To implement the logic circuits using decoder.
4. To implement the logic circuits using multiplexer.
5. To design parity generator and checker circuits.
6. To design and implement RS FLIP FLOP using basic latches.
7. Realization and testing of basic logic gates using discrete components.
8. Realization and testing of CMOS IC characteristics.
9. Realization and testing of TTL IC characteristics.
10. Realization and testing of RAM circuit using IC 7489.
11. Realization and testing of Interfacing of CMOS- TTL and TTL- CMOS ICS.

PEC-233 MEASUREMENT & INSTRUMENTATION LAB

1. To calculate the frequency using Wein Bridge.
2. To determine the value of unknown Inductor using Maxwell Bridge.
3. To determine the value of unknown Inductor using Hey's Bridge.
4. To verify and calibrate temperature using RTD circuit.
5. To measure the speed of a motor using magnetic sensor.
6. To measure the speed of a motor using photo-electric sensor.
7. To determine the characteristics of LVDT.
8. To measure the temperature using thermo couple module.
9. To measure the pressure using pressure transducer module.
10. To measure strain using strain gauge module.
11. To measure the weight using load cell module.
12. To determine and plot the characteristics of a light sensor.

PEE-233 NETWORK LAB

1. Implementation and verification of Maximum Power Transfer and Superposition theorem in ac circuits.
2. Implementation and verification of Thevnin's and Norton's theorem in ac circuits.
3. Implementation and verification of Tellegens theorem.
4. Implementation and verification of Reciprocity theorem.
5. Design and testing transient analysis in RC/RL circuits.
6. Design and testing of transient analysis in RLC circuits.
7. To calculate Z, Y, ABCD parameters of a given two port Networks.
8. Implementation and verification of transfer function of two port network.
9. To calculate image and characteristic impedance in T and π networks.
10. Implementation and verification of interconnection i.e. cascade, series, parallel, effect of loading of two port networks.
11. Design and implementation of K-derived LPF and HPF in T sections.

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
II-YEAR (IV-SEMESTER)
(Effective from session: 2012-13)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-241	Analog Communication Systems	3	1	0	30	20	50	100	150
2.	TEC-242	Analog Integrated Circuits	3	1	0	30	20	50	100	150
3.	TEC-243	Microprocessors	3	1	0	30	20	50	100	150
4.	TEC-244	Electromagnetic Field Theory	3	1	0	30	20	50	100	150
5.	TAH-241	Industrial Economics & Management	3	1	0	30	20	50	100	150
PRA CTICAL										
6.	PEC-241	Analog Communication Lab	0	0	2	10	15	25	25	50
7.	PEC-242	Analog Integrated Circuits Lab	0	0	2	10	15	25	25	50
8.	PEC-243	Microprocessor Lab	0	0	2	10	15	25	25	50
9.	PEC-244	PCB Lab	0	0	2	10	15	25	25	50
10.	GPP-241	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

TEC-241 ANALOG COMMUNICATION SYSTEMS

UNIT 1: INTRODUCTION: Overview of communication system, communication channels, need for modulation, baseband and pass band signals.

RANDOM PROCESS Probability theory, random variables, statistical averages, transformation of random variables, random processes, stationary, mean, correlations and covariance functions, ergodicity, power spectral density and Gaussian process.

UNIT 2: AMPLITUDE MODULATION: Amplitude Modulation, Double side band with Carrier (DSB-C), Double side band without Carrier, Single Side Band Modulation, DSBSC, DSB-C, SSB Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Frequency division multiplexing, single side band transmission, comparison of various AM systems.

UNIT 3: ANGLE MODULATION: Angle (Phase and frequency) Modulation, Mathematical Analysis, Deviation sensitivity, Waveforms, Phase deviation and modulation index, Frequency analysis of angle modulated system, Bandwidth requirement of angle modulated system, FM Modulators and Demodulators, Nonlinear effects in FM systems, FM Broadcasting, comparison of angle modulation and amplitude modulation.

UNIT 4: PULSE MODULATION: Sampling Theorem, Pulse Amplitude Modulation (PAM), Natural PAM Frequency Spectra for PAM , Flat-top PAM, Sample and hold circuits, Time division Multiplexing, PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM); Pulse Width Modulation(PWM), Pulse Position Modulation (PPM), PPM Demodulator.

UNIT 5: NOISE IN CW MODULATION SYSTEMS: Internal noise (Thermal, shot, Transit time Miscellaneous); External noise (Atmospheric, Industrial, Extra Terrestrial); Noise calculations; Noise figure; Noise temperature, narrow band Noise, receiver model, Noise calculation in AM, DSB-SC, SSB, receivers, superheterodyne receiver, noise in FM receivers, pre-emphasis and De-emphasis in FM.

BOOKS:

1. George Kennedy, “Communication System” TMH
2. B. P. Lathi, “Modern Digital and Analog Communication System” Oxford University Press.
3. Simon Haykin , “Communication Systems” John Wiley & Sons.
4. Taub Schilling, “Principles of Communication Systems” TMH.
5. W. Tomasi, “Electronic communications systems”, Pearson Education.
6. J. C. Hancock, “An Introduction to the Principles of Communication Theory”, McGraw Hill.
7. J. G. Proakis, M. Salehi, “Communications Systems Engineering”, PHI.
8. D. Roddy and J. Coolen, “Electronic Communications”, PHI.

TEC-242 ANALOG INTEGRATED CIRCUITS

UNIT 1: OPERATIONAL AMPLIFIERS: Block diagram of a typical Op-Amp, Schematic symbol, integrated circuits and their types, IC package types, Pin Identification and temperature range, Interpretation of data sheets, Overview of typical set of data sheets, Characteristics and performance parameters of and Op-Amp, Ideal Op-Amp, Equivalent circuit of an Op-Amp, Ideal voltage transfer curve, Open loop configurations: Differential, Inverting & Non Inverting. Practical Op-Amp: Input offset voltage, Input bias current, Input offset current, total output offset voltage, Thermal drift, Effect of variation in power supply voltages on offset voltage, Change in Input offset voltage and Input offset current with time, Temperature and supply voltage sensitive parameters, Noise, Common Mode configuration and common mode rejection Ratio.

UNIT 2: APPLICATIONS OF OP-AMP: Summing amplifier, Integrator, Differentiator, Scaling and Averaging Amp, Instrumentation Amplifier, V to I and I to V converter, Log and Antilog Amp, Peak Detector, Sample and Hold Circuit, Op-amp as precision diode and its application in half and full wave rectifiers.

UNIT 3: FREQUENCY RESPONSE OF OP-AMP AND ACTIVE FILTERS: Frequency response, Compensating networks, Slew rate, causes of slew rate and its effect on applications. First order LP Butterworth filter, Second order LP Butterworth filter, First order HP Butterworth filter, Second order HP Butterworth filter, Higher order filters, Band pass filter, Band reject filters, All pass filter.

UNIT 4: COMPARATORS AND WAVEFORM GENERATORS: Basic comparator, Zero crossing detector, Schmitt trigger, Square wave generator, Triangular wave generator, Saw tooth wave generator.
TIMER: Pin configuration, Block diagram, application of 555 IC as Monostable and Astable Multivibrator.

UNIT 5: PHASE LOCK LOOPS: Basic operating principle, phase detector, voltage controlled oscillator (VCO), PLL IC 565, applications of PLL.
VOLTAGE REGULATORS: Discrete transistor shunt and series voltage regulators, IC voltage regulators**,** fixed voltage regulators, Adjustable voltage regulators, Boosting IC regulator output current, regulated power supplies, and switched mode power supply.

BOOKS:

1. Linear integrated circuits by D R Choudhury and S Jain
2. Op Amps & Linear Integrated circuits by Ramakant Gayakwad.
3. Op Amps & Linear Integrated circuits by Coughlin
4. Op Amps & Linear Integrated circuits by Ravi Raj Dudeja

TEC-243 MICROPROCESSORS

UNIT 1: 8085 MICROPROCESSOR –Study of 8085 Microprocessor pin diagram, signals and bus timing, internal architecture, instruction set and programming.

UNIT 2: 8086 MICROPROCESSOR– 8086/8088 microprocessor pin diagram and signals, internal architecture and register organization, Execution unit, Bus Interface Unit, Signal description, Physical memory organization, General bus operation, I/O addressing capabilities, Minimum mode and maximum mode timing diagrams, Comparison of 8086 and 8088**.**

UNIT 3: 8086 PROGRAMMING – Addressing modes, Instruction set description, Assembler directives and operators, Procedures and Macros, Assembly language program development tools (editor, linker, loader, locator, Assembler, emulator and Debugger), Writing programs for use with an assembler, using assembly language, Basic Memory and I/O interfacing, 8086 Interrupts and Interrupt Programming.

UNIT 4: INTERFACING – Direct Memory Access and DMA controlled I/O, Interfacing OF MICROPROCESSORS with, 8255, 8254, 8251, 8279, Numeric processor 8087, I/O processor 8089.

UNIT 5: ADVANCE MICROPROCESSORS: Microprocessors Evolution and types (Intel 4004– Pentium IV and road maps), 80286, 80386, 80486, Pentium processors and Microcontrollers.

BOOKS:

1. A K Gautam, “Fundamental and Advance Microprocessors” Khanna publication
2. Barry B. Brey, Intel Microprocessors, 8th Edition , Pearson Education/Prentice Hall
3. Y.-C. Liu and G. A. Gibson, “Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design”, PHI.
4. A. K. Ray and K M Bhurchandi, “Advanced Microprocessors and Peripherals”, TMH.

5. D.V. Hall, “Microprocessors and Interfacing”, TMH, 2nd Ed.
6. R.S Gaonkar,”Microprocessor Architecture, Programming and Applications with 8085/8080A”, Wiley Eastern Limited.

TEC-244 ELECTROMAGNETIC FIELD THEORY

UNIT 1: VECTOR ANALYSIS: Vector algebra, dot and cross products, Coordinate systems, Relation in rectangular, cylindrical, and spherical coordinate systems, concept of differential line, differential surface and differential volume in different coordinate systems.
ELECTROSTATICS: Coulomb’s law, electric field intensity, fields due to different charge distributions, electric flux density, gauss law of electrostatics, divergence theorem, electric potential, relations between E and V, Maxwell’s equations for electrostatic fields, energy density, convection and conduction currents, continuity equation, boundary conditions, dielectrics materials, boundary conditions, capacitance – parallel plate, coaxial, spherical capacitors, Poisson’s and Laplace’s equations.

UNIT 2: MAGNETOSTATICS: Biot-Savart law, Ampere’s circuital law, magnetic flux density, curl, Stoke’s theorem, Maxwell’s two equations for static EM fields, magnetic scalar and vector potentials, forces due to magnetic fields, Ampere’s Force law, inductances and magnetic energy.
MAXWELL’S EQUATIONS (TIME VARYING FIELDS): Faraday’s law and emf, concept of displacement current density, Maxwell’s equations in integral and differential forms, retarded potential.

UNIT 3: TRANSMISSION LINES: Definition of characteristic impedance and propagation constant, general solution of the transmission line–the two standard forms for voltage and current of a line terminated by impedance, input impedance of a lossless line terminated by impedance, meaning of reflection coefficient–wavelength and velocity of propagation, distortion less transmission line, standing wave ratio on a line, the quarter wave line and impedance matching, single stub matching and double stub matching, Smith chart, application of the smith chart, conversion from impedance to reflection coefficient and vice-versa.

UNIT 4: ELECTROMAGNETIC WAVES: Wave propagation in free space, conducting and perfect dielectric media, Skin effect, Poynting vector and Poynting theorem, wave polarization.

UNIT 5: PLANE WAVES REFLECTION AND DISPERSION: Reflection of wave at normal incidence and multiple interfaces, wave propagation in general direction, reflection at oblique incident angles, Brewster angle, total refection and transmission of obliquely incident wave, wave propagation and pulse broadening in dispersive media.

BOOKS:

1. Engineering Electromagnetic – William H. Hayt Jr. and John A. Buck, TMH,
2. Electromagnetic (Se) (Schaum's Outlines Series), Edminister, TMH
3. Electromagnetic With Applications, Jd Kraus, TMH

TAH-241 INDUSTRIAL ECONOMICS AND MANAGEMENT

UNIT-1: ANALYSIS OF PUBLIC PROJECTS: Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.

UNIT-2: INTRODUCTION TO MANAGEMENT: Theories of management: Traditional behavioral, contingency and systems approach, organization as a system.

UNIT-3: MOTIVATION AND PRODUCTIVITY: Theories of motivation, leadership styles and managerial grid. Co-ordination, monitoring and control in organizations, Techniques of control, Japanese management techniques.

UNIT-4: MICRO ECONOMICS: Basic concept of Micro Economics, Concept of demand, supply & price, the law pertaining to demand, supply & price indifference curve analysis, price effect, income effect & substitution effect.

UNIT-5: MONEY & BANKING: Balance of payment disequilibrium in balance of payment, Functions of money, Value of money, Functions of bank: commercial banks & central banking in India. Monetary & fiscal policy: a brief introduction case study pertaining to macro economics, A brief description of Indian Financial system.

BOOKS:

1. Engineering Economics: White, Wiley India.
2. Engineering Economics: Riggs, J. L. Bedworth D. B., Randhawa, S. U.; McGraw Hill.
3. Introduction to Management: Schemerhorn. John Wiley.
4. Principles of Management: Draft; Cengage Learning Pb.
5. The Practice of Management: Peter Drucker, Harper and Row.
6. Industrial Economics and Organization: Bernadette Andreosso, David Jacobson. 7. Essentials of Macroeconomics: Peter Jochumzen; BookBoon,
8. The Economics of Industries and Firms: Ken Heather.
9. Managerial Economics: Bruce Allen, Neil Doherty, Keith Weigelt; Edwin Mansfield.

PEC-241 ANALOG COMMUNICATION LAB

1. Design and testing of an amplitude modulator & demodulator circuit and determine the depth of modulation.
2. Design and testing of a frequency modulator & demodulator circuit and determine the modulation index.
3. Design and testing of a phase modulator & demodulator circuit and determine the standard deviation.
4. Design and tracing the signals at various points of a pulse amplitude modulator and demodulator circuit.
5. Design and tracing the signals at various points of a pulse position modulator and demodulator circuit.
6. Design and tracing the signals at various points of a pulse width modulator and demodulator circuit.
7. Implementation and verification of frequency division multiplexer & de-multiplexer.
8. Design and tracing the signals at various points of a DSB-SC modulator and demodulator circuit.

9. Design and tracing the signals at various points of a SSB-SC modulator and demodulator circuit.
10. Verification and of Sampling theorem and reconstruction of its equivalent analog signal.
11. Design and tracing the signals at various points of a Delta modulation & demodulation modulator and demodulator circuit.

PEC-242 ANALOG INTEGRATED CIRCUITS LAB

1. To design voltage and verify the op-amp working as:
   i. Unity Gain amplifier. ii.
   Inverting amplifier.
   iii. Non Inverting amplifier.
2. Design & test a difference amplifier using operational amplifier.
3. Design & test a constant current source with grounded load operational amplifier.
4. Design an active second order low pass filter using operational amplifier & plot the Frequency response characteristics.
5. Design an active second order high pass filter using operational amplifier and plot the frequency response characteristics.
6. Design and test a square wave generator using operational amplifier.
7. Design and test a triangular wave generator using operational amplifier.
8. Design and test a mono stable multivibrator using Timer IC 555.
9. Design and test an astable multivibrator using Timer IC 555.
10. Design and test IC voltage regulator circuits using ICs 723/7805/7905.
11. Determine the locking and capture range of a PLL IC 565.

PEC-243 MICROPROCESSOR LAB

1. Write and implement a program for adding two 8- bit numbers using microprocessor.
2. Write and implement a program for subtracting two 8- bit numbers using microprocessor.
3. Write and implement a program for finding the smallest number from a given set of numbers using microprocessor.
4. Write and implement a program for finding the largest number from a given set of numbers using microprocessor.
5. Write and implement a program for arranging the numbers in ascending order of a set of the numbers.
6. Write and implement a program for converting Binary code into Gray code using 8086 microprocessor.
7. Write and implement a program for conversion of data string to its 2's complement using 8086 microprocessor.
8. Write and implement a program for multiplication of the given numbers.
9. Write and implement a program for division of the given numbers.
10. Design and test microprocessor based traffic light control system using 8086 microprocessor.
11. Write and implement a program for interfacing of keyboard controller with microprocessor.

PEC-244 PCB LAB

Design and test a PCB for a given circuit using following PCS design equipments:

1. PCB art work film maker
2. Artwork table
3. PCB shearing machine
4. Photo resist dip coating machine
5. UV exposure unit
6. Dye tank
7. Development tank
8. PCB etching machine
9. Drill machine
10. Solder able lacquer tank
11. PCB Curing Machine
12. Soldering Station

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
III-YEAR (V-SEMESTER)
(Effective from session: 2013-14)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-351	Digital Communication Systems	3	1	0	30	20	50	100	150
2.	TEC-352	Antenna and Wave Propagation	3	1	0	30	20	50	100	150
3.	TEC-353	Micro-Controller and Embedded Systems	3	1	0	30	20	50	100	150
4.	TEE-351	Control Systems	3	1	0	30	20	50	100	150
5.	TCS-357	Object Oriented Programming & Design	3	1	0	30	20	50	100	150
PRA CTICAL										
6.	PEC-351	Digital Communication Lab	0	0	2	10	15	25	25	50
7.	PEC-352	Electronics Circuit Simulation Lab	0	0	2	10	15	25	25	50
8.	PEE-351	Control Systems Lab	0	0	2	10	15	25	25	50
9.	PCS-357	Object Oriented Programming & Design Lab	0	0	2	10	15	25	25	50
10.	GPP-351	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

TEC-351 DIGITAL COMMUNICATION SYSTEMS

UNIT 1: ELEMENTS OF DIGITAL COMMUNICATION AND INFORMATION THEORY: Model of a digital communication system, probability theory, entropy and information rate, conditional entropy and redundancy, source coding, fixed and variable length code words, source coding theorem, prefix free code and Kraft inequality, Shannon-Fano and Huffman coding.

UNIT 2: DIGITAL BASE BAND TRANSMISSION: PCM Coding, DM, DPCM, ADCM, data transfer rate, line coding and its properties, NRZ & RZ types, signalling format for unipolar, polar, bipolar(AMI) & Manchester coding matched filter receiver, derivation of its impulse response and peak pulse signal to noise ratio, ISI, rectangular**,** sync & raised cosine pulse comparison.

UNIT 3: DIGITAL MODULATION TECHNIQUES: Gram-Schmidt orthogonalization procedure, Hilbert transform, types of digital modulation, correlation receiver, waveforms for amplitude, frequency and phase shift keying, method of generation and detection of coherent & noncoherent

binary ASK, FSK & PSK & PSD derivation for coherent & non-coherent binary ASK, FSK & PSK, differential phase shift keying, bit error rate comparison of digital modulation techniques.

UNIT 4: ADVANCED MODULATION TECHNIQUES: Introduction to M-ary modulation techniques 16 PSK, QPSK, QAM, continuous phase shift keying, MSK, GMSK, direct sequence spread spectrum, processing gain, frequency hop spread spectrum.

UNIT 5: ERROR CONTROL CODING: Error free communication over a noise channel, Hamming code, relation between minimum distance and minimum distance error correcting & detection capability, linear block codes, encoding and syndrome decoding, cyclic codes, encoder and decoder for cyclic codes, convolution coding & Viterbi decoding, introduction to burst error correction codes.

BOOKS:

1. Analog and Digital Communication, Hwei Hsu, Debjani Mitra, TMH
2. Digital Commnunication, Amitabha Bhattacharya, TMH
3. Schaums Outline and Digital Communication, Hwei Hsu, TMH
4. Principles of Communication Systems, Taub & Schilling, TMH
5. Electronic Communication Systems, Kennedy, TMH
6. Analog And Digital Communication, Sudakshina Kundu, Pearson
7. Digital Communication, Sklar & Ray, Pearson
8. Digital Communication, Ian Glover, Pearson
9. Modern Digital and Analog Communication Systems, Lathi, Oxford
10. Digital Communications, Simon Haykin, Wiley
11. Digital And Analog Communication Systems, K.Sam Shanmugam, Wiley
12. An Introduction to Analog and Digital Communication System, Simon Haykin, Wiley
13. Information Theory and Network Coding, Raymond W, Springer
14. Principle of Digital Communication, J. Das, New Age
15. Digital Communication, Barry John, Le, Edward, David. G, Springer

TEC-352 ANTENNA AND WAVE PROPAGATION

UNIT 1: REVIEW OF ELECTROMAGNETIC THEORY: Functions and properties of antennas, basic antenna elements, radiation mechanism, radiated power and radiation resistance of current element, radiation pattern, radiation power density, radiation intensity, directivity, gain, antenna efficiency, beam width, bandwidth, polarization, antenna input impedance, elementary idea about self and mutual impedance, radiation efficiency, effective aperture, antenna temperature.

UNIT 2: ANTENNA ARRAYS: Array of two point sources, array factor, n-element linear array with uniform amplitude and spacing, analysis of broadside array, ordinary end-fire array, Hansen-Woodyard end fire array, n-element linear array with non-uniform spacing, analysis of binomial and Dolph-Tschebyscheff array, scanning array, super directive array.

UNIT 3: TYPES OF ANTENNA: HF, VHF and UHF antennas: folded dipole, V-antenna, rhombic antenna, Yagi-Uda antenna, log-periodic antenna, loop antenna, radiation field from short magnetic dipole, microwave antennas helical antenna, microstrip antenna, horn antenna, parabolic dish etc.

UNIT 4: WAVE PROPAGATION: Friis free space equation, reflection from earth's surface, surface and space wave propagation, field strength of space wave, range of space wave propagation, effective earth's radius, effect of earth imperfections and atmosphere on space wave propagation, modified refractive index, duct propagation, tropospheric propagation, structure of

ionosphere, propagation of radio waves through ionosphere, refractive index of ionosphere, reflection and refraction of waves by ionosphere, critical frequency, maximum usable frequency, optimum working frequency, lowest usable high frequency, virtual height, skip distance, effect of earth's magnetic field.

UNIT 5: ANTENNA MEASUREMENT: Antenna ranges**,** reflection, free-space ranges, near field/far field, measurement of radiation pattern, impedance, directivity, gain-absolute gain and transfer gain, efficiency, current, polarization and scale model.

BOOKS:

1. Antenna and wave propagation, A K Gautam, Kataria & Sons
2. Antenna Theory, Balanis C.A ,John Wiley & sons.
3. Electromagnetics and radiating systems, Jordan E.C., PHI.
4. Antenna and radio wave propagation, Collins R.E., McGraw Hill.
5. Antenna Theory, Krauss J.D., McGraw Hill.

TEC-353 MICRO-CONTROLLER AND EMBEDDED SYSTEMS

UNIT 1: 8051 MICRO CONTROLLER: Comparison of microprocessor and microcontroller, microcontroller and embedded processors, overview of various families.

UNIT 2: 8051 ASSEMBLY LANGUAGE PROGRAMMING: Introduction to 8051 assembly programming, assembling and running an 8051 program, data types and directives. 8051 flag bits and PSW register, register banks and stack, jump loop and call instructions, I/O port programming: addressing modes and accessing memory using various addressing modes, arithmetic instructions and programs, logic instructions and programs, single bit instructions and programming, timer/counter programming in the 8051.

UNIT 3: REAL TIME EMBEDDED SYSTEMS: 8051 connection to RS 232, 8051 serial communication programming, Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051, Timers, Free running counter & Real Time control, classification of real time embedded system, introduction to real time operating system.

UNIT 4: SYSTEM DESIGN: Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing. Application of Microcontrollers in interfacing, Robotics, MCU based measuring instruments. Real Time
Operating System for System Design, Multitasking System, Task Definition in a Multitasking System, Round Robin Scheduling, Full Pre-emptive Scheduling

UNIT 5: EMBEDDED SYSTEM AND ITS DESIGN: Introduction to ES& its applications, design parameters of an ES and its significance (With respect to all parameter), present trends in ES, Embedded System design life cycle, product specifications and hardware and software partitioning, Codesign, Introduction to latest micro controllers.

BOOKS:

1. B. B. Brey: The Intel Microprocessors, Architecture, Programming and Interfacing, Pearson Education.
2. Liu Gibson: Microcomputer Systems: The 8086/8088 Family- Architecture, Programming And Design , PHI
3. D. V. Hall: Microprocessors and Interfacing, TMH
4. Mazidi and Mazidi: The 8051 Microcontroller and Embedded Systems, Pearson Education.
5. Ayala Kenneth:- The 8051 microcontroller, Third Edition, Cengage Learning

6. A V. Deshmukh: Microcontroller (Theory and Application), TMH.
7. Raj Kamal: Embedded Systems- Architecture, Programming and Design, TMH,
8. V. Udayashankara and M. S. Mallikarjunaswamy: 8051 Microcontroller
9. The 8051 Microocntroller and embedded Systems by: - Ali Mazidi
10. Am embedded software primer, David e Simon, Pearson Education
11. Embedded system design by Frank vahid and Tony Givargus

TEE-351 CONTROL SYSTEMS

UNIT-1: GENERAL INTRODUCTION TO CONTROL SYSTEM: Historical background, openloop and closed loop control systems, basic elements of a feedback control system, types of feedback control systems, effects of feedback.
TRANSFER FUNCTION: Laplace transform and inverse Laplace transform, differential equations of physical systems, poles and zeros, characteristic equation; Block diagrams: representation and reduction; Signal flow graphs: definitions, properties, gain formula; analogous systems.

UNIT-2: TIME RESPONSE ANALYSIS: standard test signals, response of first and second order systems, time response specifications, steady state errors, types of control systems, static error constants; effects of addition of poles and zeros.
CONCEPT OF STABILITY: definition, absolute and relative stability, asymptotic stability; RouthHurwitz stability criterion: stability conditions, Hurwitz criterion, Routh-array, special cases, relative stability analysis, design applications. Root locus technique: root locus, complementary root locus and root contours, basic fundamentals, construction rules, effects of addition of poles and zeros.

UNIT-3: FREQUENCY DOMAIN ANALYSIS: frequency response specifications, correlation between time and frequency response, Bode plot, Polar plot, Nyquist stability criterion, gain and phase margins; Closed-loop frequency response: M-circles, N-circles, closed-loop frequency response for unity and non-unity feedback systems.

UNIT-4: AUTOMATIC CONTROLLERS: Basic control actions, PD, PI and PID controllers, effect on the time response.
Compensation techniques: classifications, lead, lag and lag-lead compensations. **Digital control systems:** Introduction, sampling theorem, Jury's stability criterion.

UNIT-5: STATE SPACE ANALYSIS: Concepts of states, state variables, and state model; state models of linear systems; state-transition matrix; solution of state equations, various canonical forms, transfer matrix; characteristic equation; eigenvalues and eigenvectors; derivation of transfer function from state model, Introduction of State space representation of digital system, Controllability and Observability tests.

BOOKS:

1. Nagrath & Gopal, "Control System Engineering", 4th Edition, New age International.
2. K. Ogata, "Modern Control Engineering", Prentice Hall of India.
3. B. C. Kuo & Farid Golnaraghi, "Automatic Control System" Wiley India Ltd, 2008.
4. D. Roy Choudhary, "Modern Control Engineering", Prentice Hall of India.

TCS-357 OBJECT ORIENTED PROGRAMMING & DESIGN

UNIT 1: C++ standard library, preprocessor directives, illustrative simple C++ programs, header files and namespaces, library files, concept of objects, object oriented analysis & object modeling techniques.

OBJECT ORIENTED CONCEPTS: Introduction to objects and object oriented programming, encapsulation (information hiding), access modifiers: controlling access to a class, method, or variable (public, protected, private, package), other modifiers, polymorphism: overloading, inheritance, overriding, abstract classes, reusability.

UNIT 2: Classes and data abstraction: structure, definitions, accessing members of structures, class scope and accessing class members, controlling access function and utility functions, initializing class objects: constructors.
USING DESTRUCTORS, CLASSES: Const(constant) object and const member functions, object as member of classes, friend function and friend classes, using this pointer, dynamic memory allocation with new and delete, static class members, container classes and iiterators, function overloading.

UNIT 3: OPERATOR OVERLOADING: Introduction, fundamentals of operator overloading, restrictions on operators overloading, operator functions as class members vs. as friend functions, overloading, «, »
INHERITANCE: Base classes and derived classes, protected members, casting base class pointers to derived- class pointers, using member functions, overriding base -class members in a derived class, public, protected and private inheritance, using constructors and destructors in derived classes, implicit derived -class object to base- class object conversion, composition vs. inheritance.

Unit 4: Virtual functions, abstract, base classes and concrete classes, new classes and dynamic binding, constructors, destructors, dynamic binding, files and i/o streams and various operation on files, stream input/output classes and objects, stream output, stream input, unformatted i/o (with read and write), stream manipulators, stream format states, stream error states.

UNIT 5: TEMPLATES & EXCEPTION HANDLING: Function templates, overloading template functions, class template, class templates and non-type parameters, templates and inheritance, templates and friends.
TEMPLATES AND STATIC MEMBERS: Introduction, basics of C++ exception handling: try throw, catch, throwing an exception;- catching an exception, re-throwing an exception, exception specifications, processing unexpected exceptions, constructors, destructors and exception handling, exceptions and inheritance.

BOOKS:

1. C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
2. Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
3. Programming with C++ By D Ravichandran, 2003, T.M.H
4. Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill 5. Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley, 6. The Complete Reference in C++ By Herbert Schildt, 2002, TMH.
7. C++ Programming Fundamentals by Chuck Easttom, Firewall Media.

PEC-351 DIGITAL COMMUNICATION LAB

1. Implementation and verification of ASK modulation and demodulation techniques.
2. Implementation and verification of FSK modulation and demodulation techniques.
3. Implementation and verification of PSK modulation and demodulation techniques.

4. Implementation and verification of the pulse code modulation and demodulation systems.
5. Implementation and verification of delta modulation and demodulation techniques and observe the effect of slope overload.
6. Verification of communication signals between a TDM-PCM transmitter and receiver.
7. Verification of analog signal transmission using sampling & reconstruction Transceiver.
8. Implementation and verification of adaptive delta modulation and demodulation processes.
9. Implementation and verification of delta sigma modulation & demodulation techniques.
10. To determine the performance and draw the radiation pattern of various antennas.
11. To verifying the data formatting techniques using transmitter and receiver modules.

PEC-352 ELECTRONICS CIRCUIT SIMULATION LAB

1. Design simulation and analysis of two input NAND and NOR gate.
2. Design, simulation and analysis of NMOS and CMOS inverter.
3. Design, simulation and analysis of full adder circuit.
4. Design, simulation and analysis of push-pull amplifier.
5. Design, Simulation and analysis of different amplifier.
6. Design, Simulation and analysis of amplitude modulation using MATLAB.
7. Design, Simulation and analysis of frequency modulation using MATLAB.
8. Design, Simulation and analysis of phase modulation using MATLAB.
9. Design, Simulation and analysis of ASK using MATLAB.
10. Design, Simulation and analysis of FSK using MATLAB.
11. Design, Simulation and analysis of PSK using MATLAB.

PEE-351 CONTROL SYSTEMS LAB

1. To determine response of second order systems for step input for various values of constant 'k' using linear simulator unit and compare theoretical and practical results.
2. To verify and compare the performance of P, PI and PID temperature controller for an oven.
3. To determine the performance of a dc position Control System.
4. To obtain transfer characteristics of a synchro-transmitter and receiver.
5. To determine speed–torque characteristics of an ac servomotor.
6. To determine the performance parameters of a dc servo motor.
7. To analyze the behavior of dc motor in open loop at various loads.
8. To design and test a lag, lead and lag-lead compensator using Bode plot.
9. To calculate the basic step angle of a stepper motor.
10. To verify the response of a digital controller over a second order simulated process.
11. To verify the frequency response analysis of the dc servomotor control system using PID controller.
12. To position the D.C Servomotor to required degree using DSP Controller.

PCS 357 OBJECT ORIENTED PROGRAMMING & DESIGN LAB

1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value Use a default argument of 2 for p. so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.
2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates.
   Write a program that uses a structure called point to model a point Define three points, and have the user input values to two of them then set the third point equal to the sum of the other two. and display the value of the new point Interaction with the program might look like this:
   Enter coordinates for PI : 3 4 Enter
   coordinates for P2: 5 7
   Coordinates of PI + P2 are: 8 11
3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding. subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.
   Enter first number. Operator, second number: 10/3
   Answer = 3.333333
   Do another (YI N)? Y
   Enter first number. Operator, second number 12 + 100
   Answer = 112
   Do another (Y I N)? N
4. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB.
   Use a friend function to carry out the addition operation. The object that stores the results maybe DM object or DB object. depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on object on display.
5. Create a class rational which represents a numerical value by two double valuesNUMERATOR & DENOMINATOR Include the following public member Functions:
   - constructor with no arguments (default).
   - constructor with two arguments.
   - void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
   - Overload + operator to add two rational number Overload » operator to enable input through cin Overload « operator to enable output through cou1.
   - Write a main ( ) to test all the functions in the class.
6. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

7. A hospital wants to create a database regarding its indoor patients. The information to store include
   Name of the patient
   Date of admission
   Disease
   Date of discharge
   Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age or the patients List the information about the entire store, the age of the patients. List the information about a pediatric patient (less than twelve years in age).
8. Make a class Employee with a name and salary. Make a class Manager inherits from Employee. Add an instance variable, named department, of type string. Supply a method to String that prints the manager's name, department and salary. Make a class Executive inherit from Manager Supply a method to String that prints the string Executive followed by the information stored in the Manager super class object. Supply a test program that tests these classes and methods.
9. Imagine a tollbooth with a class called toll Booth. The two data items of a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called paying Car ( ) increments the car total and adds 0.50 to the cash total. Another function, called no pay Car (). Increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals.

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
III-YEAR (VI-SEMESTER)
(Effective from session: 2013-14)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-361	Digital Signal Processing	3	1	0	30	20	50	100	150
2.	TEC-362	Microwave and Radar Engineering	3	1	0	30	20	50	100	150
3.	TEC-363	IC Technology	3	1	0	30	20	50	100	150
4.	TEC-364	Microelectronics	3	1	0	30	20	50	100	150
5.	TEC-365	Wireless Communication	3	1	0	30	20	50	100	150
PRA CTICAL										
6.	PEC-361	Digital Signal Processing Lab	0	0	2	10	15	25	25	50
7.	PEC-362	Microwave Engineering Lab	0	0	2	10	15	25	25	50
8.	PEC-363	Advance Simulation Lab	0	0	2	10	15	25	25	50
9.	PEC-364	Seminar	0	0	2	0	50	50	0	50
10.	GPP-361	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**15**	**5**	**8**	**180**	**245**	**425**	**575**	**1000**

TEC-361 DIGITAL SIGNAL PROCESSING

UNIT 1: DISCRETE FOURIER TRANSFORM: Discrete Fourier transform, frequency domain sampling and reconstruction of discrete-time signals, DFT as a linear transformation, relationship of the DFT to other transforms, properties of the DFT: periodicity, linearity, and symmetry, multiplication of two DFTs and circular convolution, additional DFT properties, frequency analysis of signals using DFT, introduction to MATLAB. (Coding of Implementation of LTI using DFT)

UNIT 2: EFFICIENT COMPUTATION OF DFT: Efficient computation of DFT: FFT algorithms, direct computation of the DFT, Radix-2 FFT algorithms, efficient computation of the DFT of two real sequences, computations, efficient computation of the DFT of 2N-point real sequences.
(Coding of FFT algorithms)
FILTER STRUCTURES: Direct form (I & II), LATTICE for FIR & IIR filters.

UNIT 3: DESIGN OF FIR FILTERS: Properties of non-recursive filters, rectangular, Hamming, Blackman, Chebyshev, and Kaiser Windowing, optimum approximation of FIR filters, multistage approach to sampling rate concession. (Coding of windowing for FIR filters)

UNIT4: DESIGN OF IIR FILTERS: Impulse invariant and bilinear transformation techniques for Butterworth and Chebyshev filters; cascade and parallel. (Coding of Butterworth and Chebyshev filters)

UNIT5: APPLICATION OF DSP AND CODING: Sampling frequency conversion, quadraturemirror-image filter banks, Hilbert transforms, Adaptive digital filters, two dimensional filter designs, Audio and Video coding, MPEG coding standardization, DCT, Walsh and Hardmard Coding.
DSP PROCESSOR ARCHITECTURE FUNDAMENTALS: Study of ADSP and TMS series of processor architectures.

BOOKS:

1. Proakis, J.G. & Manolakis, D.G., “Digital Signal Processing: Principles Algorithms and
2. Applications”, Prentice Hall (India).
3. Apte, “ Digital Signal Processing”, 2nd Edition, John Wiley (India)
4. Rabiner, L.R. and Gold B., “Theory and applications of DSP”, PHI.
5. Thomas J, Cavichhhi, “Digital Signal Processing”, John Wiley & Sons
6. Andreas Antoniou, Digital Signal Processing, McGraw Hill
7. A V Oppenhein, Digital Signal Processing, PHI
8. Ifeachor, Digital signal processing, pearson education.
9. Salivahanan, Vallavaraj, and Gananpriya, Digital signal processing, TMH.

TEC-362 MICROWAVE AND RADAR ENGINEERING

UNIT 1: PROPAGATION THROUGH WAVEGUIDES: Rectangular and circular waveguides solution of wave equation for TE & TM modes, degenerate and dominant modes, power transmission power loss, excitation of wave guides, non existence of TEM mode in waveguide, Introduction to stripline and microstrip-line.
MICROWAVE CAVITY RESONATORS: Rectangular and cylindrical cavities, quality factor and excitation of cavities.

UNIT 2: MICROWAVE COMPONENTS: Scattering matrix, E-plane, H-plane and hybrid tees, hybrid ring, waveguide discontinuities, waveguide couplings, bends and twists, transitions, directional couplers, matched load, attenuators and phase shifters, irises and tuning screws, detectors, wave meter, isolators and circulators.

UNIT 3: MICROWAVE MEASUREMENTS: Tunable detector, slotted line carriage, VSWR meter, measurement of frequency, wave length, VSWR, impedance, attenuation low and high power radiation patterns.

UNIT 4: MICROWAVE TUBES: Limitation of conventional active devices at microwave frequency. Klystron, Reflex klystron, magnetron, TWT, BWO: principle of operation and its performance characteristic and application.
MICROWAVE SEMICONDUCTOR DEVICES: PIN diode, Tunnel diode, Gunn devices, IMPATT and TRAPATT, their principal of operation, characteristics and applications.

UNIT 5: PRINCIPLES OF RADAR: Radar block diagram operation, radar range equation, radar frequencies, pulse and CW radar, introduction to doppler and MTI radar, and applications, block diagram of radar receiver for CW and pulse radar, radar displays, introduction to radar clutter.

BOOKS:

1. Liao, S.Y., Microwave Devices & Circuits; PHI 3rd Ed.
2. A K Gautam, Microwave and radar Engineering, Kataria & Sons.
3. M.I. Skolnik, Introduction to Radar Engineering; THM.
4. Collin, R.E. Foundations for Microwave Engineering; TMH 2nd Ed.
5. Rizzi, Microwave Engineering: Passive Circuits; PHI.
6. A Das and S.K. Das, Microwave Engineering; TMH.

TEC-363 IC TECHNOLOGY

UNIT 1: INTRODUCTIN TO IC TECHNOLOGY: Classification if ICs, Scale of integration, semiconductor and hybrid ICs Features of ICs,
CRYSTAL GROWTH: monolithic and hybrid ICs, crystal growth**,** techniques of crystal growth (Czochloskey and Bridgeman), wafer preparation and specifications, testing, measurements of parameters of crystals, Fabrication steps,
OXIDATION: Theory of growth of Silicon di-oxide layer, calculation of SiO2 thickness and oxidation kinetics, Dry wet and high pressure oxidation, plasma oxidation, properties of oxidation, defects induced due to oxidation.

UNIT 2: EPITAXIAL PROCESS: Epitaxy and its concept, Growth kinetics of epitaxy, epitaxial growth, Low temperature epitaxy, Si-epitaxy- growth chemistry of Si epitaxial layer, auto doping apparatus for epitaxial layer, apparatus for epitaxy, MBE system
DIFFUSION PROCESS: Diffusion models of solid, Ficks theory of diffusion, Solution of Fick`s law, diffusion parameters measurements schemes, Ion implantation- Scattering phenomenon, range theory, channeling, implantation damage, ion-implantation systems, Annealing.

UNIT 3: LITHOGRAPHY: Photolithography and pattern transfer, Optical and non optical lithography, electron, X-ray and ion-beam lithography, contact/proximity and projection printers, alignment.
PHOTO RESIST AND ETCHING: Types of photo resist, polymer and materials, Etching**-** Dry & Wet etching, basic regimes of plasma etching, reactive ion etching and its damages, lift-off, and sputter etching.

UNIT 4: METALLIZATION: Applications and choices, physical vapor deposition, patterning, problem areas.
IC PROCESS INTEGRATION: PMOS**,** NMOS and CMOS IC technology, MOS memory IC technology, bipolar IC fabrication.

UNIT 5: ASSEMBLY TECHNIQUE AND PACKAGING: Package types, packaging design consideration, IC assembly technologies.

YIELD AND RELIABILITY: Yield loss in IC, yield loss modeling, reliability requirements, accelerated testing.

BOOKS:

1. S.M. Sze, VLSI Technology, M Hill.
2. R. K. SINGH, VLSI (Technology, Design & Basic of Micro Elec.), Kataria & Sons
3. S.A. Campbell, the Science and Engineering of Microelectronic Fabrication, Oxford University Press
4. Sedra / Smith Microelectronic Circuits International Student Edition.
5. S.K. Ghandhi, "VLSI Fabrication Principles," John Wiley & Sons.
6. Runyan & Bean, “Semiconductor Integrated Circuit Processing Technology,” AdisonWesley, Inc.
7. G.W. Neudeck and R.F. Pierret, "Introduction to Microelectronic Fabrication,"
8. R.A. Colclaser, "Microelectronics -- Processing and Device Design,"

TEC-364 MICROELECTRONICS

UNIT 1: FUNDAMENTALS OF SEMICONDUCTORS: Semiconductor materials, elemental and compound semiconductors, energy band diagram, carrier concentration, drift and diffusion currents, conductivity, Einstein relations, recombination and generation, carrier transport equation.

UNIT 2: JUNCTIONS AND INTERFACES: Description of PN junctions, abrupt, linearly graded, diffused junctions, Diode models, temperature dependence of I-V characteristics, high level injection effects, breakdown mechanism in PN junctions, small signal and switching transients in diodes, LED, varactor, photodiode, Schottkey, tunnel diodes and their constructions and characteristics.

UNIT 3: BIPOLAR JUNCTION TRANSISTORS: Principle of operation, doping profiles, analysis of ideal diffusion BJT static I-V characteristics, charge control equations, drift, power and switching transistors.

UNIT 4: MOSFETS: C-V characteristics of a MOS capacitor, basic structure and operating principle of MOSFETs, I-V characteristics, short channel effects.

UNIT 5: ADVANCE SEMICONDUCTOR DEVICES: Structure, operation and I-V characteristics and high frequency performance of MESFET, fundamentals and applications of heterojunctions, HEMTs.

BOOKS:

1. S M Sze, Physics of Semiconductor devices, Wiley
2. M S Tyagi, Introduction to Semiconductor materials and devices, Wiley
3. Michael Shur, Physics of Semiconductor devices, PHI
4. B. G. Streetman and S. Banerjee, “Solid state electronics devices”, PHI
5. Microelectronics, Donald A Neamon, TMH
6. S.K. Ghandhi, "The Theory and Practice of Microelectronics," John Wiley & Sons.

TEC-365 WIRELESS COMMUNICATION

UNIT 1: SERVICES AND TECHNICAL CHALLENGES: Types of services, requirements for the services, multipath propagation, spectrum limitations, noise and interference limited systems, principles of cellular networks, multiple access schemes.

UNIT 2: WIRELESS PROPAGATION CHANNELS: Propagation mechanisms (qualitative treatment), propagation effects with mobile radio, channel classification, link calculations, narrowband and wideband models, propagation models, path loss components.

UNIT 3: WIRELESS TRANSCEIVERS: Structure of a wireless communication link, modulation and demodulation–quadrature/4-differential quadrature phase shift keying, offset-quadrature phase shift keying, phase shift keying, binary frequency shift keying, minimum shift keying, Gaussian minimum shift keying, power spectrum and error performance in fading channels.

UNIT 4: SIGNAL PROCESSING IN WIRELESS SYSTEMS: Principle of diversity, macrodiversity, micro-diversity, signal combining techniques, transmit diversity, equalizers- linear and decision feedback equalizers, review of channel coding and speech coding techniques.

UNIT 5: ADVANCED TRANSCEIVER SCHEMES: Spread spectrum systems- cellular code division multiple access systems- principle, power control, effects of multipath propagation on code division multiple access, application of orthogonal frequency division multiplexing in GSM, IS–95, IS-2000 and III & IV generation wireless networks and standards.

BOOKS:

1. Andreas.F. Molisch, “Wireless Communications”, John Wiley – India.
2. Simon Haykin & Michael Moher, “Modern Wireless Communications”, Pearson Education.
3. Rappaport. T.S., “Wireless communications”, Pearson Education.
4. Gordon L. Stuber, “Principles of Mobile Communication”, Springer International Ltd.
5. Andrea Goldsmith, “Wireless Communications”, Cambridge University Press.

PEC-361 DIGITAL SIGNAL PROCESSING LAB

1. To verify Linear Convolution
2. To verify Circular Convolution 3. To verify Discrete Fourier Transform.
4. To verify Fast Fourier Transform.
5. To verify FIR low pass filter using Rectangular window.
6. To verify FIR low pass filter using Hamming window.
7. To verify FIR low pass filter using Triangular window.
8. To verify FIR high pass filter using Rectangular window.
9. To verify FIR high pass filter using Hamming window.
10. To verify FIR high pass filter using Triangular window.
11. To verify IIR low pass filter.
12. To verify IIR high pass filter.
13. To verify DCT.

PEC-362 MICROWAVE ENGINEERING LAB

1. Verification of the characteristics of the reflex klystron tube and determine its electronic tuning range.
2. Measurement the frequency and wavelength of a rectangular waveguide working on TE_{10} mode.
3. To determine the standing wave ratio and coefficient of rectangular wave-guide.
4. To verify the following characteristics of Gunn Diode: (a) V-I characteristics.

   (b) Output power and frequency as a function of voltage. (c)
   Square wave modulation through PIN diode.
5. To measure the polar pattern and the gain of wave guide horn antenna.
6. Verification of the function of multi- hole directional coupler using the following parameters.

   (a) Main line and auxiliary line VSWR.
   (b) Coupling factor & directivity of the coupler.
7. Determine S-parameters of magic Tee terminated by matched load.
8. Verify working principal of the Isolator.
9. Verify working principal of the Circulators.
10. Verify working principal of Attenuators (Fixed and variable type).
11. Verify working principal of the Phase shifter.

PEC-363 ADVANCE SIMULATION LAB

Perform the following exercises using MATLAB:

1. To develop elementary signal function modules (m-files) for unit sample, unit step, exponential and unit ramp sequences.
2. To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
3. To develop program for discrete convolution and correlation.
4. To develop program for finding response of the LTI system described by the difference equation.
5. To develop program for computing inverse Z-transform.
6. To develop program for finding magnitude and phase response of LTI system described by system function H(z).
7. To develop program for computing DFT and IDFT.
8. To develop program for computing circular convolution.

9. To develop program for conversion of direct form realization to cascade form realization.
10. To develop program for cascade realization of IIR and FIR filters.
11. To develop program for designing FIR filter.
12. To develop program for designing IIR filter.

EVALUATION SCHEME

B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING

IV-YEAR (VII-SEMESTER)

(Effective from session: 2014-15)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-471	Optical Communication	3	1	0	30	20	50	100	150
2.	TEC-472	VLSI Design	3	1	0	30	20	50	100	150
3.	TEC-473	Digital System Design using VHDL	3	1	0	30	20	50	100	150
4.	TEC-474	Data Communication Networks	3	1	0	30	20	50	100	150
5.	EEC-47X	Elective-I	3	1	0	30	20	50	100	150
PRA CTICAL										
6.	PEC-471	Advance Communication Lab	0	0	2	10	15	25	25	50
7.	PEC-472	Industrial Training	0	0	2	0	50	50	0	50
8.	PEC-473	Project-I	0	0	4	25	25	50	50	100
9.	GPP-471	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**15**	**5**	**8**	**185**	**240**	**425**	**575**	**1000**

Elective-I:

EEC-471 Digital Image Processing and Applications

EEC-472 Mobile Communication

EEC-473 Multimedia Communication

EEC-474 Power Electronics

TEC-471 OPTICAL COMMUNICATION

UNIT 1: INTRODUCTION: Demand of information age, block diagram of optical fiber communication system, technology used in OFC system, structure and types of fiber, modes and configuration**,** mode theory for circular guide modal equation, modes in optical fiber, linearly polarized modes, attenuation factors, pulse broadening in optical fiber, single mode fiber, mode field diameter, single distortion in single mode fiber, derivation of material dispersion and waveguide dispersion, attenuation, signal degradation in optical waveguides, pulse broadening in graded index fiber waveguides, mode coupling.

UNIT 2: OPTICAL SOURCES: LED: Visible LED, infrared LED, LED structure and configuration, loss mechanism, application of LED, operating characteristics of materials for visible LED.
LASER: Principle of LASER action, efficiency of LASER diode, principles and structures, index guided and gains guided lasers, mode separation, quantum well laser, laser modulation.

UNIT 3: OPTICAL DETECTORS: Optical absorption in semiconductors, types of photo diodes, Principle of photo detection, working and structures of p-i-n and APD photo detectors, noises in photo detectors, SNR, detector response time effects, comparison of various photo detectors.

UNIT 4: ANALYSIS AND PERFORMANCE OF OPTICAL RECEIVER: Receiver sensitivity, photodiode for optical receiver, optical receiver design, recent receiver circuits, system configuration and power budget.

UNIT 5: OPTICAL NETWORKS: WDM concepts and principles, passive components, SONET/SDH networks, performance of WDM.

BOOKS:

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition.
2. Optical Fiber Communications – John M. Senior, PHI.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley.
4. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI.
5. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education.
6. Fiber Optic Communications – Joseph C. Palais, Pearson Education

TEC-472 VLSI DESIGN

UNIT 1: REVIEW: Current conduction in MOSFET, electrical properties of MOS, CMOS, BiCMOS, pass transistor.

UNIT 2: CMOS INVERTER: Static CMOS inverter, layout, switching threshold and noise margin concepts and their evaluation, dynamic behavior, power consumption. NMOS MOS pass transistor inverter.
COMBINATIONAL LOGIC: Static CMOS design, rationed logic, pass transistor logic, dynamic logic, cascading dynamic gates, CMOS transmission gate logic.

UNIT 3: SEQUENTIAL LOGIC: Static latches and registers, bi-stability principle, MUX based latches, static SR flip-flops, master-slave edge-triggered register, dynamic latches and registers, concept of pipelining, timing issues.

UNIT 4: MEMORY AND ARRAY STRUCTURE: ROM, RAM, peripheral circuitry, memory reliability and yield, SRAM and DRAM design, flash memory, PLA, PAL, FPGA.

UNIT 5: DESIGN FOR TESTABILITY: Logic testing, sequential logic testing, guidelines to be adopted in design for test, scan designing techniques, built-in self test (BIST) techniques.

BOOKS:

1. Basic VLSI Design by D.A. Pucknell & Eshraghian (PHI)
2. Modern VLSI Design Systems on Silicon by Wayne Wolf (Pearson Pub.) 3. R. K. Singh VLSI DESIGN (With VHDL), Kataria & Sons.
4. CMOS Digital Integrated Circuits by S M Kunj and L. Yusuf.
5. Digital Integrated Circuits: A Design Perspective by S M Rabaey.

TEC-473 DIGITAL SYSTEM DESIGN USING VHDL

UNIT 1: INTRODUCTION TO VHDL: VHDL description, combinational networks, modeling flipflop using VHDL, VHDL model for multiplexer, compliance and simulation of VHDL, codes, modeling a sequential machine, variables, signals and constants, arrays VHDL operators, VHDL functions, VHDL procedures, packages and libraries, VHDL model for a counter, attributes, transport and inertial delays, operator over loading, multi valued logic and signal resolution, IEEE-1164 , standard logic, generic, generates statements, synthesis of VHDL codes.

UNIT 2: DESIGN OF NETWORKS FOR ARITHMATIC OPERATIONS: Design of serial adder with accumulator, state graph for control networks design of binary multiplier, multiplication of signed binary numbers, design of binary divider.
DIGITAL DESIGN WITH SM CHART: State machine charts, derivation of SM charts, realization of SM charts, implementation of dice game, alternative realization of SM charts using microprogramming.

UNIT 3: FLOATING POINT ARITHMETIC: Representation of floating point numbers, floating point multiplication, and other floating point operations.
DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES: Xilinx 3000 series FPGAs, Xilinx 4000 series FPGAs, using one hot state assignment.

UNIT 4: MEMORY MODELS FOR MEMORIES AND BUSES: Static RAM, a simplified 486 bus model, interfacing memory to microprocessor bus.
UNIT 5: DESIGN EXAMPLES: UART design, description of MC68HC05 microcontroller, design of microcontroller CPU, and complete microcontroller design.

BOOKS:

1. Charles H Roth Jr, “Digital System Design using VHDL”, Thomson Learning.
2. Stephen Brown & Zvonko Vranesic, “Fundamentals of digital logic design with VHDL”, TMH.
3. John F Wakerly, “Digital design”, PHI, 4th Ed.
4. Digital system design, Nababi

TEC-474 DATA COMMUNICATION NETWORKS

UNIT 1: INTRODUCTION: Switching systems**,** network hardware and software, layering, design issues for layering, reference models and their comparison, example networks.
PHYSICAL LAYER: Transmission media and channel impairments, modulation, multiplexing, digital channels, mobile telephone systems.

UNIT 2: DATA LINK LAYER: Design issues, framing, error control, elementary data link protocols and sliding window protocols, HDLC, data link layer in internet.
MEDIUM ACCESS CONTROL: Channel allocation problem, MAC protocols- Aloha, CSMA, collision free protocols, limited contention protocol, ethernet, IEEE 802.3 standard, repeaters, bridges, routers and gateways.

UNIT 3: NETWORK LAYER: Design issues, VC and datagram subnets, routing algorithms for wired and wireless hosts, congestion prevention policies, load shedding. Connectivity of networks, connectionless internetworking, internetwork routing, fragmentation, IP protocols, IP addressing, OSPF, IPv6.

UNIT 4: TRANSPORT LAYER: Transport service and primitives, addressing, connation establishment and release, flow control, buffering, multiplexing and crash recovery, introduction of UDP, modeling TCP connection management, TCP congestion control, and performance issues.

UNIT 5: DNS name space and DNS server, overview of www, http. Introduction of cryptography, substitution cipher and transposition cipher, DES, cipher methods, public key algorithms, social issues- privacy, freedom of speech, copy right.

BOOKS:

1. Forouzan, B.A., “Data Communication and Networking”, Tata McGraw-Hill.
2. Tanenbaum, A.S, “Computer Networks”, Pearson Education.
3. Stallings W., “Data and Computer Communication”, Prentice-Hall.
4. Kurose, J.F. and Ross, K.W., "Computer Networking: A Top-Down Approach Featuring the Internet", Addison Wesley.

EEC-471 DIGITAL IMAGE PROCESSING AND APPLICATIONS

UNIT 1: DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS: Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT– Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT 2: IMAGE ENHANCEMENT TECHNIQUES: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering.

UNIT 3: IMAGE RESTORATION AND COMPRESSION: Model of Image Degradation/ restoration process – Noise models – Inverse filtering -Least mean square filtering –Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition Lossless compression: Variable length coding – LZW coding – Bit plane codingpredictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG, Basics of Vector quantization.

UNIT 4: IMAGE SEGMENTATION AND REPRESENTATION: Edge detection– ThresholdingRegion Based segmentation – Boundary representation: chair codes- Polygonal approximation– Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors – Regional descriptors –Simple descriptors-Texture.

BOOKS:

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education.
2. William K Pratt, Digital Image Processing John Willey
3. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos, Thompson Learniy.
4. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
5. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India.

EEC-472 MOBILE COMMUNICATION

UNIT 1: Radio propagation characteristics, models for path loss, shadowing & multipath fadingdelay spread, coherence bandwidth, coherence time, Doppler spread Jake's channel model.

UNIT 2: Digital modulation for mobile radio, analysis under fading channel, diversity techniques and rake demodulator, introduction to spread spectrum communication, multiple access techniques used in mobile wireless communications: FDMA/TDMA/CDMA.

UNIT 3: Cellular concept, frequency reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, cellular system, channel allocation schemes, handover analysis, cellular CDMA, soft capacity, Erlang capacity comparison.

UNIT 4: Wireless standards-GSM, IS-95, UMTS-IMT-2000, signaling, call control, mobility management and location tracing, wireless internet, ad hoc wireless networks, broadband wireless and quality of service, location management, pervasive healthcare.

BOOKS:

1. Theodore S. Reppeport, Wireless Communications Principles and Practice, PHI.
2. William C.Y. Lee, Mobile Cellular Telecommunication, Analog and Digital Systems, McGraw Hill.
3. Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, PHI.
4. Kaveh Pahlavan and Allen H. Levesque" Wireless Information Networks", Wiley.

EEC-473 MULTIMEDIA COMMUNICATION

UNIT 1: INTRODUCTORY CONCEPTS: Multimedia , definition, different types of multimedia products in different fields, introduction to making of multimedia – the stages of the projects, the hardware and software requirements etc., authoring tools, categories of authoring tools.

UNIT 2: Lossless and lossy compression, run length coding, statistical coding, transform coding, making of JPEG, making of MPEG, text compression using static Huffman technique, dynamic Huffman technique, arithmetic technique etc.

UNIT 3: Distributed multimedia systems, resource management of DMS, IP networking, multimedia operating systems, distributed multimedia servers, distributed multimedia applications, multimedia file formats.

UNIT-4: Multimedia communication standards, MPEG-1, MPEG-2, MPEG-4 Audio/Video, MPEG-4 Visual Texture coding (VTC), Multimedia communication across networks, compression techniques: JPEG, MPEG.

BOOKS:

1. Rao, Bojkovic, Milovanovic, “Multimedia Communication Systems”, PHI
2. Andleigh, Thakrar, “Multimedia System Design”, PHI
3. Sharda, “Multimedia Information Networking”, PHI
4. Vaughan, “Multimedia making it work”, Tata Mc Graw Hill

EEC-474 POWER ELECTRONICS

UNIT 1: POWER SEMICONDUCTOR DEVICES: Two-transistor model of thyristor, methods of triggering a thyristor, thyristor types, triggering devices: triggering devices, unijunction transistor, characteristics and applications of UJT, programmable unijunction transistor, DIAC, siliconcontrolled switch, silicon unilateral switch, silicon bilateral switch, shockley diode, opto-isolators.

UNIT 2: THYRISTOR FIRING CIRCUITS TURN ON SYSTEMS: requirements for triggering circuits, thyristor firing circuits, full wave control of ac with one thyristor, light activated SCRs (LASCR) control circuit, pulse transformer triggering, firing SCR by UJT, TRIAC firing circuit, phase control of SCR by pedestal and ramp controlled rectifier: types of converters, effect of inductive load, commutating diode or free-wheeling diode, controlled rectifiers, bi-phase halfwave (single way), single-phase full-wave phase controlled converter using bridge principle (double way), single phase full-wave phase controlled converter using bridge principal (double way) harmonics.

UNIT 3: INVERTERS: Types of inverters, bridge inverters, voltage source inverters (VSI), pulse width modulated inverters, current source inverter ac voltage controllers: types of ac voltage controllers, ac phase voltage controllers, single-phase voltage controller with R-L load, harmonic analysis of single-phase full-wave controller with R-L load, gating signals.
DC to DC Converters (Choppers): dc choppers, chopper classification, two quadrant chopper, four quadrant chopper, and Morgan chopper.

UNIT 4: CYCLOCONVERTERS: Types of cycloconverters, single-phase cycloconverter, threephase cycloconverters. thyristor
Protection: Protection, dv/dt protection, di/dt protection, over 42, over voltage protection.
Industrial Applications: "one shot" thyristor trigger circuit, overvoltage protection, simple battery charger, battery charging regulator, ac static switches dc static switch microprocessor based applications**.**

BOOKS:

1. Rashid “Power Electronics: Circuits, Devices & Applications” PHI – 2 nd Edition.
2. P. C. Sen, “Power Electronics” TMH – 2 nd Edition.
3. H. C. Rai, “Power Electronics Devices, Circuits, Systems and Application”,Galgotia.
4. P. S. Bimbhara, “Electrical Machinery, Theory Performance and Applications” Khanna Publications.

PEC-471 ADVANCE COMMUNICATION LAB

1. Analysis and measurement of 16-ary QAM and ASK modulation scheme.
2. Analysis and measurement of FSK and QPSK, modulation scheme.
3. Analysis and measurement of DPSK and BPSK modulation scheme.
4. Setting up Fiber Optic Analog Link and Digital Link.
5. Analysis of intensity modulation technique using analog input signal and digital input signal.
6. Analysis of (i) Propagation loss (ii) Bending loss in optical fiber.
7. Measurement of optical power using optical power meter at 660 nm & 950 nm.
8. Measurement of propagation loss in optical fiber using power meter.

9. Measurement of numerical aperture of an optical fiber.
10. Analysis of direct sequence spread spectrum (DSSS) based modulation and demodulation technique.
11. Analysis of CDMA- DSSS technique in a two users/two channels environment.

EVALUATION SCHEME
B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING
IV-YEAR (VIII-SEMESTER)
(Effective from session: 2014-15)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
TH EORY										
1.	TEC-481	Electronic Switching Systems	3	1	0	30	20	50	100	150
2.	TEC-482	Satellite Communication	3	1	0	30	20	50	100	150
3.	TEC-483	Television Engineering	3	1	0	30	20	50	100	150
4.	EEC-48X	Elective-II	3	1	0	30	20	50	100	150
PR ACTICAL										
5.	PEC-481	VHDL & VLSI Design lab	0	0	2	10	15	25	25	50
6.	PEC-482	Project-II	0	0	6	50	50	100	200	300
7.	GPP-481	General Proficiency	0	0	0	0	50	50	0	50
SEMESTER TOTAL			**12**	**4**	**8**	**180**	**195**	**375**	**625**	**1000**

Elective-II:

EEC-481 Artificial Neural Networks and Fuzzy Logic

EEC-482 Biomedical Signal Processing

EEC-483 Principles of Secure Communication

EEC-484 Radar and Navigation

TEC-481 ELECTRONIC SWITCHING SYSTEMS

UNIT 1: INTRODUCTION: Message switching, circuits switching, functions of a switching system, register translator senders, distribution frames, crossbar switch, a general trunking Transmission Systems, FDM Multiplexing and modulation, Time Division Multiplexing, Digital Transmission and Multiplexing: Pulse Transmission, Line Coding, Binary N-Zero Substitution, Digital Bi-phase, Differential Encoding, Time Division Multiplexing (T1 carrier system CCIT and DS lines) Time Division Multiplex Loops and Rings.

UNIT 2: DIGITAL SWITCHING: Switching functions, space division switching, multiple stage switching, non blocking switches, blocking Probabilities DCS hierarchy, integrated cross connect equipment, digital switching in environment, zero loss switching.

UNIT 3: TELECOM TRAFFIC ENGINEERING: Network traffic load and parameters, grade of service and blocking probability, Traffic Characterization: Arrival Distributions, Holding Time Distributions, Loss Systems, Network Blocking Probabilities: End-to-End Blocking Probabilities, Overflow Traffic, Delay Systems: Exponential service Times, Constant Service Times, Finite Queues.

UNIT 4: NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT: Timing Recovery, Phase-Locked Loop, Clock Instability, Jitter Measurements, Systematic Jitter. Timing Inaccuracies: Slips, Asynchronous Multiplexing, Network Synchronization, U.S. Network Synchronization, Network Control, Network Management.

UNIT 5: DIGITAL SUBSCRIBER ACCESS: ISDN Basic Rate Access Architecture, ISDN U Interface, ISDN D Channel Protocol. HD-Rate Digital Subscriber Loops: Asymmetric Digital Subscriber Line, VDSL.
DIGITAL LOOP CARRIER SYSTEMS: Universal Digital Loop Carrier Systems, Integrated Digital Loop Carrier Systems, Next-Generation Digital Loop Carrier, Fiber in the Loop, Hybrid Fiber Coax Systems, Voice band Modems: PCM Modems, Local Microwave Distribution Service, Digital Satellite Services.
DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS. SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STSI, Virtual Tributaries and Higher rate of service.

BOOKS:

1. Tele communication switching system and networks - Thyagarajan Viswanath, PHI.
2. Digital telephony - J. Bellamy, John Wiley.
3. Data Communications & Networks - Achyut. S.Godbole, TMH.
4. Principles of Communication Systems – H. Taub & D. Schilling , TMH.
5. Telecommunication switching, Traffic and Networks - J E Flood, Pearson Education.

TEC-482 SATELLITE COMMUNICATION

UNIT 1: OVERVIEW OF SATELLITE SYSTEMS, ORBITS AND LAUNCHING METHODS: Frequency Allocations, Intelsat, U.S. Domsats, Polar Orbiting Satellites, Problems, Kepler's Law, Definitions of Terms for Earth-orbiting Satellites, Orbital Elements, Effects of a Nonspherical Earth, Atmospheric Drag, Inclined Orbits ,Calendars , Universal , Sidereal Time, Julian Dates , The Orbital Plane – The Geocentric-, Topcentric-Horizon , The Sub-satellite Point – Predicting Satellite Position.

UNIT 2: GEOSTATIONARY ORBIT & SPACE SEGMENT: Antenna Look Angels, The Polar Mount Antenna, Limits of Visibility, Near Geostationary Orbits, Earth Eclipse of Satellite, Launching Orbits, Problems, Power Supply, Attitude Control, Spinning Satellite Stabilization Momentum Wheel Stabilization, Station Keeping, Thermal Control, Transponders, Wideband Receiver, Power Amplifier, Antenna Subsystem, Morelos, Advanced Spacecraft.

UNIT 3: EARTH SEGMENT & SPACE LINK: Equivalent Isotropic Radiated Power, Transmission Losses, Free-Space Transmission, Feeder Losses, Antenna Misalignment Losses, Fixed Atmospheric and Ionospheric Losses, Link Power Budget Equation, System Noise, Antenna Noise, Amplifier Noise Temperature, Amplifiers in Cascade , Noise Factor, Noise Temperature,

Overall System Noise Temperature, Carrier-to-Noise Ratio, Uplink, Saturation Flux Density, The Earth Station HPA, Downlink, Output Back off, Effects of Rain, Uplink rain-fade margin, fade margin, Combined Uplink and Downlink C/N Ratio, Inter modulation Noise.

UNIT 4: SATELLITE ACCESS: Single Access–Preassigned FDMA, Demand-Assigned FDMA, SPADE System. Bandwidth-limited a Power-limited TWT amplifier operation, FDMA downlink analysis. TDMA: Reference Burst; Traffic Date, Frame Efficiency and Channel capacity, preassigned TDMA, Demand assigned TDMA, Speech Interpolation and Prediction, Downlink analysis for Digital transmission. Companion of uplink Power requirements for FDMA & TDMA.

UNIT 5: DIRECT BROADCAST SATELLITE SERVICES: Introduction–Orbital Spacings–Power Rating and Number of Transponders–Frequencies and Polarization–Transponder Capacity–Home Receiver Outdoor Unit (ODU)–Home Receiver Indoor Unit (IDU)–Downlink Analysis–Uplink-Problems-Satellite Mobile Services–VSATs–Radarsat–Global Positioning Satellite System–Orbcomm.

BOOKS:

1. Dennis Roddy, Satellite Communications, McGraw-Hill Publication.
2. Timothy Pratt – Charles Bostian & Jeremy Allmuti, Satellite Communications, Willy
3. Wilbur L. Pritchars Henri G.Suyder Hond Robert A.Nelson, Satellite Communication Systems Engineering, Pearson Education Ltd.

TEC-483 TELEVISION ENGINEERING

UNIT 1: FUNDAMENTALS OF TELEVISION: Geometry form and Aspect Ratio, Image Continuity, Number of scanning lines, interlaced scanning, Picture resolution, composite video signal, video signal dimension, horizontal sync, vertical sync, Picture signal Transmission, positive and negative modulation, VSB transmission, sound signal transmission, channel bandwidth, TV standards.

UNIT 2: CAMERA AND PICTURE TUBES: Basic principle of camera tubes, Image orthicon, vidicon, plumbicon, silicon diode array vidicon, solid state image scanners, monochrome picture tubes, beam deflection, screen phosphor, face plate, picture tube characteristics.

UNIT 3: MONOCHROME TELEVISION: TV transmitter, TV signal propagation, Interference, TV transmission Antennas, Monochrome TV receiver, RF tuner, UHF, VHF tuner, Digital tuning techniques, AFT-IF subsystems, AGC, Noise cancellation, Video and sound inter carrier detection, vision IF subsystem, video amplifiers requirements and configurations, DC reinsertion, Video amplifier circuits, Sync separation, typical sync processing circuits, Deflection current waveform, Deflection Oscillators, Frame deflection circuits, requirements, Line Deflection circuits, EHT generation, Receiver Antennas.

UNIT 4: COLOUR TELEVISION: Compatibility, colour perception, Three colour theory, luminance, hue and saturation, colour television cameras values of luminance and colour difference signals, colour signal transmission bandwidth, modulation of colour difference signals, weighting factors, Formation of chrominance signal. Introduction to different color television systems: NTSC colour TV system, PAL colour TV SECAM system. PAL colour TV receiver, colour television display tubes, delta, gun-precision, in-line and Trinitron colour picture tubes.

UNIT 5: ADVANCED TELEVISION SYSTEMS: Satellite TV technology, Cable TV, VCR- Video Disc recording and playback, Tele Text broadcast receiver, digital television, Transmission and

reception, projection Television, Flat panel display TV receiver, Stereo-sound in TV, 3D TV, HDTV, LCD, LED Television.

BOOKS:

1. R.R.Gulati, " Monochrome Television Practice, Principles, Technology and Servicing, New age International Publishes.
2. R.R.Gulati "Monochrome and colour television ", New age International Publisher.
3. A.M Dhake, "Television and Video Engineerign", TMH.
4. S.P.Bali, " Colour Television, Theory and Practice", TMH.

EEC-481 ARTIFICIAL NEURAL NETWORKS AND FUZZY LOGIC

UNIT 1: NEURAL NETWORKS-1(INTRODUCTION & ARCHITECTURE): Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks, various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

UNIT 2: NEURAL NETWORKS-II (BACK PROPAGATION NETWORKS): Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient; back propagation algorithm, factors affecting back propagation training, applications.

UNIT 3: FUZZY LOGIC-I (INTRODUCTION): Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory versus probability theory, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT 4: FUZZY LOGIC –II (FUZZY MEMBERSHIP, RULES): Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzifications, Fuzzy Controller.

UNIT 5: APPLICATION OF NEURAL NETWORK AND FUZZY LOGIC: Application of neural network, case study, Inverted pendulum, Image processing, introduction to neuro & fuzzy logic controller.

BOOKS:

1. Jacek M. Zurada, 'Introduction to Artificial Neural Systems', Jaico Publishing home.
2. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', John Wiley.

EEC-482 BIOMEDICAL SIGNAL PROCESSING

UNIT 1: INTRODUCTION TO BIO-MEDICAL SIGNALS: Classification, Acquisition and Difficulties during Acquisition Basics of Electrocardiography, Electroencephalography, Electromyography & electro-retinography 3. Role of Computers in the Analysis, Processing, Monitoring & Control and image reconstruction in bio-medical field

UNIT 2: ECG: Measurement of Amplitude and Time Intervals, QRS Detection(Different Methods), ST Segment Analysis, Removal of Baseline Wander And Power line Interferences, Arrhythmia Analysis, Portable Arrhythmia Monitors.

UNIT 3: DATA REDUCTION: Turning Point algorithm, AZTEC Algorithm, Fan Algorithm, Huffman and Modified Huffman Coding, Run Length Coding.

UNIT 4: EEG: Neurological Signal Processing, EEG characteristic, linear prediction theory, Sleep EEG, Dynamics of Sleep/Wake transition. Study of pattern of brain waves, EpilepsyTransition, detection and Estimation.

UNIT 5: EP ESTIMATION: by Signal Averaging, Adaptive Filtering:- General Structures of Adaptive filters, LMS Adaptive Filter, Adaptive Noise Canceling, Wavelet Detection:Introduction, Detection By Structural features, Matched Filtering, Adaptive Wavelet Detection, detection of Overlapping Wavelets.

BOOKS:

1. Biomedical Digital Signal Processing, Willis J Tomkin, Phi.
2. Biomedical Signal Processing, D.C Reddy McGraw Hill.
3. Biomedical Instrumentation and Measurement.,Crommwell,Weibel and Pfeifer, PHI.
4. Biomedical Signal Processing, Arnon Cohen, volume I & Licrc Press
5. Biomedical Signal Analysis A Case Study Approach, Rangaraj M. Rangayyan, John Wiley
6. Medical instrumentation Application and Design, john G. Webster, John Wiley.

EEC-483 PRINCIPLES OF SECURE COMMUNICATION

UNIT 1: DIRECT SEQUENCE SPREAD SPECTRUM SYSTEMS: Model of SS digital communication system, direct sequence spread spectrum signal, error rate performance of the decoder, processing gain and jamming margin, uncoded DSSS signals, applications of DSSS signals in anti-jamming, low detectability signal transmission, code division multiple access and multipath channels, effect of pulsed interference on DSSS systems, Generation of PN sequences using m sequence and Gold sequences, excision of narrowband interference in DSSS systems, acquisition and tracking of DSSS system.

UNIT 2: FREQUENCY HOPPED SPREAD SPECTRUM SYSTEMS: Basic concepts, slow and fast frequency hopping, performance of FHSS in AW GN and partial band interference, FHSS in CDMA system, Time hopping and hybrid SS system, acquisition and tracking of FH SS systems.

UNIT 3: CRYPTOGRAPHIC TECHNIQUES: Classical encryption technique, Symmetric cipher model, cryptography and cryptanalysts, Substitution techniques, transposition techniques

UNIT 4: BLOCK CIPHER AND DATA ENCRYPTION STANDARD: Block cipher principle, data encryption standard (DES) strength of DES, differential and linear cryptanalysts, block cipher design principles, simplified advanced encryption standard (S-AES), multiple encryption and triple DES, Block cipher modes of operation, stream ciphers and RC4 algorithm

UNIT 5: PUBLIC KEY CRYPTOGRAPHY: Prime numbers, Fermat and Euler's theorem, Chinese remainder theorem, discrete algorithms, principles of public key cryptosystems, RSA algorithm, key management Diffie-Hellman key exchange, message authentication requirements and functions.

BOOKS:

1. Digital Communication by J.G. Proakis McGraw Hill.
2. Cryptography and Network Security by W. Stallivgs, PHI.
3. Digital Communication by Simon Haykin, Wiley.
4. Principle of Communication systems by Taub & Schilling TMH.
5. Cryptography and secure Communications by M.Y. Rhee, Mc Graw Hill.

EEC-484 RADAR & NAVIGATION

UNIT 1: RADAR SIGNAL MODELS: Amplitude models, distributed target forms of range equation, radar cross section, statistical description of radar cross section, Swerling model, Clutter, signal to clutter ratio, temporal and spatial correlation of clutter, noise model and signal to noise ratio, frequency models, Doppler shift, simplifies approach to Doppler shift, stop and hop assumption, spatial model, variation with angle, variation with range, projections, multipath, spectral models.

UNIT 2: RADAR WAVE FORMS: Waveform matched filter of moving targets, ambiguity function, ambiguity function of the simple matched pulse filter for the pulse burst, pulse by pulse processing, range ambiguity, Doppler response and ambiguity function of the pulse burst. Introduction to Synthetic Aperture Radar (SAR)

UNIT 3: DETECTION FUNDAMENTALS: Radar detection as hypothesis testing, NeymanPearson detection rule, likelihood ratio test, threshold detection of radar signals, non-coherent integration of non-fluctuating targets, Albersheim and Shnidaman equations, Binary integration.

UNIT 4: RADIO DIRECTION FINDING: loop direction finder, goniometer, errors in direction finding, RADIO RANGES: LF/MF four course radio ranges, VOR, ground equipment & receiver, VOR errors.
HYBERBOLIC SYSTEM OF NAVIGATION: LORAN & Decca DME & TECAN

UNIT 5: AIDS TO APPROACH AND LANDING: ILS & GCA & MLS DOPPLER NAVIGATION: Doppler frequency, Doppler radar equipment, CW & FMCW Doppler radar, frequency trackers, Doppler range equation.
SATALLITE NAVIGATION SYSTEM: transit system, NAVSTAR, GPS, basic principles of operation, signal structure of NAVSTAR broadcasts, data message, velocity determination, accuracy of GPS & differential navigation, NAVSTAR receiver.

BOOKS:

1. Fundamentals of radar signal processing, Mark A Richards, TMH.
2. Elements of Electronics Navigation, N. S. Nagraja, TMH.
3. Radar principles, Peebles Jr. P. Z., Wiley, NY.

PEC-481 VHDL & VLSI DESIGN LAB

Experiments of this lab will be based on the following advanced circuit design tools:

1. SPICE,
2. VHDL/ Verilog,
3. Design using FPGA,
4. Cadence Design software