

PONDICHERRY UNIVERSITY
B.TECH (ELECTRONICS AND COMMUNICATION ENGINEERING)
CURRICULUM AND SYLLABUS

I Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	T101	Mathematics-I	3	1	-	4	25	75	100
2.	T102	Physics	4	-	-	4	25	75	100
3.	T103	Chemistry	4	-	-	4	25	75	100
4.	T110	Basic Civil and Mechanical Engineering	4	-	-	4	25	75	100
5.	T111	Engineering Mechanics	3	1	-	4	25	75	100
6.	T112	Communicative English	4	-	-	3	25	75	100
Practicals									
7.	P104	Physics Lab	-	-	3	2	50	50	100
8.	P105	Chemistry Lab	-	-	3	2	50	50	100
9.	P106	Workshop Practice	-	-	3	2	50	50	100
Total			22	2	9	29	300	600	900

T101 - MATHEMATICS – I

UNIT - I

Calculus: Curvature, radius of curvature, evolutes and involutes. Beta and Gamma functions and their properties.

UNIT - II

Multiple Integrals and Applications: Multiple integrals – change of order of integration. Applications: Areas (double integration) and volumes by triple integration (Cartesian and polar) – mass and center of mass (constant and variable densities).

UNIT - III

Analytical Solid Geometry: Directional cosines and ratios – angle between two lines – the equation of plane - equations to a straight line and shortest distance between two skew lines.

UNIT - IV

Differential Equations: Exact equations, First order linear equations, Bernoulli's equation, orthogonal trajectories, growth and decay, geometrical applications and electric circuits. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT - V

Differential Equations (Higher order):

Linear differential equations of higher order – with constant coefficients, the operator D - Euler's linear equation of higher order with variable coefficients - simultaneous linear differential equations – solution by variation of parameters method – simple applications to electric circuits.

Text Book:

1. M.K.Venkataraman, Engineering Mathematics (First Year), Second Edition, The National Publishing Company, Madras, 2001.

Reference Book:

1. N.P. Bali and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications, New Delhi, 2007.

T102 - PHYSICS

UNIT - I

Acoustics and NDT: Ultrasonics - Ultrasonic Waves Productions (Piezoelectric and Magnetostriction method) – Detections (Acoustic Grating)

Acoustics - Factors affecting Acoustic of Buildings (Reverberation, Loudness, Focusing, Echo, Echelon Effect and Resonance) and their Remedies - Sabine's formula for Reverberation Time . NDT applications - Pulse Echo Method - Liquid Penetrant Method

UNIT - II

Optics: Interference - Air Wedge – Michelson's Interferometer – Wavelength Determination– Interference Filter – Antireflection Coatings. Diffraction - Diffraction Grating – Dispersive power of grating - Resolving Power of Grating and Prism. Polarisation - Huygens Theory of Double Refraction – Quarter and Half Wave Plates – Specific Rotary Power – Laurent Half Shade Polarimeter

UNIT - III

Lasers and Fiber Optics: Lasers - Principles of Laser – Spontaneous and Stimulated Emissions - Einstein's Coefficients – Population Inversion and Laser Action – Optical resonators – Types of Lasers - NdYAG, CO₂ laser, GaAs Laser
Fiber Optics - Principle and Propagation of light in optical fiber – Numerical aperture and acceptance angle – Types of optical fibers (material, refractive index, mode)

UNIT - IV

Wave Mechanics:

Matter Waves – de Broglie Wavelength – Uncertainty Principle – Schrödinger Wave Equation – Time Dependent – Time Independent – Application to Particle in a One Dimensional Box – Quantum Mechanical Tunneling – Tunnel Diode.

UNIT - V

Nuclear Energy Source: General Properties of Nucleus (Size, Mass, Density, Charge) – Mass Defect – Binding Energy - Disintegration in fission – Nuclear Fusion (p-p and C-N cycle) – Nuclear Reactor: Materials Used in Nuclear Reactors. – PWR – BWR – FBTR

Text Books:

1. A S Vasudeva, Modern Engineering Physics, S. Chand & Co, New Delhi, 2006.
2. V Rajendran, Engineering Physics, TMH, New Delhi 2008.

Reference Books:

1. Richtmyer, Kennard and cooper , Introduction to Modern Physics, TMH, New Delhi 2005.
2. Ajay Ghatak, Optics, TMH, New Delhi, 2007.
3. Thiagarajan and Ghatak, Laser and Application, TMH, New Delhi, 2008.
4. Arthur Beiser, Concept of Modern Physics, TMH, New Delhi, 2008.
5. Avadhanulu M N and Kshir Sagar , A Text Book of Engineering Physics, S. Chand & Co, New Delhi, 2007.
6. R. Murugeshan, Modern Physics, S. Chand & Co, New Delhi, 2006.
7. K.R.Nambiar, Lasers, New Age International, New Delhi, 2008.

T103 – CHEMISTRY

UNIT - I

Water: Hardness of water – units and calcium carbonate equivalent. Determination of hardness of water- EDTA method. Disadvantages of hardwater-boiler scale and sludge, caustic embrittlement, priming and foaming and boiler corrosion. Water softening method – internal and external conditioning – lime-soda process, zeolite process and ion exchange process. Desalination – reverse osmosis and electro dialysis.

UNIT - II

Polymers : Classification, types of polymerization reactions - mechanism of radical, ionic and Ziegler-Natta polymerizations. Polymer properties - chemical resistance, crystallinity and effect of temperature. Thermoplastics and thermosets. Polymerization techniques -bulk, suspension, emulsion, solution and gas phase polymerization. Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, polyurethane, Mn and Mw. Rubbers - vulcanization, synthetic rubber, buna S, buna N, silicone and butyl rubber. Conducting polymers - classification and applications. Polymer composites – FRP - laminar composites.

UNIT - III

Electrochemical Cells: Galvanic cells, single electrode potential, standard electrode potential, electromotive series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes-hydrogen calomel, Ag /AgCl and glass electrodes. Batteries - primary and secondary cells, laclanche cell, lead acid storage cell, Ni-Cd battery and alkaline battery. Fuel cells - H₂-O₂ fuel cell.

UNIT - IV

Corrosion And Its Control: Chemical and electrochemical corrosion-Galvanic seriesgalvanic, pitting, stress and concentration cell corrosion. Factors influencing corrosioncorrosion control methods - cathodic protection and corrosion inhibitors. Protective coating - types of protective coatings-metallic coating-tinning and galvanizing, cladding, electroplating and anodizing.

UNIT - V

Phase Rule: Definition and derivation of phase rule. Application to one component system - water and sulphur systems. Thermal analysis, condensed phase rule. Two component alloy systems - Pb-Ag, Cu-Ni and Mg-Zn systems.

Text books:

1. P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi 2004.
2. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, 2nd edition. PHI Learning PVT., LTD, New Delhi, 2008.

Reference Books:

1. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand & Co., Ltd. New Delhi.
2. B. K. Sharma, Engineering Chemistry, 3rd edition Krishna Prakashan Media (P)

T 110 - BASIC CIVIL AND MECHANICAL ENGINEERING
PART-A CIVIL ENGINEERING

UNIT - I

Buildings, Building Materials: Buildings-Definition-Classification according to NBCplinth area, Floor area, carpet area, floor space index-construction materials-stone, brick, cement, cement-mortar, concrete, steel- their properties and uses.

UNIT - II

Buildings and their Components: Buildings- Various Components and their functions. Soils and their classification Foundations-Functions and types of foundations, Masonry, Floors-functions and types of floors, Roofs and types of roofs.

UNIT - III

Basic Infrastructure: Surveying-classification, general principles of surveying – Basic terms and definitions of chain, compass and leveling surveying , uses of surveying , contours, their characteristics and uses. Roads-types, Water bound macadam road, cement concrete road, bituminous road. Bridges-components and types of bridges. Dams-Purpose, selection of site, types of dams and components. Water supply-sources and quality requirements. Rainwater harvesting.

PART - B MECHANICAL ENGINEERING

UNIT - IV

Internal and External Combustion Systems: Working principles of IC engines - Classification – Diesel and petrol engines: two stroke and four stroke engines. Steam generators(Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories.

Conventional Power Generation Systems: Hydraulic, steam and gas turbines power plants – Schemes and layouts – Selection criteria of above power plants.

UNIT - V

Non-Conventional Energy Systems (Description Only): Solar thermal systems – Solar photovoltaic – Solar pond – wind, wave, tidal, geothermal and ocean thermal energy conversion systems.

Casting : Green and dry sand moulding processes for ferrous and non-ferrous metals – applications.

UNIT - VI

Metal Joining: Elements of arc and gas welding, brazing and soldering – Bolted joint types – Adhesive Bonding; classification of adhesives – applications. Sheet Metal Processing- Punching, blanking, shearing, bending, and deep drawing processes; descriptions and applications .

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<http://ece.pec.edu>

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Text Books:

1. Purushothama Raj.P., Basic civil engineering, 3rd Edn., Dhanam Publications, Chennai, 2001.
2. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications Chennai, 2001.
- 3.Lindberg, R.A.Process and Materials of Manufacture, PHI, 1999.
4. Nagpal, Power Plant Engineering, Khanna Publishers, Delhi, 1998.

Reference Books

1. Rajput, R K, Engineering Materials, S Chand & Co. Ltd., New Delhi, 2002.
2. Punmia, B.C., et. al., Surveying , Vol-I, Laxmi Publishers, New Delhi, 2002.
3. Punmia, B.C., et.al Building Construction, Laxmi Publishers, New Delhi ,2002.
4. El.Wakil, M.M., Power Plant Technology, Mc Graw Hill Book Co.,1985.
5. Hajra Choudhry, et. al., Workshop Technology Vol I and II, Media Promoters Publishers Pvt. Ltd., Bombay, 2004.

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T111 - ENGINEERING MECHANICS

UNIT - I

Fundamental of Mechanics: Basic Concepts Force System and Equilibrium, Definition of Force, Moment and Couple, Principle of Transmissibility, Varignon's theorem, Resultant of force system – Concurrent and non concurrent coplanar forces, Condition of static equilibrium for coplanar force system, stability of equilibrium, concept of free body diagrams, applications in solving the problems on static equilibrium of bodies.

UNIT - II

Plane Trusses: Degrees of freedom, Types of supports and reactions, Types of loads, Analysis of Trusses-method of joints, method of sections

Friction: Introduction, Static dry friction, simple contact friction problems, ladders, wedges, screws and belt friction.

UNIT - III

Properties of Surfaces: Properties of sections – area, centroids of lines, areas and volumes, moment of inertia first moment of inertia, second moment of inertia and product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.

UNIT - IV

Kinematics and Kinetics of Particles: Equations of motion - Rectilinear motion, curvilinear motion, Relative motion, D'Alembert's principle, work- Energy equation – Conservative forces and principle of conservation of energy, Impulse – momentum, Impact – Direct central impact and oblique central impact.

UNIT - V

Kinematics and Kinetics of Rigid bodies: Plane motion, Absolute motion, Relative motion, translating axes and rotating axes, work and energy, impulse and momentum

Text Books

1. Bhavikatti, S.S and K.G.Rajashekarappa, Engineering Mechanics, New Age International (p) Ltd, New Delhi, 2008.
2. Rajasekaran, S and Sankara Subramanian., G., Engineering Mechanics, Vikas Publishing House Private Ltd., 2002.

Reference Books

1. Palanichamy, M.S. Nagan, S., Engineering Mechanics – Statics & Dynamics, Tata McGraw-Hill, 2001.
 2. Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers, Vol. 1 Statics and Vol.2 Dynamics, McGraw – Hill International Edition, 1997.
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T112 - COMMUNICATIVE ENGLISH

UNIT - I

Basic Communication Theory: Importance of Communication – stages of communication, modes of communication – barriers to communication – strategies for effective communication – Listening: Importance, types, barriers – Developing effective listening skills.

UNIT - II

Comprehension and Analysis: Comprehension of technical and non-technical material – Skimming, scanning, inferring-Note making and extension of vocabulary, predicting and responding to context- Intensive Reading and Reviewing

UNIT - III

Writing: Effective sentences, cohesive writing, clarity and conciseness in writing – Introduction to Technical Writing – Better paragraphs, Definitions, Practice in Summary Writing – Four modes of writing – Use of dictionaries, indices, library references – making bibliographical entries with regard to sources from books, journals, internet etc.

UNIT - IV

Business Writing / Correspondence: Report writing – Memoranda – Notice – Instruction – Letters – Resumes – Job applications

UNIT - V

Oral Communication: Basics of phonetics – Presentation skills – Group Discussions – Dialogue writing – Short Extempore – Debates-Role Plays-Conversation Practice

Reference Books:

1. Ashraf M.Rizvi., Effective Technical Communication. Tata-McGraw, 2005.
2. Boove, Courtland R et al., Business Communication Today, Pearson Education, New Delhi, 2002.
3. Meenakshi Raman and Sangeeta Sharma., Technical Communication Principles and Practice,OUP, 2007.
4. Robert J.Dixson. ,Complete Course in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2006.
5. Robert J.Dixson., Everyday Dialogues in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2007.
6. Sethi,J and Kamalesh Sadanand., A Practical Course in English Pronunciation, Prentice-Hall of India Pvt. Ltd, New Delhi,2007.

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P104 - PHYSICS LABORATORY

List of experiments (Any 10 Experiments)

1. Thermal conductivity – Lee’s DISC
 2. Thermal conductivity - Radial flow
 3. Spectrometer – Prism or Hollow prism
 4. Spectrometer – Transmission grating
 5. Spectrometer - Ordinary & Extraordinary rays
 6. Newton’s rings
 7. Air – wedge
 8. Half shade polarimeter – Determination of specific rotatory power
 9. Jolly’s experiment – determination of α
 10. Magnetism: i – h curve
 11. Field along the axis of coil carrying current
 12. Vibration magnetometer – calculation of magnetic moment & pole strength
 13. Laser experiment: wavelength determination using transmission grating, reflection grating (vernier calipers) & particle size determination
 14. Determination of optical absorption coefficient of materials using laser
 15. Determination of numerical aperture of an optical fiber
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P105 - CHEMISTRY LABORATORY

List of experiments (Any 10 Experiments)

1. Determination of dissolved oxygen in water.
2. Determination of total hardness of water by EDTA method.
3. Determination of carbonate and bicarbonate in water.
4. Estimation of chloride content in water.
5. Estimation of magnesium by EDTA.
6. Estimation of vinegar.
7. Estimation of ferrous by permanganometry.
8. Estimation of ferrous and ferric iron in a solution mixture by dichrometry.
9. Estimation of available chlorine in bleaching powder.
10. Estimation of copper in copper sulphate solution.
11. Estimation of calcium by permanganometry.
12. Estimation of iron by colorimetry.

Demonstration Experiments (Any two of the following)

1. Determination of COD of water sample.
 2. Determination of lead by conductometry.
 3. Percentage composition of sugar solution by viscometry.
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P106 - WORKSHOP PRACTICE

Sl.No.

Trade List of Exercises

1.Fitting

Study of tools and Machineries. Exercises on symmetric joints and joints with acute angle.

2. Welding

Study of arc and gas welding equipment and tools – Edge preparation – Exercises on lap joint and V Butt joints – Demonstration of gas welding

3.Sheet metal

work

Study of tools and Machineries – exercises on simple products like Office tray and waste collection tray.

4.Carpentry

Study of tools and Machineries – Exercises on Lap joints and Mortise joints

LIST OF EXERCISES

I - Fitting

1.Study of tools and Machineries

2.Symmetric fitting 3.Acute angle fitting

II - Welding

1. Study of arc and gas welding equipment and tools

2.Simple lap welding (Arc) 3.Single V butt welding (Arc)

III - Sheet metal work

1. Study of tools and machineries

2. Funnel

3. Waste collection tray

IV - Carpentry

1. Study of tools and machineries

2. Half lap joint

3. Corner mortise joint.

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II Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	T107	Mathematics – II	3	1	-	4	25	75	100
2.	T108	Material Science	4	-	-	3	25	75	100
3.	T109	Environmental Science	4	-	-	3	25	75	100
4.	T104	Basic Electrical and Electronics Engineering	3	1	-	4	25	75	100
5.	T105	Engineering Thermodynamics	3	1	-	4	25	75	100
6.	T106	Computer programming	3	1	-	3	25	75	100
Practicals									
7.	P101	Computer programming	-	-	3	2	50	50	100
8.	P102	Engineering Graphics	2	-	3	2	50	50	100
9.	P103	Basic Electrical and Electronics lab	-	-	3	2	50	50	100
10.	P107	NSS/NCC*	-	-	-	2	-	-	-
Total			22	4	9	27	300	600	900

T107 - MATHEMATICS – II

UNIT - I

Algebra: Binomial, exponential and logarithmic series (without proof) – problems on summation, approximation and coefficients.

UNIT - II

Matrices: Inverse of matrix by row transformation – Eigen values and Eigen vectors - Cayley-Hamilton theorem (without proof) – Diagonalisation – rank of matrix – solution of a general system of m linear algebraic equations in n unknown ($m \leq n$).

UNIT - III

Trigonometry: Expansions for $\sin \theta$, $\cos \theta$, $\tan \theta$, $\sin(n\theta)$, $\cos(n\theta)$, $\tan(n\theta)$. Exponential, circular, hyperbolic, inverse hyperbolic and logarithmic functions of a complex variable – separation of real and imaginary parts.

UNIT - IV

Vector Analysis: Scalar fields and Vector fields – Gradient, Divergence and Curl – their properties and relations – Gauss and Stokes theorems (without proof), simple problems for their verification.

UNIT - V

Statistics: Moments, kurtosis and skewness based on moments only. Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions. Correlation and regression – rank correlation.

Text Books:

1. M.K. Venkataraman, Engineering Mathematics (First Year), Second Edition, The National Publishing Company, Madras, 2001.
2. M.K. Venkataraman, Engineering Mathematics (Third Year-Part A), The National Publishing Company, Madras, 2001.

Reference Book:

1. N.P. Bali and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications, New Delhi, 2007.
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T108 - MATERIAL SCIENCE

UNIT - I

Crystal Structure and Defects: Crystal Systems – Bravais Lattices – Coordination Number, Atomic Radius, Packing Factor for FCC & HCP structures – Miller Indices for a cubic crystal– Powder X Ray Diffraction Method - Lattice defects – Qualitative ideas of point, line, surface and volume defects.

UNIT - II

Dielectric Properties: Dielectric Polarization and Mechanism – Internal or local Field - Clausius-Mossotti relation – Dielectric loss - Temperature and frequency dependence of dielectric constant – Measurement of Dielectric constant and loss using Scherring bridge – Elementary ideas of Piezoelectrics, Ferroelectrics and Pyroelectric materials and its Applications.

UNIT - III

Magnetic Properties: Elementary Ideas of classification of magnetic materials (Dia, Para, Ferro & Ferri) – Quantum theory of Para & Ferro Magnetism – Domain Theory of Hysteresis – Heisenberg Theory of Exchange Interaction (without derivation) – Qualitative ideas of Anti ferromagnetic Ordering – Structure and Properties of Ferrites – Properties of Soft & Hard Magnetic Materials – Applications: floppy disks, CD ROM, Magneto optical recording

UNIT - IV

Semiconductors and Superconductors: Derivation of Carrier concentration in intrinsic Semiconductor – Hall effect in Semiconductors -- Application of Hall Effect - Basic Ideas of Compound Semiconductors (II-VI & III-V) - Basic concepts of superconductivity – transition temperature – Meissner effect – Type I and II superconductors – high temperature superconductors – 123 superconductor.

UNIT - V

Advanced Materials: Liquid Crystals – Types – Application as Display Devices – Metallic Glasses – Nanomaterials (one, Two & three Dimensional) – Physical Properties and Applications of Carbon Nano Tubes

Text books:

1. V Raghavan , Materials Science and Engineering- A First Course, PHI Learning, 2008.
2. M Arumugam , Materials Science, Anuratha Printers, 2004.

Reference Books:

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1. M Ali Omar, Elementary Solid State Physics, Addison Wesley Publishing Co., 2000.
2. William D Callister Jr., Material Science and Engineering, John Wiley and sons, 2006.
3. Srivatsava J P, Elements of Solid State Physics, PHI Learning, 2001.
4. Charles Kittel, Introduction to Solid State Physics, John Wiley & sons, Singapore ,2007.
5. S.O Pillai , Solid State Physics– New Age International,2005.
6. Charles P Poole and Frank J Owens, Introduction to Nanotechnology, Wiley Interscience, 2003.

T109 - ENVIRONMENTAL SCIENCE

UNIT - I

Environmental Segments and Natural Resources: Environmental segments-lithosphere, hydrosphere, biosphere and atmosphere-layers of atmosphere. Pollution-definition and classification. Pollutants-classification. Forest resources-use and overexploitation, deforestation, forest management. Water resources-sources, use and conflicts over water, dams-benefits and problems. Mineral resources-mineral wealth of India, environmental effects of extracting and using mineral resources. Food resources-world food problems, environmental impact of modern agriculture-fertilizer and pesticides, overgrazing and land resources-land degradation- land slides, soil erosion and desertification. Energy resources-growing energy needs renewable and non-renewable energy resources and use of alternate energy sources.

UNIT - II

Ecosystem and Biodiversity: Concept of an ecosystem-structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of forest, grass land, desert and aquatic (fresh water, estuarine and marine) ecosystem. Biodiversity-definition-genetic species and ecosystem diversity. Value of biodiversity – consumptive use, productive use, social, ethical, aesthetic and option values. Hot spots of biodiversity. Threats to biodiversity-habitat loss, poaching of wild life, human-wildlife conflicts. Endangered and endemic species. Conservation of biodiversity-in situ and ex-situ conservation of biodiversity.

UNIT - III

Air Pollution: Air pollution-sources of air pollution. Sources, effects and control measures of oxides of nitrogen, oxides of sulphur, oxides of carbon, hydrocarbon, chlorofluoro carbons and particulates. Green house effect-causes and effects on global climate and consequences. Ozone depletion-causes, mechanism and effect on the environment. Mogsulfurous and photochemical smog-effect on the environment. Acid rain-theory of acid rain and effects.

UNIT - IV

Water Pollution and Solid Waste Management Sources: effects and control measures of –water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and radioactive pollution. Solid waste management – causes, effect and control measures of Curriculum & Syllabi B.Tech. Electronics & Communication Engineering urban and industrial wastes.

UNIT - V

Social Issues and the Environment: From unsustainable to sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, water shed management. Resettlement and rehabilitation of people. Environmental ethics. Consumerism and waste products. Environmental protection act-air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act. Role of an individual in prevention of pollution. Human population and the environment-population growth, variation among nations, population explosion, role of information technology in environment and human health.

Text Books:

1. K. Raghavan Nambiar, "Text Book of Environmental Studies" 2nd edition, Scitech Publications, India, Pvt. Ltd, Chennai, 2008.
2. A. K. De, "Environmental chemistry" 6th edn; New age international (P) Ltd, New Delhi, 2006.

Reference Books:

1. B.K. Sharma, "Environmental chemistry" goel publishing house, Meerut, 2001.
2. G. S. Sodhi, Fundamental concepts of environmental chemistry, Narosa publishing house, New Delhi
3. S .S.Dara, " A text book of environmental chemistry and pollution control, S. Chand and Company Ltd, New Delhi, 2002.
4. Richard T. Wright, environmental science, 9th edition, Pearson education inc, New Delhi, 2007
5. P. Meenakshi, "Elements of environmental science and engineering" PHI Learning, New Delhi, 2006. Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

T104 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
PART A – ELECTRICAL

UNIT – I

Review of Kirchoff's laws - series and parallel circuits, equivalent resistance, star/delta conversion. Concepts of AC circuits – rms value, average value, form and peak factors – real and reactive power – power factor.

UNIT – II

Node and mesh methods of analysis of DC circuits and simple AC circuits - Introduction to three phase circuits, Introduction to three phase system - phase and line parameters – relations, power measurement – voltmeter and ammeter method, two and three wattmeter methods.

UNIT – III

Principle of DC generator and motor - Transformer, synchronous generator, induction motor (single phase). Sources for electrical energy conversion-thermal and hydraulic plant (Block diagram approach only). Components of AC transmission and distributions systems – line diagram.

PART B – ELECTRONICS

UNIT – IV

Half-wave rectifier and Full-wave rectifier- filters - Amplifiers-common emitter and common collector amplifiers- Hartley oscillator and RC phase shift oscillator. Transducers – Resistance temperature detector (RTD) – Linear variable differential transformer (LVDT) - Strain gauge – Piezo electric transducer.

UNIT – V

Boolean algebra – Reduction of Boolean expressions – De-Morgan's theorem – Logic gates – Implementation of Boolean expressions – Flip flops – RS, JK, T and D. Combinational logic – Half adder, Full adder and Subtractors. Sequential logic – Ripple counters and shift registers.

UNIT – VI

Model of communication system – Analog and digital – Wired and wireless channel. Block diagram of various communication systems – Microwave, satellite, optical fiber and cellular mobile system. Network model – LAN, MAN and WAN – Circuit and packet switching – Overview of ISDN.

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Text Books:

1. Hughes revised by John Hiley, Keith Brown, Ian McKenzie Smith, Electrical and Electronics Technology, Pearson Education Limited, New Delhi, 2007.
2. Smarajit Ghosh, Fundamentals of Electrical and Electronics Engineering, Second Edition, PHI Learning, 2007.
3. George Kennedy and Bernard Davis, Electronics communication Systems, Tata McGraw-Hill Ltd, New Delhi, 2007.

Reference Books:

1. D.P.Kothari and I.J.Nagrath, Theory and Problems of Basic Electrical Engineering, PHI Learning., New Delhi.
2. J.B.Gupta, A Course in Electrical Power, Katson Publishing House, New Delhi, Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

T105 – ENGINEERING THERMODYNAMICS

UNIT - I

Basic Concepts and Definitions: Energy conversion and efficiencies - System, property and state - Thermal equilibrium - Temperature - Zeroth law of Thermodynamics.

UNIT - II

First Law of Thermodynamics: The concept of work and adiabatic process - First law of thermodynamics - Conservation of Energy principle for closed and open systems - Calculation of work for different processes of expansion of gases

UNIT - III

Second Law of Thermodynamics: Equilibrium and the second law - Heat engines - Kelvin-Planck statement of second law of thermodynamics - Reversible and irreversible processes - Carnot principle - Clausius inequality- Entropy

UNIT - IV

Gas Power Cycles: Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and Bryton cycles and their efficiencies

UNIT - V

Refrigeration Cycles and Systems: Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system (only theory)- Liquifaction and solidification of gases

Text Books:

1. Nag, P. K., "Engineering Thermodynamics", 4th edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1995.
2. Wark, K., "Thermodynamics", 4th edition, McGraw Hill, N.Y., 1985

Reference Books :

1. Arora, C.P., "Thermodynamics" , Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1998.
2. Burghardt, M.D., "Engineering Thermodynamics with Applications", 4th edition, Harper and Row, N.Y., 1986.
3. Huang, F.F., "Engineering Thermodynamics" 2nd edition , Macmillan Publishing Co. Ltd., N.Y., 1989.
4. Cengel, Y.A. and Boles, M.A., "Thermodynamics - An Engineering Approach", 5th edition, McGraw Hill, 2006

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T106 - COMPUTER PROGRAMMING

UNIT – I

History of Computers – Block diagram of a Computer – Components of a Computer system – Classification of computers - Hardware – Software – categories of Software – Operating System – Applications of Computers - Role of Information Technology – Internet and its services – Intranet – Study of word processor – Preparation of worksheets

UNIT – II

Problem solving techniques – Program – Program development cycle – Algorithm design – Flowchart - Pseudo code.

Introduction to C – C tokens – data types – Operators and expressions – I/O functions

UNIT – III

Decision making statements – branching and looping – arrays – multidimensional arrays – Functions – Recursion – Passing array to functions Storage classes – Strings – String library functions

UNIT – IV

Structures – Arrays and Structures – nested structures – passing structures to functions – user defined data types– Union

Pointers – pointers and arrays – pointers and functions - pointers and strings - pointers and structures

UNIT – V

Files – operations on a file – Random access to files – command line arguments

Introduction to preprocessor – Macro substitution directives – File inclusion directives – conditional compilation directives – Miscellaneous directives

Text Books:

1. Ashok N Kamthane, “Computer Programming”, Pearson education, Second Impression, 2008.
2. K. Venugopal and C.Kavichithra, “Computer Programming”, New Age International Publishers, First Edition, 2007.

Reference Books:

1. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, Third edition, 2006. Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

P101 - COMPUTER PROGRAMMING

LABORATORY List of Exercises:

OS Commands, Word Processor and Spreadsheets

1. Study of OS commands-Compilation and execution of simple C programs
2. Use of mail merge in word processor
3. Use of spreadsheet to create Charts(XY, Bar, Pie) and apply the formulae wherever necessary C Programming (Flowcharts and algorithms are essential for the programming exercises)
4. Greatest of three numbers using conditional operator and if statement
5. Read two numbers and swap those two numbers using temporary variable and without using temporary variable.
6. Solve quadratic equation for different sets of inputs.
7. Use of Switch...Case statements
8. Generation of prime and Fibonacci series
9. Evaluate the COSINE series using for, while and do..while loops
10. Matrix operations
 - (a) Addition
 - (b) Transpose
 - (c) Multiplication
11. Evaluate the sin(x) series using functions and recursive functions
12. Read a string and find solution to remove the duplicates of a given string from the given sentence

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13. Create an array of structures for a list of items with the following details

Item_Code Item_Name

102 Paste – Colgate

102 Paste –Pepsodent

102 Paste –Close-up

101 Soap-Cinthol

101 Soap-Lux

101 Soap-Hamam

101 Soap-Dove

Arrange the set of items in ascending order of its Item_Code and descending order of its Item_name as given below

Item_Code Item_Name

101 Soap-Lux

101 Soap-Hamam

101 Soap-Dove

101 Soap-Cinthol

102 Paste –Pepsodent

102 Paste –Colgate

102 Paste – Close-up

14. Use of Structure to define a user defined data types, input the data and write the data into the file

15. Use of pointers and array of pointers

16. Functions with static data types

17. Write command line program to implement the following DOS commands using files

- Del
- Copy

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P102 - ENGINEERING GRAPHICS

Unit - 0

Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning

Unit - I

Conic sections, Involutives, Spirals, Helix. Projection of Points, Lines and Planes

Unit - II

Projection of Solids and Sections of Solids.

Unit - III

Development of surfaces - Intersection of surfaces (cylinder-cylinder, cylinder-cone)

Unit - IV

Isometric projections and Orthographic projections

Unit - V

Computer Aided Drafting: Introduction to Computer Aided Drafting hardware - Overview of application software - 2D drafting commands (Auto CAD) for simple shapes - Dimensioning.

Text Books

1. K.R. Gopalakrishna and Sudhir Gopalakrishna, Engineering Graphics, Inzinc Publishers, 2007.
2. K.V. Natarajan, A Text Book of Engineering Drawing, Dhanalakshmi Publishers, 2006.
3. BIS, Engineering Drawing practice for Schools & College, 1992.

Reference Books

1. N.D. Bhatt, Engineering Drawing, 49th edition, Chorotar Publishing House, 2006.
2. K. Venugopal, Engineering Drawing and Graphics + Auto CAD, 4th edition, New Age International Publication Ltd., 2004 .
3. David I cook and Robert N Mc Dougal, Engineering Graphics and Design with computer applications, Holt – Sounders Int. Edn. 1985.
4. James D Bethune and et. al., Modern Drafting, Prentice Hall Int., 1989.
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P103 - BASIC ELECTRICAL AND ELECTRONICS LABORATORY

ELECTRICAL LABORATORY

1. Study of tools and accessories
2. Study of joints
3. Staircase wiring
4. Doctor's room wiring
5. Godown wiring
6. Tube Light and Fan connection
7. Lamp controlled from three different places-wiring

ELECTRONICS LABORATORY

1. Rectifiers

Construction of half wave and full wave rectifiers with and without filters –
Calculation of ripple factors.

2. Frequency Response of RC Coupled Amplifiers

Determination of frequency response of given RC coupled amplifier-calculation of bandwidth.

3. Verification of Kirchoff's Voltage and Current Laws

Determine the voltage and current in given circuits using Kirchoff's laws theoretically and verify the laws experimentally.

4. Study of Logic Gates

(a) Verification of Demorgan's theorems

(b) Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR, EXNOR gates and Flipflops - JK, RS, T and D

(c) Implementation of digital functions using logic gates

5. Study of CRO

(a) Measurement of AC and DC voltages

(b) Frequency and phase measurements (using Lissajou's figures)

6. Study of Transducers

(a) Displacement and load measurements with transducers

(b) Temperature measurement with thermocouple

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P107 - NCC / NSS

NCC/NSS training is compulsory for all the Undergraduate students:

1. The above activities will include Practical/field activities/Extension lectures.
2. The above activities shall be carried out outside class hours.
3. In the above activities, the student participation shall be for a minimum period of 45 hours.
4. The above activities will be monitored by the respective faculty incharge and the First Year Coordinator.
5. Pass /Fail will be determined on the basis of participation, attendance, performance and behaviour. If a candidate Fails, he/she has to repeat the course in the subsequent years
6. Pass in this course is mandatory for the award of degree.

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III Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	MA T31	Mathematics – III	3	1	-	4	25	75	100
2.	EC T32	Electrical Engineering	4	-	-	3	25	75	100
3.	EC T33	Data Structures and Algorithms	3	1	-	3	25	75	100
4.	EC T34	Electronic Devices	4	-	-	4	25	75	100
5.	EC T35	Circuit Theory	3	1	-	4	25	75	100
6.	EC T36	Engineering Electromagnetics and Waves	3	1	-	4	25	75	100
Practicals									
7.	EC P31	Electrical Engineering Lab	-	-	3	2	50	-	50
8.	EC P32	Data Structures and Algorithms	-	-	3	2	50	50	100
9.	EC P33	Electronic Devices Lab	-	-	3	2	50	50	100
Total			20	4	9	28	350	600	950

MA T31 - MATHEMATICS - III

UNIT - I

Laplace Transform: Definitions - Laplace transform of unit impulse and step functions - Laplace transform of periodic functions - Exponential shift formula- Initial and final value theorems - Laplace transform of derivatives and integrals - Convolution theorem - Inverse Laplace transform - Methods of determining inverse Laplace transform -Solution of linear differential equations using Laplace transforms.

UNIT - II

Function of a Complex Variable: Functions of a complex variable - continuity, derivative and analytic function - Cauchy - Riemann equations – Necessary and sufficient conditions for analyticity - Harmonic and orthogonal properties of real and imaginary parts - Conformal mapping - Bilinear transformations.

UNIT - III

Complex Integration: Cauchy's theorem -Cauchy's integral formula - Taylor's and Laurent series - Residue theorem - Contour integration round the unit circle and semicircular contour.

UNIT - IV

Fourier Series: Dirichlet's conditions - Expansion of periodic functions into Fourier series- Change of interval- Half-range Fourier series.
Complex form of Fourier series - Root mean square value - Parseval's theorem on Fourier coefficients - Harmonic analysis.

UNIT - V

Fourier Transform: Definition and properties - Fourier Integral theorem - statement - Fourier sine transform and cosine transforms - Inverse Fourier transform.

Text Books:

1. M.K.Venkataraman, Engineering Mathematics, Vol. II, National Publishing co. Madras, 2009
2. M.K.Venkataraman, Engineering Mathematics, Vol. III, National Publishing co. Madras, 2009

Reference Books:

1. N.P. Bali & Manish Goyal : A text book of Engineering Mathematics, Laxmi Publications, New- Delhi, 2008.
2. Erwin Kreyszig : Advanced Engineering Mathematics, John- Wiley sons, New-York, 2005.
3. B. S. Grewal, : Higher Engineering Mathematics, Khanna Publishers, New-Delhi, 2008

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EC T32 - ELECTRICAL ENGINEERING

UNIT - I

Transformers: Principle of operation – Single Phase transformer – Equivalent circuit – Regulation – Losses and Efficiency – Introduction to 3 phase transformers – Autotransformers – pulse transformers.

UNIT - II

D.C. Machines: Construction, Principles of operation of DC Generators – types -EMF equation – No load and Load characteristics of series and shunt generators – DC motor – Torque – Speed – Torque characteristics of series and shunt motors – Speed control and application.

UNIT - III

A.C. Machines: Principle of operation of 3-phase Induction Motor – Torque, slips characteristics – Speed control methods – Single-phase Induction motor starting methods – Braking concepts.

UNIT - IV

Special Machines: servo motor – DC and AC servomotors; stepper motors – variable reluctance and permanent magnet stepper motors; single phase synchronous motor – reluctance motor and hysteresis motor – universal motor – Linear induction motor(LIM) – linear synchronous motor(LSM).

UNIT - V

Utilisation: Domestic wiring – principle of electrical heating – The law of illumination – Electric lamps – Photometers – Electroplating – Electric Traction – Air conditioning – Earthing.

Text Books:

1. B.L. Theraja, “Electrical Technology Vol.II AC/DC Machines”, S. Chand, 2008
2. I.J. Nagrath and D.P. Kothari, “Electric machines”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 3rd Edition, 2008.

Reference Books:

1. Battacharya S K, “Electrical Machines”, Technical Teachers Training institute”, 2nd edition.2003.
2. J.B.Gupta, “Theory and Performance of Electrical Machines”, J.K.Kataria & Sons, 13th edition, 2004.
3. S.L.Uppal, “Electrical power” Khanna Publications (p) Ltd, Delhi, 2002.
4. G.C.Garg, “Utilisation of Electric power and electric traction” Khanna Publications (p) Ltd, Delhi, 2006.
5. A.Chakrabarti, M.I.Soni, P.V.Gupta, “Textbook on ower sytems engineering”, Dhanpat Rai, 2008.

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EC T33 - DATA STRUCTURES AND ALGORITHMS

UNIT – I

Introduction to data structures: Information and meaning – Arrays in C – Structures in C
Stack: Definition and examples – Representing stacks in C – Infix, postfix and prefix

UNIT – II

Recursion: Recursive definition and processes – Recursion in C – Writing recursive programs – Simulating recursion – Efficiency of recursion.

Queues and Lists: The queue and its sequential representation – Linked Lists – Lists in C – Simulation using linked lists – Other list structures.

UNIT – III

Trees: Binary trees – Binary tree representations – Huffman algorithm – Representing lists as binary trees – Trees and their applications – Game trees.

UNIT – IV

Sorting: General background – Exchange sorts – Selection and tree sorting – Insertion sorts – Merge and radix sorts

Searching: Basic search techniques – Tree searching – General search trees - Hashing

UNIT – V

Graphs and their applications: Graphs – A flow problem – Linked representation of graphs – Graph traversal and spanning forests

Storage management: General lists – Automatic list management – Dynamic memory management.

Note: It is expected to mention the type of algorithm such as greedy, dynamic programming, divide and conquer, backtracking etc., for every problem discussed in this paper.

Text Book:

1. Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenebaum, “Data Structures Using C and C++” Prentice Hall of India, 2008
 2. Niklaus wirth, “Algorithms + Data Structures = Programs”, PHI, 2008.
 3. R.G.Dromey, “How to Solve it by Computer”, PHI, 2002.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T34 - ELECTRON DEVICES

UNIT- I

Electron Ballistics and Semiconductor Theory: Force on charge in electric field – two dimensional motion- force in a magnetic field - parallel and perpendicular electric and magnetic field – electrostatic and magnetic deflection in CRT. Energy band structure of insulators, conductors and semiconductors – conductivity of an intrinsic semiconductor – Fermi Dirac distribution and energy band diagram – Fermi levels in extrinsic semiconductor – Hall effect.

UNIT- II

Semiconductor Diodes: PN Junction Diode – operation, forward, reverse bias characteristics- Diode equation, Temperature effects – DC and AC resistance – Diode equivalent circuit – Transition and diffusion capacitance – Diode switching times – Diode applications- Logic gates AND and OR, Series and parallel clippers. Zener diode characteristics – Breakdown concepts- Zener/Avalanche breakdown.

UNIT- III

Transistors: Transistor operation – Current components – CB, CE, CC configuration and characteristics – Early effect – Eber-Moll model of transistor – Transistor as an amplifier- Transistor as a switch – Transistor switching times. Construction and characteristics of JFET – Relation between pinch off voltage and drain current – JFET as voltage variable resistor – MOSFET – Depletion and enhancement types, CMOS – Its construction and characteristics.

UNIT- IV

Special Diodes and Photonic Devices: Construction, Principle of operation, application and characteristics of Schottky barrier diode, Varactor diode, Tunnel diode, PIN diode. LED, LCD, Seven segment display, Photoconductivity – Photodiode, APD, Phototransistor, Solar cells- Concept of DLP.

UNIT- V

Power Devices: SCR, Two transistor model- operation and characteristics, Phase control using SCR, SCS and light activated SCR, Schottky diode, DIAC, TRIAC and their applications. Characteristics and equivalent circuit of UJT – intrinsic standoff ratio –UJT relaxation oscillator, triggering circuit for SCR – programmable UJT.

Text Books:

1. Jacob Millman and Christos C. Halkias, “Electronic Devices and Circuits” Tata McGraw Hill
2. R.L. Boylestad and L. Nashelsky, “Electronic Devices and Circuit Theory”, PHI Learning Private Limited, Ninth Edition, 2008

Reference Books:

1. David A. Bell, “Electronic Devices and Circuits”, PHI Learning Private Limited, Fourth Curriculum & Syllabi B.Tech. Electronics & Communication Engineering Edition, 2007
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EC T35 - CIRCUIT THEORY

UNIT- I

DC Circuit Analysis: Sources-Transformation and manipulation, Network theorems - Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Millman's theorem, Compensation theorem, Maximum power transfer theorem and Tellegen's theorem – Application to DC circuit analysis.

UNIT- II

AC Circuit Analysis: Series circuits - RC, RL and RLC circuits and Parallel circuits -RLC circuits - Sinusoidal steady state response - Mesh and Nodal analysis - Analysis of circuits using Superposition, Thevenin's, Norton's and Maximum power transfer theorems. Resonance - Series resonance - Parallel resonance - Variation of impedance with frequency - Variation in current through and voltage across L and C with frequency – Bandwidth - Q factor -Selectivity.

UNIT- III

Transient Analysis: Natural response-Forced response - Transient response of RC, RL and RLC circuits to excitation by DC and exponential sources - Complete response of RC, RL and RLC Circuits to sinusoidal excitation.

UNIT- IV

Magnetically Coupled Circuits: Self inductance - Mutual inductance - Dot rule - Coefficient of coupling - Analysis of multiwinding coupled circuits - Series, Parallel connection of coupled inductors - Single tuned and double tuned coupled circuits.

UNIT -V

Network Topology: Network terminology - Graph of a network - Incidence and reduced incidence matrices – Trees –Cutsets - Fundamental cutsets - Cutset matrix – Tiesets - Link currents and Tieset schedules -Twig voltages and Cutset schedules, Duality and dual networks.

Text Book:

1. William H. Hayt, Jr. Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", McGraw Hill Science Engineering, Seventh Edition, 2006

Reference Books:

1. Joseph Edminister and Mahmood Nahvi, "Electric Circuits", Schaum's Outline Series, Fourth Edition, Tata McGraw Hill Publishing Company, New Delhi, 2003.

2. David A. Bell, "Electric Circuits", Sixth Edition, PHI Learning, New Delhi, 2003.

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EC T36 - ENGINEERING ELECTROMAGNETICS AND WAVES

UNIT-I

Electric Field: Introduction - Orthogonal co-ordinate systems – Divergence theorem, Stoke's theorem. Coulomb's law - Electric field intensity, electric fields due to point charge, line charge, surface charge and volume charge distributions – Electric flux density - Gauss's law and its applications - Electric potential – Potential gradient, Poisson and Laplace equations - Dipole and dipole moment. Capacitors - Capacitance of system conductors – Electric potential energy associated with different charge distribution – Energy density.

UNIT-II

Magnetic Field: Concepts – Vector magnetic potential – Force on a current element, Biotsavart's law and applications – Magnetic flux density and magnetic field intensity – Force between current carrying conductors – Torque on closed conductors, Ampere's law and modified Ampere's law, Helmholtz's theorem.

UNIT-III

Electromagnetic Induction: Faraday's law of electromagnetic induction– Inductance of solenoids, toroids, transmission lines and cables – Mutual inductance – Inductors in series and parallel circuits – Energy stored in magnetic fields and energy density – Force and torque on closed circuits .Boundary conditions at the surface of dielectric, conductor and magnetic.

UNIT-IV

EM Waves and Wave Equations: Maxwell's equation in point and integral form– Poynting's theorem – Energy in electromagnetic field, Electromagnetic wave equation, wave equation for free space and conducting medium.

UNIT-V

Electromagnetic Waves: Uniform plane wave - Characteristics impedance or intrinsic impedance – Wave propagation in a lossless medium, conducting medium, good dielectric, good conductor – phase velocity and group velocity – Depth of penetration – Polarization, linear polarization, circular polarization and elliptical polarization - Reflection and refraction of plane waves – Surface waves.

Text Books:

1. David K. Cheng, "Field and Wave Electromagnetics", Second Edition, Pearson Education, Asia, 2008.
2. Edward C.Jordan and Keith G.Balaman, "Electromagnetic waves and radiating systems", Second Edition, PHI Learning, 2007.

Reference Books:

1. K.A.Gangadhar, "Field Theory", Khanna Publishers, 2006.
 2. William H. Hayt, "Engineering Electromagnetics", McGraw Hill, Fifth Edition, 2008.
 4. J. D. Kraus, "Electromagnetics", McGraw Hill, 2007.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P31 - ELECTRICAL ENGINEERING LABORATORY

1. OC and SC test on single phase transformer.
 2. Load test on single phase transformer.
 3. Load test on DC shunt motor.
 4. OCC characteristics of generator.
 5. Two wattmeter method of power measurement.
 6. Swinburne's test.
 7. Load test on single phase IM.
 8. Load test on 3 phase transformer.
 9. Load test on 3 phase induction motor.
 10. Parallel operation of transformer.
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EC P32 - DATA STRUCTURES AND ALGORITHMS LABORATORY

1. Recursion:
 - a) Fibonacci Series.
 - b) Factorial Computation.
 2. Linked list:
 - a) Implementing Singly Linked List- Creation, Insertion, Deletion.
 - b) Implementing Doubly Linked List- Creation, Insertion, Deletion.
 - c) Implementing Circular Linked List- Creation, Insertion, Deletion.
 3. Stack:
 - a) Implementing Stack Operation- Push, Pop.
 - b) Implementing Double Stack Operation- Push, Pop.
 4. Queue:
 - a) Implementing Queue Operation.
 - b) Implementing Circular Queue Operation.
 5. Binary tree:
 - a) Binary Search Tree – Searching, Insertion & Deletion.
 - b) Binary Tree Traversal.
 6. Minimum spanning tree:
 - a) Prim's Algorithm.
 - b) Kruskal's Algorithm.
 7. Graph:
 - a) All Pair Shortest Path.
 - b) 8 – Queen problem.
 8. Sort:
 - a) Bubble Sorting.
 - b) Quick sorting.
 - c) Merge Sorting.
 - d) Insertion Sorting.
 9. Hashing:

Implementing Hashing Techniques.
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EC P33 - ELECTRON DEVICES LABORATORY

1. V-I characteristics of semiconductor diodes
 - a) PN Junction diode
 - b) Point contact diode
 - c) Zener diode
2. Characteristics of BJT in CB configuration
 - a) Determination of input and output characteristics
 - b) Determination of voltage gain, current gain, input and output resistances from the characteristics
3. Characteristics of BJT in CE configuration
 - a) Determination of input and output characteristics
 - b) Determination of voltage gain, current gain, input and output resistances from the characteristics
4. Characteristics of JFET
 - a) Determination of output and transfer characteristics
 - b) Determination of pinch off voltage, r_d , g_m and μ from the characteristics
5. Characteristics of MOSFET
 - a) Determination of output and transfer characteristics
 - b) Determination of r_d , g_m and μ from the characteristics
6. Characteristics of SCR and TRIAC
7. Characteristics of UJT
Determination of intrinsic stand off ratio
8. Characteristics of photonic devices
 - a) Determination of V-I characteristics of LED
 - b) Determination of V-I and intensity characteristics of phototransistor
9. Clipper circuits using diodes
Positive, negative, biased and combinational clippers
10. Switching circuit
 - a) AND and OR logic gates using diodes
 - b) NOT gate using transistor

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IV Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	MA T41	Numerical Methods and Techniques	3	1	-	4	25	75	100
2.	EC T42	Electronic Circuits – I	3	1	-	4	25	75	100
3.	EC T43	Signals and Systems	3	1	-	4	25	75	100
4.	EC T44	Networks and Transmission Lines	3	1	-	4	25	75	100
5.	EC T45	Digital Electronics	3	1	-	4	25	75	100
6.	EC T46	Analog Communication Systems	3	1	-	4	25	75	100
Practicals									
7.	EC P41	Electronic Circuit-I Lab	-	-	3	2	50	50	50
8.	EC P42	Digital Circuit Design Lab	-	-	3	2	50	50	100
9.	EC P43	Communication Lab – I	-	-	3	2	50	50	100
10.	SP P44	Physical Education*	-	-	-	-	-	-	100
Total			18	6	9	30	300	600	900

MA T41 - NUMERICAL METHODS AND TECHNIQUES

UNIT - I

Solution of Algebraic and Transcendental Equation and Eigen Value Problem:

Solution of algebraic and transcendental equation by the method of bisection, the method of false position, Newton-Raphson method and Graeffe's Root squaring method. Eigen value problem by power method and Jacobi method.

UNIT-II

Solution of System of Equations and Matrix Inversion: Solution of linear algebraic equation: Gauss and Gauss-Jordan elimination methods- Method of Triangularization and Crout's reduction. Iterative methods: Gauss-Jacobi, Gauss-Seidel and Relaxation methods. Matrix inversion by Gauss - Jordan elimination and Crout's methods.

UNIT-III

Interpolation: Finite Differences, Relation between operators - Interpolation by Newton's forward and backward difference formulae for equal intervals. Newton's divided difference method and Lagrange's method for unequal intervals. Numerical differentiation in one variable. Numerical Integration by Trapezoidal and Simpson's rule with respect to one and two variables.

UNIT-IV

Solution of Ordinary Differential Equation: Single step methods: Taylor series method, Picard's method of successive approximation, Euler and Improved Euler methods, Runge-Kutta method of fourth order only. Multistep methods: Milne and Adams - Bashforth methods.

UNIT - V

Solution of Partial Differential Equations: Boundary value problems: Laplace and Poisson equations- Liebmann's iterative method. Diffusion equation: Explicit and Crank-Nicholson implicit difference schemes. Wave equation: Explicit difference method.

Text Book:

1. P. Kandasamy, K. Gunavathy and K. Thilagavathy, "Numerical Methods", S. Chand & Company Ltd, New Delhi.

Referencess:

1. M.K. Venkataraman, "Numerical methods in Science and Engineering", National Publishing Company, Madras.
2. B.S. Grewal, "Numerical methods in Engineering & Science", Khanna Publishers, New Delhi.

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EC T42 - ELECTRONIC CIRCUITS –I

UNIT- I

Biasing and Stabilization: Operating point and Q-point - Different types of BJT biasing – Fixed bias, Collector to base bias, Self bias - Stabilization of Q point and stability factor – Bias compensation- Thermistor and sensistor compensation –Thermal runaway and thermal stability. FET biasing – gate bias, self bias and voltage divider biasing – MOSFET biasing

UNIT- II

Transistor Low Frequency Analysis: Two port devices and hybrid model – transistor hybrid model and h parameters - determination of h-parameters from the characteristics – Analysis of transistor amplifier using h-parameters – emitter follower -comparison of transistor amplifier configurations – CE amplifier with an emitter resistance; Low frequency FET model –Common source and Common drain amplifiers

UNIT- III

Transistor High Frequency Analysis: Hybrid pi CE transistor model – Hybrid pi conductances and capacitances - CE short circuit current gain and current gain with resistance- CE transistor amplifier response. High frequency FET model – common source and common drain amplifiers at high frequencies.

UNIT- IV

Small Signal Amplifiers: Cascading amplifiers – direct coupled and capacitor coupled two stage CE amplifiers – Differential amplifier - Darlington Pair - Cascode amplifier- Tuned amplifiers - single tuned –double tuned -stagger tuned amplifiers-wideband amplifiers.

UNIT- V

Power Supplies: Rectifiers – Half wave, Full wave and bridge rectifiers – ripple factor and efficiency –capacitor filter. Zener diode voltage regulator– Transistor series regulator – current limiting – short circuit protection and fold back current limiting – Opamp voltage regulator –switching regulator – step up and step down converters.

Text Books:

1. Millman and Halkias, “Integrated Electronics”, Tata McGraw Hill International Edition.
2. Mottershed A, “ Electronic Devices and Circuits”, PHI Learning, 2008.

Reference Books:

1. R.L. Boylestad and L. Nashelsky, “Electronic Devices and Circuit Theory”, PHI Learning Pvt. Ltd, India, Ninth Edition, 2008
2. David. A. Bell, “Electronic Devices and Circuits”, PHI Learning Private Ltd, India, Fourth Edition, 2008

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EC T43 - SIGNALS AND SYSTEMS

UNIT- I

Representation / Classification of Signals and Systems: Continuous time signals – Discrete time signals – Representation of signals – Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential signals, Operation on the signals – Classification of continuous time and discrete time signals – Periodic, Aperiodic, Deterministic, Random, Even, Odd, Energy and Power Signals – Continuous time and discrete time systems – Classification of systems – Properties of systems.

UNIT- II

Continuous Time Signal Representation / Analysis: Fourier series analysis – Representation of periodic signals in trigonometric and exponential forms – Fourier transform analysis of aperiodic signals – Spectral analysis of periodic and aperiodic signals – Parseval's theorem for periodic and aperiodic signals – Laplace transform in signal analysis.

UNIT- III

Continuous Time Systems: LTI continuous time systems – Differential equation – Block diagram representation and reduction techniques – impulse response – Convolution integral – Properties of LTI continuous time systems – Frequency response of continuous time LTI systems – Analysis of LTI systems using Fourier and Laplace transform techniques – State variable representation of LTI systems.

UNIT- IV

Discrete Time Signal Representation / Analysis: Discrete time Fourier series – Discrete time Fourier transform – Spectrum of discrete time periodic and aperiodic signals – Parseval relations – Z transform – Properties and application to discrete time signal analysis – Inverse Z transform.

UNIT- V

Discrete Time Systems: LTI discrete time systems – Difference equation – Block diagram representation and reduction techniques – impulse response – Convolution Sum – Properties of discrete time LTI systems – Frequency response – Analysis of LTI systems using Fourier and Z transform techniques – State variable representation of discrete time LTI systems.

Text Book:

1. Simon Haykins and Barry Van Veen, "Signals and Systems", Second Edition, John Wiley and Sons, 2002.

Reference Books:

1. Allan V. Oppenheim, Allan S. Willsky and S. Hamid Nawab, "Signals and Systems", Second Edition, PHI Learning, New Delhi, 2007.
Curriculum & Syllabi B.Tech. Electronics & Communication Engineering
2. Douglas K. Lindner, "Signals and Systems", McGraw-Hill International Edition, 1999.
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EC T44 - NETWORKS AND TRANSMISSION LINES

UNIT- I

Network Parameters: Open circuit impedance (Z) parameters - short circuit admittance (Y) parameters - transmission (ABCD) parameters and inverse transmission parameters - Hybrid (h) parameters and inverse hybrid parameters - Conversion between parameters - interconnection of two-port networks.

UNIT- II

Time and Frequency Domain Analysis: Network elements- Network function- driving point and transfer impedances and their properties- Poles and zeros of network function, Time domain response for pole-zero plot. Immittance – loci of RLC networks – frequency response of RLC networks- frequency response from pole-zero plots. Synthesis of one port networks- synthesis of RL, RC, LC by Foster and Caue method.

UNIT- III

Network Filters: Classification of filters - characteristic impedance in the pass band and stop band, constant K filters - m-derived filters – BPF and BSF. Insertion loss and reflection factor- Attenuators – Equalizer - T section and Pi section filters – Twin T networks, Bridged T and lattice networks.

UNIT- IV

Transmission Line Theory: Transmission line equation – Primary and secondary constants - Infinite line- attenuation and phase constants- skin effect- wavelength- velocity of propagation- group velocity. Waveform distortion- distortion less transmission line telephone cable- inductance loading of telephone cables. Open and short circuit lines.

UNIT-V

Transmission Line at Radio Frequencies: Line with any termination- Input impedance, input impedance of a lossless line, Reflection coefficient- Standing wave ratio. Ultra high frequency lines- Characteristics impedance, SWR, Smith chart- applications of smith chart- Quarter wave transformer-Stub matching- Single and double.

Text Books:

1. M.E. Van Valkenburg, “Network Analysis”, PHI, Third Edition, 2008.
2. John. D. Ryder, “Network lines and fields”, PHI Learning, Second Edition, 2005.

Reference Books:

1. Umesh Sinha, “Transmission lines and Networks”, Sathya Prakasham Publishers, 1997.
 2. Shyammoan and Sudhakar, "Circuits and Networks", Tata McGraw Hill, 1994.
 3. Frankline F.Kuo, “Network Analysis and Synthesis”, Wiley Eastern Edition, 1996.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

ECT45 - DIGITAL CIRCUITS

UNIT- I

Number System: Review of Binary, Octal and Hexadecimal Number Systems – Conversion methods. Number Representations – Signed Numbers and Complements, Unsigned, Fixed point, and Floating point numbers. Addition and subtraction with 1's and 2's complements.

Codes: Binary code for decimal numbers- Gray code-Codes for detecting and correcting errors: Even and Odd parity codes, Hamming Codes, Checksum codes, m-out-of-n-codes, codes for serial data transmission and storage.

UNIT – II

Boolean Algebra: Basic theorems- Postulates- Duality – Canonical form.

Simplification of Boolean Function: Karnaugh map method – Incompletely specified functions. Realization of logic functions - NAND gate realization - NOR gate realization - Multilevel synthesis.

UNIT - III

Combinational Logic Design: Half adder - Full adder- Full-subtractor – Parallel Adder- Carry Look Ahead Adder – BCD Adder – Magnitude Comparator – Encoders and Decoders – Multiplexers – Code converters – Parity generator, Parity checker- Combinational circuit implementation using multiplexers and decoders.

Programmable Logic Devices: PROM – EPROM – EEPROM- Programmable Logic Array (PLA) – Programmable Array Logic (PAL) -Realization of combinational circuits using PLDs.

UNIT – IV

Sequential Circuits: General model of sequential circuits –latches – Master-slave Configuration- Flip-Flops - Concept of State – State diagram – State Table.

Synchronous Sequential Circuits – Binary ripple counters-Design of Synchronous counters- binary counters- Arbitrary sequence counter - BCD counter – Shift Registers – Ring Counter – Johnson Counter – Timing diagram – Serial Adder – PN sequence generator.

Sequential PLDs - Introduction to CPLD and Field programmable Gate Array (FPGA).

UNIT – V

Memory: Classification of Memories – RAM Organization – Write Operation – Read Operation – Memory Cycle – Timing Waveforms – Memory Decoding – Memory Expansion – Static RAM Cell – Bipolar RAM Cell – MOSFET RAM Cell – Dynamic RAM Cell.

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Text Books:

1. John F. Wakerly, “Digital Design Principles and Practices”, PHI Private Ltd., New Delhi, Fourth Edition, 2006
2. Morris Mano, “Digital design”, PHI Learning, Fourth Edition, 2008.

Reference Books:

1. Donald P Leach, Albert Paul Malvino and Goutam Saha, “Digital Principles and Applications,” 6th edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.
2. Thomas L. Floyd, “Digital Fundamentals,” Dorling Kindersley (India) Pvt. Limited, 8th ed., 2008.
3. Tocci R J, “Digital systems: Principles and Applications”, PHI learning, New Delhi, Tenth Edition 2006.

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EC T46- ANALOG COMMUNICATION SYSTEMS

UNIT-I

Noise and Amplitude Modulation: General communication systems-external and internal noise-Noise figure and noise temperature-AWGN-Need for modulation-Amplitude modulation-Frequency spectrum-Power relation-Different types of AM modulators-SSB and VSB generation-AM transmitters-Block diagram-Functions of each block-High level transmitter.

UNIT-II

Angle Modulation: Principle of frequency and phase modulation-Relation between FM and PM waves-Bandwidth of FM-Narrow band and wideband FM-Generation of FM wave-Direct and Indirect methods-FM transmitters-Block diagram-Function of each block.

UNIT-III

Detection and Receivers: Detection-Diode detectors-Synchronous detection-FM detectors-Slope detectors-Phase discriminators-Ratio detectors. Receivers- different types super heterodyne receivers- Block diagram-choice of IF and oscillator frequencies-Tracking-Alignment-AVC, AFC-Communication receivers- AM and FM - Receiver characteristics.

UNIT-IV

Pulse Modulation Systems and RADAR: Sampling theorem-Generation and detection of PAM, PWM and PPM-Conversion of PWM to PPM- TDM and FDM. Basic principles of RADAR system- Range equation- Pulse radar system- MIT radar- CW Radar- FM CW Radar.

UNIT-V

Television: Introduction of Television-Television systems and standards-Black and white transmission-black and white reception-color transmission and reception-Introduction to modern TV cameras, LCD and plasma displays

Text Book:

1. George Kennedy and Bernard Davis, "Electronic Communication Systems", Tata McGraw Hill, Fourth Edition, 2008.

Reference Books:

1. Roddy and Coolen, "Communication Systems", PHI learning, 2001.
 2. Wayne Tomasi, "Electronic Communication Systems- Fundamentals Theory Advanced", Fourth Edition, Pearson Education, 2001.
 3. A.M. Dhake, "Television and Video Engineering", McGraw Hill Publications, 2008.
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EC P41 - ELECTRONIC CIRCUITS – I LABORATORY

*1. Design and testing of biasing circuits

i. Fixed bias

ii. Collector to base bias

iii. Self bias

*2. Design and measurement of frequency response, signal handling capacity, input and output impedances of CE amplifier

*3. Design and measurement of frequency response, signal handling capacity, input and output impedances of Emitter follower.

*4. Design and measurement of frequency response, signal handling capacity, input and output impedances of common drain FET amplifier.

*5. Design and measurement of frequency response, signal handling capacity, input and output impedances of cascade amplifier.

*6. Design and measurement of frequency response, input and output impedances of Darlington pair.

*7. Design and measurement of frequency response, input and output impedances of Cascode amplifier.

*8. Differential amplifier.

Differential mode performance, Common mode performance and measurement of CMRR.

*9. Bridge rectifier

Determination of ripple factor for bridge rectifier with and without filters

10 Voltage regulation characteristics of shunt, series and IC regulators

* Practical performance is to be compared with PSPICE simulated results.

Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P42 –DIGITAL CIRCUITS LABORATORY

1. Adder and Subtractors

- a) Boolean function implementations using NAND/NOR logic gates
- b) Study of half-adder, full-adder, half-subtractor and full-subtractor

2. Code convertors

Design, realization and study of the following code convertors

- a) Gray to 8421BCD
- b) 8421BCD to Excess-3-code
- c) 8421BCD to Gray code
- d) Excess-3-code to 8421BCD

3. Parity generator/checker, magnitude comparator

- a) Implementation of error detection circuit using odd and even parity generator/checker
- b) Study of 4-bit magnitude comparator IC
- c) Realization of 8-bit magnitude comparator using 4-bit magnitude comparator ICs

4. Multiplexers and Encoders

- a) 4×1 multiplexer IC
- b) Realization of 16×1 multiplexer using 4×1 multiplexer ICs
- c) Realization of combinational circuit using multiplexer
- d) Priority encoder

5. Decoders and Demultiplexers

- a) 3 to 8 line decoder IC
- b) 3 to 8 line decoder as demultiplexer
- c) Realization of 4 to 16 line decoder using 3 to 8 line decoder ICs
- d) Realization of combinational circuits using decoder.

6. Study of Flip-Flops

- a) Flip-Flops using RS,JK, and D type FF ICs
- b) Conversion of one type of FF to another type

7 Shift register

- a) Various modes of operation of shift register
- b) Ring counter and its timing diagram
- c) Johnson counter and its timing diagram

8 Ripple Counters and their timing diagrams

- a) Binary ripple counters
- b) Binary up/down counters
- c) BCD counter using mod-10 counter ICs

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9 Design and implementation of Synchronous Counters and study of their timing diagrams

- a) Binary counters
- b) Non-sequential binary counter
- c) Binary up/down counters,

10. Memory chips

- a) READ and WRITE involving memory chips
- b) Expansion of memory size

Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P43 - COMMUNICATION LABORATORY-I

1. AM modulator and demodulator
 - a) To construct AM modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.
 - b) To determine the modulation index of AM by classical method and trapezoidal method.
2. FM modulator and demodulator
 - a) To construct frequency modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.
3. Sample & hold and PAM
 - a) To construct sample and hold circuit and to trace the message and sample and hold signal.
 - b) To construct PAM circuit and to trace the input and PAM signal.
4. Pre-emphasis and de-emphasis
 - a) To construct pre-emphasis and de-emphasis circuit and to determine the frequency response.
5. Tuned and wideband amplifiers
 - a) To construct tuned and wideband amplifiers and to determine the frequency response.
6. Frequency mixer and ring modulator
 - a) To construct a frequency mixer and to test its operation.
 - b) To construct a ring modulator and to trace the DSB-SC waveform.
7. Simple and delayed AGC
 - a) To construct simple and delayed with and without AGC circuit and to test its impact.
8. PWM and PPM
 - a) To construct PWM and PPM circuit and trace the output waveforms.
9. TDM
 - a) To construct TDM circuit and to trace the multiplexed and de-multiplexed waveform.
10. Simulation of AM, FM, PAM, PWM and PPM
 - a) To simulate AM modulator and demodulator using PSPICE/EWB and to trace the time domain and frequency domain signal.
 - b) To simulate Direct and Indirect FM generation and detection using MATLAB and to trace the time domain and frequency domain waveform.
 - c) To simulate PAM, PWM and PPM circuits using PSPICE/EWB and to trace the time domain signal.
 - d) To simulate PAM, PWM and PPM using MATLAB and to trace the time domain and frequency domain waveform.
11. Simulation of Pre-emphasis, De-emphasis, TDM and FDM
 - a) To simulate TDM and FDM using PSPICE/EWB and to trace the multiplexed and demultiplexed signal.
 - b) To simulate Pre-emphasis and De-emphasis using PSPICE/EWB and to trace their characteristics.

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SP P44 - PHYSICAL EDUCATION

Physical Education is compulsory for all the Undergraduate students

1. The above activities will include games and sports / extension lectures.
2. In the above activities, the student participation shall be for a minimum period of 45 hours.
3. The above activities will be monitored by the Director of Physical Education.
4. Pass /Fail will be determined on the basis of participation, attendance, performance and behaviour. If a candidate Fails, he/she has to repeat the course in the subsequent years
5. Pass in this course is mandatory for the award of degree.

PONDICHERY UNIVERSITY
B.TECH (ELECTRONICS AND COMMUNICATION ENGINEERING)
CURRICULUM AND SYLLABUS

V Semester

Sl. No	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	MA T51	Probability and Random Process	3	1	-	4	25	75	100
2.	EC T52	Electronic Circuits – II	3	1	-	4	25	75	100
3.	EC T53	System Design Using Integrated Circuits	4	-	-	4	25	75	100
4.	EC T54	Digital Signal Processing	3	1	-	4	25	75	100
5.	EC T55	Linear and Digital Control Systems	3	1	-	4	25	75	100
6.	EC T 56	Waveguides, Antennas and Wave Propagation	3	1	-	4	25	75	100
Practicals									
7.	EC P51	Electronic Circuits Lab – II	-	-	3	2	50	50	50
8.	EC P52	System Design using Integrated Circuits Lab	-	-	3	2	50	50	100
9.	EC P53	Networks and Transmission Lines Lab	-	-	3	2	50	50	100
10.	EC P54	General Proficiency – I	-	-	3	2	100	-	100
Total			19	5	12	32	300	600	900

MA T51 - PROBABILITY AND RANDOM PROCESSES

UNIT - I

Discrete Random Variables: Random Variables and their event spaces The probability mass function Distribution functions Special discrete distributions (Bernoulli, Binomial, Geometric, Negative Binomial, Poisson, Hypergeometric, Discrete Uniform, Constant and Indicator) Probability Generating function.

UNIT - II

Continuous Random Variables: The Exponential distribution The Reliability, Failure density and Hazard function - Some important distributions (Hypoexponential, Erlang, Gamma, Hyper exponential, Weibull, Gaussian, Uniform and Pareto distributions).

UNIT - III

Stochastic Processes: Definition, Classification of Stochastic Processes Strictly Stationary Process, Wide Sense Stationary, Bernoulli Process Poisson process Renewal process (Fundamental Renewal equation only) Availability analysis.

UNIT - IV

Discrete Parameter Markov Chains: Introduction, Computation of n-step transition probabilities Chapman - Kolmogorov equation State classification and limiting Probabilities M/G/1 queueing system, Pollaczek-Khinchin transform equation.

UNIT - V

Continuous Parameter Markov Chain: The Birth and Death process (MM/1, M/M/c, M/M/1/N, MM/c/N ($c < N$), MM/c/c, M/M/ models only, derivation of mean number of customer in the system, in the queue and waiting time Simple applications) Special case of Birth and Death model (Pure Birth and Pure Death Processes)

Text Books:

1. Kishor S.Trivedi, "Probability and Statistics with Reliability," Queueing and Computer Science Applications, John Wiley & Sons Inc. Second Edition, 2002
2. D.Gross and C.M.Harris, "Fundamentals of Queueing Theory," Wiley Students Edition, Third Edition, 1985.
3. T. Veerarajan, "Probability, statistics and Random Processes," Tata Mc.Graw-Hill Publishing Company Ltd., 2005.

Reference Book:

1. J.Medhi, Stochastic Processes, New Age International (P) Ltd., Second Edition, 1994. Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T52 - ELECTRONIC CIRCUITS –II

UNIT - I

Feedback Amplifiers: Concept of feedback- topological classification-voltage series, voltage shunt, current series, current shunt - effect of feedback on gain, stability, distortion, band width, input and output impedances – practical feed back amplifier circuits and their analysis –multistage feedback amplifier.

UNIT - II

Oscillators: Barkhausen criterion for sustained oscillations - RC oscillators – RC phase shift oscillator and Wein bridge oscillator- resonant circuit oscillators – tuned drain and tuned collector oscillator - LC oscillators- Hartley and Colpitts oscillators – crystal oscillators and frequency stability.

UNIT - III

Wave Shaping Circuits and Multivibrators: Low pass RC circuit – integrator - High pass RC circuit – differentiator- Clamper circuits – positive, negative and biased clampers - Voltage doubler, tripler and quadrupler circuits. Multivibrators – design of transistor astable, monostable and bistable multivibrators using transistors– Schmitt trigger circuit.

UNIT - IV

Time Base Generators: General features of time base signals – RC ramp generator – constant current ramp generator, UJT saw tooth generator – Bootstrap ramp generator – Miller integrator ramp generator – triangular waveform generator – pulse generator circuit – function generator – sine wave converter.

UNIT - V

Large Signal Amplifiers: Classification of power amplifiers - Class A power amplifier direct and transformer coupled amplifiers; - Class B - Push-pull arrangements and complementary symmetry amplifiers; conversion efficiency calculations, cross over distortion – class AB amplifier - amplifier distortion – power transistor heat sinking – Class C and D amplifiers.

Text Books:

1. Millman and Halkias, “Integrated Electronics”, Tata McGraw Hill International Edition, 2002.
2. David A. Bell, “Solid State Pulse circuits”, PHI Learning Private Ltd, Fourth Edition, 2007

Reference Books:

1. David A. Bell, “Electronic Devices and Circuits”, PHI Learning Private Ltd, Fourth Edition, 2007
2. R. L. Boylestad and L. Nashelsky, “Electronic Devices and Circuit Theory”, PHI Curriculum & Syllabi B.Tech. Electronics & Communication Engineering Learning Pvt. Ltd, Ninth Edition, 2008
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EC T53 - SYSTEM DESIGN USING INTEGRATED CIRCUITS

UNIT- I

Linear IC- Operational amplifier: Introduction to linear ICs – Operational amplifier IC741 – Block diagram and characteristics – DC and AC performance – Open loop configurations – Feedback configurations – Inverting, non inverting and differential amplifier – Summer, Subtractor, Integrator, Differentiator – Zero crossing detector – Schmitt trigger – Window detector – Astable and monostable multivibrators, V-I and I-V converters. Filter and its types – Instrumentation amplifier – Precision rectifiers - Logarithmic and antilog amplifiers – multiplier- Opamp voltage regulator - IC linear voltage regulator (series 7800 and 7900 ICs) .

UNIT- II

Other LICs and Data Converters: 555 timer – Block diagram and features – Astable multivibrator – applications - Square wave oscillator, Ramp generator, Triangular waveform generator and Voltage to frequency converter – Monostable multivibrator – applications - Frequency divider, PWM and PPM generators. XR2240 Programmable Timer/Counter –Block diagram and operation – applications - Free running oscillator and frequency synthesizer. PLL565, Principle, Building blocks – applications - Frequency multiplication, Frequency translation, AM and FM detection. Data converters – DAC characteristics – Binary weighted DAC, R-2R DAC, Monolithic DAC-08– ADC characteristics–Flash ADC, Successive approximation ADC, dual slope integrating type ADC, Monolithic ADC AD670-Variable Voltage Regulators(LM317).

UNIT- III

Digital Integrated Circuits: Digital IC characteristics, Digital IC families -RTL and DTL, HTL, I²L, TTL, ECL, MOS and CMOS logic circuits, Comparison of digital IC families.

UNIT- IV

Design of sequential machines: Analysis and design of synchronous sequential machines – Mealey and Moore machines – State table – State diagram – State reduction and assignments – Analysis and design of asynchronous sequential logic – Race conditions – Design problems from specifications – Hazards in combinational and sequential circuits.

UNIT- V

Processor and control unit design: Registers – Register transfer logic – inter register transfer, bus transfer and memory transfer, Arithmetic logic and shift micro operations – Macro operations – Processor logic design – Processor organization- Bus organization – Processor unit employing a scratch pad memory – Accumulator– Design of ALU – Design of status register- Design of processor unit with control variables – Design of accumulator – Control logic design – Single flipflop/state method –Sequence register and decoder method – PLA control – Microprogram control.

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Text Books:

1. Robert.F.Coughlin and Frederick F. Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, PHI Learning Pvt. Ltd, Sixth Edition, 2008.
2. M.Morris Mano, “ Digital Logic and Computer design”, PHI Learning Pvt. Ltd, 2008

Reference Books:

1. Ramakant A. Gayakwad , “ Opamp and Linear Integrated Circuits”, PHI Learning Pvt. Ltd, Fourth Edition, 2008.
2. M. Morris Mano and Michael D. Ciletti, “Digital Design”, PHI Learning Pvt. Ltd, Fourth Edition, 2008.

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EC T54 - DIGITAL SIGNAL PROCESSING

UNIT- I

Discrete Time Signals and Systems: DSP advantages – sampling of analog signals - concept of aliasing. DFT – properties – relationship among z transform, DTFT and DFT - Frequency analysis of signals using DFT - FFT algorithms –advantages over discrete computation of DFT – radix 2 algorithms – DIT and DIF algorithms – Computation of IDFT using FFT.

UNIT- II

Infinite Impulse Response Filter Design: Design of IIR filters from analog Butterworth and Chebyshev filters - Impulse invariance and bilinear methods of IIR digital filter design – realization using direct, cascade, parallel and ladder forms.

UNIT- III

Finite Impulse Response Filter Design: Symmetric and asymmetric FIR filters – Linear phase FIR filters – Design of FIR using frequency sampling techniques – Design of FIR filters using windowing technique. Concept of optimum equiripple approximation. Realization of FIR filters – Transversal, linear phase and polyphase realization structures.

UNIT- IV

Finite Word Length Effects: Quantization noise – quantization noise power – fixed point and binary floating point number representations – comparison – overflow error – truncation error – coefficient quantization error – limit cycle oscillations – Scaling to prevent overflow – analytical model of sample and hold operations.

UNIT- V

Spectrum Estimation and Multirate Signal Processing: Periodogram estimation – nonparametric methods – Bartlett and Welch methods – parametric methods – AR, MA and ARMA models. Principles of multirate DSP – Decimation and Interpolation by integer factors – subband coding of speech signals – QMF filters.

Text Books:

1. John G. Proakis and Dimitris G. Manolakis, “Digital Signal Processing: Principles, Algorithms, and Applications”, PHI learning, New Delhi, Fourth edition 2008.

Reference Books:

1. L. R. Rabiner and B. Gold, “Theory and Application of Digital Signal Processing” PHI Learning, New Delhi, 1998.
2. Sanjit K. Mitra, “Digital Signal Processing: A Computer Based Approach, Tata McGraw – Hill, Third Edition, 2005.
3. P.Ramesh Babu, “Digital Signal processing”, Scitech Publications, Fourth Edition, 2007.

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EC T55 - LINEAR AND DIGITAL CONTROL SYSTEMS

UNIT - I

System Modelling: Introduction to control system-Basic elements in control system -Open and closed loop control systems – Differential equation representation of physical systems – Transfer function –Mathematical modeling of electrical and mechanical systems (Translational and Rotational) –Analogous system- Block diagram representation of systems- Block diagram reduction techniques – Signal flow graph-control system components-synchros-tachometer-dc and ac servomotors-stepper motors.

UNIT - II

Time Domain Analysis: Standard test signals- First order system - step, ramp and impulse response analysis-Second order system – step response analysis- steady state error – generalized error co-efficients –Effect of adding a zero to system- Principle of PI, PD and PID compensation-stability analysis – Routh Hurwitz criterion – Root locus method

UNIT - III

Frequency Domain Analysis: Frequency response –Frequency domain specifications – Correlation between time domain and frequency domain specifications-Bode plot – Stability analysis using Bode plot- transfer function from bode plot-Polar plot – Nyquist stability criterion.

UNIT - IV

Digital Control System: Basic digital control system –Spectrum analysis of sampling process –Signal reconstruction-Difference equation representation of digital control systems- Z transform and its properties –Pulse transfer function-Inverse Z transform- Response of linear discrete time systems-Z transform analysis of sampled data control systems-Stability analysis – Jury's stability criterion

UNIT - V

State Space Analysis: Introduction – Concepts of state, state variables and state model– State model of linear systems– system realization-State space representation using physical, phase and canonical variables –diagonal canonical form-Jordan canonical formdiagonalization- Time domain solution of state equation-State transition matrix-Laplace transform solution of state equations- Derivation of transfer function from the state model- Controllability and observability- State space representation of discrete time systems

Text Book:

1. I.J.Nagrath, M. Gopal, "Control Systems Engineering", Fifth Edition, New Age International, New Delhi, 2007.

Reference Books:

1. Benjamin C.Kuo, "Automatic Control Systems", Seventh Edition, PHI Learning New Delhi, 1997.
2. Katsuhiko Ogata, "Discrete Time Control Systems", Second Edition, PHI Learning New Delhi, 2006.
3. Kannan M. Moudgalya, "Digital Control," Wiley-India,2009.
4. R.Anandanatarajan, P. Ramesh Babu, "Control Systems Engineering", Second edition, Curriculum & Syllabi B.Tech. Electronics & Communication Engineering Scitech Publications Pvt. (India) Ltd, 2008
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EC T56 - WAVE GUIDES, ANTENNAS AND WAVE PROPAGATION

UNIT - I

Guided Waves: Introduction - Waves between parallel planes - Transverse electric waves, Transverse magnetic waves, Transverse electromagnetic waves and their characteristics - Wave impedances. Rectangular waveguides - TE and TM waves in rectangular waveguide - Dominant mode - Impossibility of TEM waves in wave guides - Wave impedance and characteristic impedance - Excitation methods for various modes.

UNIT - II

Circular Wave Guides: Introduction – TE and TM waves in circular waveguide- Wave impedance - Attenuation factor and Q of wave guides- Wave impedance- Excitation modes in circular wave guides. Microwave resonators introduction – Coaxial resonator- Waveguide, rectangular and circular cavity resonator - Cavity excitation and tuning - Q factor of micro wave cavities (Qualitative treatment only).

UNIT-III

Antenna Fundamentals: Power density, directivity, gain, radiation resistance, input impedance, radiation patterns, beam width, bandwidth and polarization. Retarded potential- Radiation from a current element and monopole – Radiation of half-wave and centre-fed dipole – Near and far fields, current distribution of dipole antennas. Linear and array antennas - Arrays of two point sources – Broad side and end fire arrays, binomial array - Principle of pattern multiplication – Adaptive arrays.

UNIT-IV

Special Purpose Antennas: (Qualitative treatment only) Loop antennas, Travelling wave antennas, V and rhombic antennas, Horn antennas, Yagi-Uda arrays, Wideband antennas, Log periodic antennas. Babinet's principle – Slot radiators- Parabolic reflectors – Radiation pattern, aperture efficiencies – Feeding techniques for parabolic antennas.

UNIT-V

Propagation: Factors involved in the propagation of radio waves - Ground wave, reflection of radio waves by the surface of the earth - Space wave propagation, considerations in space wave propagation, atmospheric effect in space wave propagation - Ionosphere and its effect on radio waves, Mechanism of ionospheric propagation- Ray paths – Skip distance -Critical frequency-Maximum usable frequency -Fading of signal - Types of fading- Diversity reception.

Text Books:

1. Edward C.Jordan and Keith G.Balmain, "Electromagnetic waves and radiating systems", Second Edition, PHI Learning, 2000.

Reference Books:

1. A.R.Harish and M.Sachidananda, "Antennas and wave propagation", Oxford University Press, 2008.
 2. J.D.Kraus, "Antennas", McGraw Hill 1995.
 3. R.F.Collins, "Antenna and Radiowave propagation", McGraw Hill, 1995
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EC P51 - ELECTRONIC CIRCUITS – II LABORATORY

1. Negative feedback amplifier
 - a. To design, construct and test response of
 - i. voltage shunt ii. voltage series feedback amplifiers with and without feedback for the given specification
 - b. To compare their frequency response through PSPICE simulation
 2. RC Phase shift oscillators
To design, construct and test the
 - a. RC Phase shift oscillator b. Wien bridge oscillator for the given specification
 3. Hartley and Colpitts oscillators
To design, construct and test the
 - a. Hartley oscillator b. Colpitts oscillator for the given specification
 4. Clampers and Voltage Multipliers
 - a. To design, construct and observe output of
 - i. Positive, negative and biased clampers
 - ii. Voltage doubler and tripler
 - b. To simulate the circuits using PSPICE
 5. Astable multivibrator and Monostable multivibrator
 - a. To design, construct and observe output of a transistor astable multivibrator b. To design, construct and observe output of a transistor monostable multivibrator
 6. Bistable multivibrator and Schmitt trigger
To design, construct and observe output of a transistor bistable multivibrator and Schmitt trigger circuits
 7. Time base generators
To construct and observe output waveforms of a Miller integrator and Bootstrap ramp generator
 8. UJT saw tooth generator
To construct and observe output waveforms of a UJT sweep circuit
 9. Class A power amplifier
To obtain the frequency Vs power and load Vs power characteristics
 10. Class B complementary symmetry amplifier
To obtain the frequency Vs power and load Vs power characteristics
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P52 - SYSTEM DESIGN USING INTEGRATED CIRCUITS LABORATORY

1. Applications of Op-amp

To study the application of Opamp IC741 as

- a. Inverting amplifier
- b. Non-inverting amplifier
- c. Voltage follower
- d. Summer
- e. Subtractor

2. Differentiator and Integrator

To study the op-amp performance as differentiator and integrator for various time constants

3. Comparator circuits

To study zero crossing detector, window detector and Schmitt trigger using opamp 741

4. Signal converters

To study operation of op-amp as V to I and I to V converters

5. Active filters using Op-amp

To design and test the performance of a 2nd order LPF, HPF, BPF and BSF

6. Log, antilog and instrumentation amplifier

To study 1. logarithmic and antilog amplifiers 2.

Instrumentation amplifier

7. Multivibrators using Op-Amp

To design and study the working of a. astable multivibrator

b. monostable multivibrator using IC 741.

8. Data converters

Construction and study performance of a. DAC circuits – R-2R and ladder type.

b. Successive approximation type ADC.

9. Multivibrators using IC 555

To design and study the working of a. astable multivibrator

b. monostable multivibrator using IC 555.

10. Frequency synthesizers

To study performance of a. Frequency multiplier using PLL IC 565

b. Frequency synthesizer using IC XR2240

11. Precision rectifiers

To study performance of half wave and full wave precision rectifiers using IC 741.

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EC P53 - NETWORKS AND TRANSMISSION LINES LABORATORY

1. Design of k type Low pass and high pass filters.
 - a. Frequency and phase response of the Low pass filter using Lumped elements.
 - b. Frequency and phase response of the High pass filter using Lumped elements.
2. Design of k type Band pass and Band stop filters.
 - a. Frequency and phase response of the Band pass filter using Lumped elements.
 - b. Frequency and phase response of the Band stop and notch filter using Lumped elements.
3. Design of m derived filters.
 - a. Frequency and phase response of the m derived low pass filter.
 - b. Frequency and phase response of the m derived high pass filter.
4. Simulation of filters.

Design of LPF/HPF/BPF/BEF, T/π , constant k/m derived /composite for the given cutoff frequency using MATLAB - phase and frequency response.

5. Design of switched Twin T network.
Frequency and phase response of a Twin T network.
6. Characteristics of Attenuators and Equalizers.
 - a. Measurement of attenuation of a transmission line for various lengths (like 25, 50, 75, 100 meters) - frequency response of the line at a fixed length.
 - b. Study of frequency response of an equalizer that can boost or attenuate frequencies 50Hz, 1 KHz and 10 kHz.
7. Simulation of equalizer.
Design of an attenuator/phase equalizer and obtain the relevant responses.
8. Impedance (Z) and ABCD Parameters of a transmission line
 - a. Measurement of Z parameters of a transmission line constructed using Lumped elements.
 - b. Measurement of ABCD parameters of a transmission line constructed using Lumped elements.
9. Design of LC resonant circuit
Frequency response – measurement of quality factor of a LC resonant circuit.
10. Characteristics of a low-loss transmission line.
 - a. Measurement of characteristic impedance of the twin pair transmission line.
 - b. Measurement of capacitance and inductance per unit length of a coaxial cable.
 - c. Measurement of voltage reflection coefficient and voltage standing wave ratio of a twin pair using VSWR meter.

11. Impedance matching on transmission line

- a) Maximizing the power across a given load connected to a twin pair transmission line using a single stub and smith chart analysis
- b) Maximizing the power across a given load connected to a twin pair transmission line using a double stub and smith chart analysis

Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

HS P54 - GENERAL PROFICIENCY-I

UNIT - I

Art of Communication: Verbal and Non-verbal Communication – Barriers to Communication – Importance of Body Language – Effective Listening – Feedback

UNIT - II

Introduction to Soft Skills: Attitude – Self-Confidence – Leadership Qualities – Emotional Quotient – Effective Time Management Skills – Surviving Stress – Overcoming Failure – Professional Ethics – Interpersonal Skills

UNIT - III

Writing: Importance of Writing – Written Vs Spoken Language – Formal and Informal Styles of writing – Resources for improving writing – Grammar and Usage – Vocabulary Building – SWOT analysis

UNIT - IV

Speaking Practice: Dialogue – Telephone Etiquette – Public Speaking – Debate – Informal Discussions – Presentations

UNIT - V

Aptitude: Verbal and Numerical aptitude

References:

1. Nicholls, Anne. Mastering Public Speaking. Jaico Publishing House, 2003.
2. Aggarwal, R.S. Quantitative Aptitude. S.Chand & Co., 2004.
3. Leigh, Andrew and Michael Maynard. The Perfect Leader. Random House Business Books, 1999.
4. Whetton .A. David and Kim S. Cameron. Developing Management Skills. Pearson Education, 2007.
5. K.R. Lakshminarayan. Developing Soft Skills. Scitech, 2009.
6. Sherfield M Robert. Developing Soft Skills Pearson Education, 2005.
7. Hair O' Dan, Friedrich W. Gustav and Lynda Dee Dixon. Strategic Communication in Business and the Professions. Pearson Education, 2008.
8. Chaney Lilian and Jeanette Martin. Intercultural Business Communication, Fourth Edition. Pearson Education, 2008.

PONDICHERY UNIVERSITY
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CURRICULUM AND SYLLABUS

VI Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	EC T61	Information Theory and coding	3	1	-	4	25	75	100
2.	EC T62	Digital Communication	3	1	-	4	25	75	100
3.	EC T63	Computer and Communication Networks	3	1	-	3	25	75	100
4.	EC T64	Microprocessor and Microcontroller	3	1	-	3	25	75	100
5.		Elective –I	4	-	-	3	25	75	100
6.		Elective –II	4	-		3	25	75	100
Practicals									
	EC P61	Communication Lab – II	-	-	3	2	50	50	50
7.	EC P62	Computer Networks Lab	-	-	3	2	50	50	100
8.	EC P63	Microprocessor and Microcontroller Lab	-	-	3	2	50	50	100
9.	EC P64	General Proficiency – II	-	-	3	2	100	-	100
Total			20	4	12	28	400	600	1000

EC T61 - INFORMATION THEORY AND CODING

UNIT- I

Introduction to Information Theory: Measure of information- Entropy of symbols - Continuous and discrete cases, Conditional entropies- Basic relationship among different entropies- Mutual information and Trans information, Redundancy and Efficiency

UNIT- II

Channel Classification and Capacity: Continuous and discrete communication channels- Discrete memoryless channels-Channel representations- noiseless channel, lossless channel, deterministic, Binary Symmetric channel, Binary Erasure channel and their capacities - Continuous and discrete channels with noise- Shannon Hartley theorem and its implications.

UNIT- III

Detection of Signals and Channels with Noise: Hypothesis testing- Baye's criterion- Minimum error probability criterion, Neyman pearson criterion, Min-max criterion- Maximum likelihood detector- Wiener filter.

UNIT- IV

Source Coding: Purpose of encoding- Uniquely decipherable codes- Code efficiency and redundancy, Shannon's first and second fundamental theorem, Shannon's encoding algorithm, Shannon Fano code, Huffman code

UNIT- V

Error Correcting Codes: Linear block codes, cyclic codes- Hamming, Block codes, BCH and RS codes, Convolutional codes- Viterbi algorithm, Concatenated codes, Trellis code modulation, Turbo codes- coding, decoding and performance, LDPC codes- construction and decoding

Text Book:

1. Das, S.K.Mullick and P.K.Chatterjee, "Principles of Digital Communication", Wiley Eastern Limited, 1986.

Reference Books:

1. K.Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley and Sons, 1985.
2. Simon Haykin, "Communication Systems", John Wiley and Sons, Fourth Edition.
3. A.J.Viterbi and J.K.Omura, "Principles of Digital Communication and Coding", McGraw Hill.

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EC T62 - DIGITAL COMMUNICATION

UNIT- I

Base Band Transmission: Base band transmission - Wave form representation of binary digits - PCM, DPCM, DM, ADM systems - Detection of signals in Gaussian noise - Matched filter - Application of matched filter - Error probability performance of binary signaling - Multilevel base band transmission - Inter symbol interference - Eye pattern - Companding - A law and μ law- correlation receiver

UNIT- II

Band Pass Transmission: ASK, FSK, PSK, QPSK, DQPSK, MSK, QAM - Detection of signals in noise - Coherent and Non-coherent detection of ASK, FSK and PSK - Comparison of error performance of non- coherently and coherently detected ASK, FSK and PSK systems - M-ary signaling - Vectorial view of MPSK and MFSK - error performance

UNIT- III

Spread Spectrum Communication: Spread spectrum technologies - spreading techniques - PN sequences - Direct sequence spread spectrum systems - Frequency hopping spread spectrum systems - Hybrid systems - Demodulation schemes - RAKE Receivers - Use of spread spectrum with code division multiple access

UNIT- IV

Synchronization: Receiver synchronization - Coherent systems - Symbol and frame synchronization - Network synchronization - Open and closed loop transmitter synchronization - Tracking and acquisition in spread spectrum system

UNIT- V

Encryption and Decryption: Model encryptor - decryptor - Classical encryption techniques - Cipher principles - Data encryption standard - Stream encryption- Key management - Diffie-Hellman key exchange - Elliptic curve architecture and cryptography - Public key encryption system- RSA algorithm

Text Books:

1. Bernard Sklar, "Digital Communication", Second Edition, Prentice Hall, Upper Saddle River, NJ, 2008.
2. Simon Haykin, "Digital Communications", John Wiley and Sons, 2008.

Reference Books:

1. Bruce Carlson, "Principles of Digital Communication", Tata McGraw Hill, 2008.
 2. Taub and Schilling, "Principles of Communication systems", Tata Mc Graw Hill, India, 2008.
 3. William Stallings, "Cryptography and Network Security - Principles and Practices", PHI Learning, Third Edition, 2008.
 4. Proakis. JG, "Digital Communications", McGraw Hill Publications, 2008.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T63 - COMPUTER COMMUNICATION NETWORKS

UNIT- I

Network Models: Data communications- Networks- LAN, MAN and WAN- Internet, Intranet and Extranets- Protocols and standards- The OSI/ISO reference model- Layers in the OSI model-TCP/IP protocol suite- IP addressing- Broadband ISDN- ATM protocol reference model-ATM layers- SONET/SDH architecture- FDDI-DQDB- Structure of circuit and packet switches.

UNIT- II

Data Link Control: Types of errors- Error detection and correction- Checksum- Framing- Flow control-Error control- Stop and wait protocol- Go-back N- Selective repeat protocols- HDLC-Random access protocols- Controlled access- Wired LANs- Ethernet- Fast Ethernet- Gigabit Ethernet- IEEE standards, IEEE 802.3, 802.4, 802.5 and 802.6- Wireless LANs- IEEE 802.11 and Bluetooth.

UNIT- III

Network Routing Algorithms: Logical addressing- IPv4 addresses- IPv6- Internet protocol- Transition from IPv4 to IPv6- Mapping logical to physical address- Mapping physical to logical address- ICMP-Direct Vs indirect delivery- Forwarding- Unicast and Multicast routing protocols- Routers and gateways.

UNIT- IV

Congestion and Traffic Management: Queuing analysis- Queuing models- Single server and multi server queues- Congestion control in data networks and internets- Effects of congestion- Congestion and control- Traffic management- Congestion control in packet networks- TCP flow control- TCP congestion control- Requirements for ATM traffic and congestion control- Performance of TCP over ATM.

UNIT- V

Network Security: Security issue- threats and responses- Preservation measures-Firewalls, Protection form spam, Home networks security, Intrusion detection systems, intrusion prevention systems- Legal implications- Next generation virus defence- wireless network security- Radiation- Wireless security features- WEP,WPA,TKIP- Defensive strategies- Network auditing and intrusion detection- Network administration.

Text Books:

1. Behrouz. A. Forouzan, "Data Communication and Networking", Fourth Edition, Tata McGraw-hill, New Delhi, 2006.
 2. Houston. H. Carr and Charles. A. Snyder, "Data Communications and Network security", Tata McGraw-hill, New Delhi, 2007.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

Reference Books:

1. William Stallings, "High Speed Networks and Internets", Second Edition, Pearson Education Asia, New Delhi, 2002.
 2. Andrew .S. Tanenbaum, "Computer Networks", Fourth Edition PHI Learning Private Ltd, New Delhi, 2008.
 3. Rainer Handel et al, "ATM Networks", Addison Wesley, New Delhi, 2008.
 4. Peterson. L and Davie. B, "Computer Networks", Morgan Kauffmann, 2008
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T64 - MICROPROCESSORS AND MICROCONTROLLERS

UNIT I

8085 Microprocessor:– Evolution of Microprocessors – 8085 architecture – Timing and Control signals - registers, address and data busses, Instruction format, Addressing modes, instruction set, Assembly Language Programming, Stacks and Subroutines - Memory and I/O interfacing.

UNIT II

Microprocessor Peripheral interfacing: Programmable Peripheral interface 8255 – Keyboard and display interface 8279– Programmable timer 8253, USART 8251, Programmable Interrupt controller 8259.

Introduction to 8086 Hardware Architecture and features.

UNIT III

8051 Microcontrollers: Microcontrollers Vs Microprocessors – 8051 Architecture - Instruction set - 8051 Assembly Language programming –Counters and Timers – Serial I/O – Interrupts.

UNIT IV

PIC Microcontroller: Overview of PIC microcontroller – Instruction set – Timer compare and capture mode – watch dog Timer - Synchronous Serial Port – Serial Peripheral Interface – I2C Bus operation .

UNIT V

Microcontroller based Systems Design: LCD interfacing – ADC, DAC, and sensor interfacing – Real-time clock - Relay, PWM, DC and Stepper motor interfacing.

Case Studies: Data Acquisition System, Temperature monitoring system, Manipulator Robot Arm.

Text books:

1. Ramesh Goankar, “Microprocessor Architecture Programming and Applications with 8085”, Penram International Publishing, 1999.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi, “The 8051 Microcontroller, and Embedded Systems”, PHI Learning, 2002.
3. Muhammad Ali Mazidi, Rolin McKinlay, Danny Causey “PIC Microcontroller and Embedded Systems, Using assembly and C for PIC 18” , Pearson Education.

References:

1. John B Peatman, “Design with PIC Microcontrollers”, Pearson Education Asia, 1998.
 2. Kenneth J.Ayala, “The 8051 Microcontroller Architecture Programming and Applications”, Penram International Publishing (India). 1996.
 3. Ajit Paul, “Microprocessor Principles and Applications”, Tata McGraw Hill Publishing Co. Ltd, 2000.
 4. Uffenbeck, “The 8086/8088 family: The design , Programming and Interfacing”, Prentice Hall of India Pvt, Ltd, 2008.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering
5. M. Gopal, “Digital Control Systems”, New Age International, 2000.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P61 - COMMUNICATION LABORATORY- II

1. Construct an Amplitude Shift Keying (ASK) modulator and demodulator circuit. Obtain the ASK modulated and demodulated waveforms.
2. Construct a Frequency Shift Keying (FSK) modulator and demodulator circuit. Obtain the FSK modulated and demodulated waveforms.
3. Construct a Binary Phase Shift Keying (BPSK) modulator and demodulator circuit. Obtain the BPSK modulated and demodulated waveforms.
4. To study the different line coding techniques 1) NRZ unipolar format 2) NRZ polar format 3) NRZ bipolar format and 4) Manchester format. Obtain the waveforms of the different formats.
5. Construct a Pulse code modulator and demodulator circuit. Obtain the coded output for the given sine wave.
6. Construct a Delta modulator and demodulator circuit. Obtain the coded output for the given sine wave.
7. To design and construct DS-SS circuit and verify its operation. Obtain the DSSS waveform.
8. Construct a time division multiplexing circuit to combine two different data streams onto a single channel by assigning time slots to each. Obtain the TDM output.
9. Construct a frequency synthesizer circuit using PLL for the given frequency. Obtain the synthesized waveform.
10. Simulate BASK, BFSK and BPSK circuits using Matlab. Obtain the time domain and frequency domain response of the above modulation schemes. Compare its bit error performance.
11. Simulate M-ary ASK, FSK and PSK circuits for $M = 2, 4, 8, 16$ using Matlab. Compare its bit error performance.
12. Implementation of data encryption and decryption using Matlab.

EC P62 - COMPUTER NETWORKS LABORATORY

1. Simulation of ON-OFF and voice traffic model
 - a) To simulate the ON-off traffic model and plot the following waveform
 - i. User numbers Vs ON period.
 - ii. Time slot Vs number of users.
 - iii. Time slot Vs bandwidth allotted.
 - b) To simulate voice traffic model and obtain
 - i. Time slot Vs bandwidth plot.
 - ii. Time slot Vs error plot.
 - iii. Average error rate.
 - iv. The optimum buffer size for which error rate will be less than stipulated value.
2. Simulation of data traffic and video traffic model
 - a) To simulate the data traffic and multiple rate video traffic for multiple users and to obtain
 - i. Time slot Vs bandwidth plot.
 - ii. Time slot Vs BER plot.
 - iii. The optimum buffer size for which error rate will be less than stipulated value.
3. Simulation of ISDN traffic model
 - a) To simulate the ISDN traffic model for multiple users and to obtain
 - i. Time slot VS bandwidth plot.
 - ii. Time slot Vs BER plot.
 - iii. Time slot Vs un-served video user.
 - iv. Time slot Vs un-served data user.
4. PN sequence generation and testing
 - a) To generate maximal and non maximal length PN sequence and test its randomness properties.
5. M/M/I queuing model
 - a) To simulate M/M/I queuing model and obtain
 - i. Time slot Vs packet loss plot.
 - ii. Maximum and average packet loss without buffer.
 - iii. Buffer size for the given loss.
 - iv. Maximum and average packet loss with buffer.
6. M/G/I and G/G/I queuing model.
 - a) To simulate a M/G/I and G/G/I queuing model and obtain
 - i. Time slot Vs packet loss plot.
 - ii. Maximum average packet loss without buffer.
 - iii. Buffer size for the given loss.
 - iv. Maximum and average packet loss with buffer.
7. Encryption and decryption
 - a) To simulate and test the following encryption and decryption algorithm.
 - i. Mono alphabetic cipher- caesar cipher.
 - ii. Poly alphabetic cipher- Trithemius key, Vigenere key, Vigenere plain and cipher key.
 - iii. RSA with and without digital signature.
8. Flow control
 - a) To simulate and test
 - i. Stop and wait protocol
 - ii. Go back N protocol
 - iii. Selective repeat protocol
9. Error control protocol
 - a) To simulate and test
 - i. Cyclic redundancy check
 - ii. Hamming code
10. Routing algorithms
 - a) To simulate and test
 - i. Shortest path routing algorithm
 - ii. Hierarchical routing algorithm
11. Generation of PDF
 - a) To study, generate and trace the following PDF
 - i. Gaussian distribution
 - ii. Uniform distribution

- iii. Exponential distribution
- iv. Rayleigh distribution
- v. Binomial distribution
- vi. Negative binomial distribution
- vii. Gamma distribution
- viii. Poisson distribution
- 12. Wireless LAN
 - a) To establish wireless LAN test bed (or) wireless LAN environment and perform
 - i. Uni-cast
 - ii. Multicast
 - iii. File transfer protocol

EC P63 - MICROPROCESSOR AND MICROCONTROLLER LABORATORY

Experiments based on 8085 Microprocessor

- 8 bit and 16 bit Arithmetic Operations
- Array operations
- Bit Manipulation operations
- Code conversions
- Subroutines
- Digital Clock simulation
- Block operations

Experiments based on 8051/PIC microcontroller

- LCD interface
- ADC /DAC interface
- Stepper motor interface
- Serial communication (kit-to-kit and/or pc-to-kit)
- Watch dog timer
- Real-time clock
- Printer interfacing
- Water level indicator
- Traffic light controller
- Elevator simulation
- Pulse width modulation
- Interfacing of relay switches

HS P64 GENERAL PROFICIENCY – II

UNIT – I

Composition Analysis: Technical and Non-Technical Passages (GRE Based) – Differences in American and British English – Analyzing Contemporary issues – Expanding Terminology

UNIT – II

Writing: Job Application Letter Writing – Resume Writing

UNIT – III

Oral Skills: Group Discussion – Introduction and Practice – Team Work – Negotiation Skills – Organizing and Attending Meetings – Facing Interviews

UNIT – IV

Adapting to Corporate Life: Corporate Etiquette – Grooming and Dressing

UNIT – V

Aptitude: Verbal and numerical aptitude

Reference Books:

1. Pushplata and Sanjay Kumar, Communicate or Collapse : A Handbook of Effective Public Speaking, Group Discussions and Interviews, PHI Learning, Delhi,2007.
2. Thorpe, Edgar. Course in Mental Ability and Quantitative Aptitude. Tata McGraw-Hill, 2003.
3. Thorpe, Edgar, Test of Reasoning, Tata McGraw-Hill,2003.
4. Prasad, H.M, How to prepare for Group Discussion and Interview, Tata McGraw-Hill, 2001.
5. Career Press Editors,101 Great Resumes, Jaico Publishing House,2003.
6. Aggarwal, R.S, A Modern Approach to Verbal and Non-Verbal Reasoning,S.Chand & Co.,2004.
7. Mishra Sunita and Muralikrishna, Communication Skills for Engineers, First Edition, Pearson Education, 2004.

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VII Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
THEORY									
1.	EC T71	Engineering Economics	3	1	-	3	25	75	100
2.	EC T72	Microwave and Optical Engineering	4	-	-	4	25	75	100
3.	EC T73	Embedded Systems	4	-	-	4	25	75	100
4.		Elective -III	4	-	-	3	25	75	100
PRACTICAL									
5.	EC P71	Communication Lab - III	-	-	3	2	50	50	100
6.	EC P72	Embedded Systems Lab	-	-	3	2	50	50	100
7.	EC P73	Seminar	-	-	3	1	50	-	100
8.	EC P74	Industrial Visit/ Training	-	-	-	1	50	-	100
9.	EC PW7	Project Work	-	-	6	2	50	-	100
Total			15	1	15	22	500	400	900

EC T71 - ENGINEERING ECONOMICS

UNIT - I

Introduction to Economics:– Flow in an Economy, Law of supply and Demand, Concept of Engineering Economics – Engineering Efficiency, Economic Efficiency, Scope of Engineering Economics, Elements of costs, Marginal Cost, Marginal Revenue, Sunk cost, Opportunity cost, Break-Even Analysis, P/V ratio, Elementary Economics Analysis – Material selection for product, Design selection for a product, Building material selection, Process Planning.

UNIT - II

Make or Buy Decision, Value Engineering : Function, Aims, Value Engineering procedure, Interest Formulas and their Applications – Time Value of Money, Single Payment Compound Amount Factor, Single Payment Present Worth Factor, Equal Payment Series, Compound Amount Factor, Equal Payment Series Sinking Fund Factor, Equal Payment Series Present Worth Factor, Equal Payment Series Capital Recovery Factor, Uniform Gradient Series Annual Equivalent Factor, Effective Interest Rate, Examples in all the methods.

UNIT - III

Methods of Comparison of Alternatives: Present Worth Method (Revenue Dominated Cash Flow Diagram, Cost Dominated Cash Flow Diagram), Future Worth Method (Revenue Dominated Cash Flow Diagram, Cost Dominated Cash Flow Diagram), Annual Equivalent Method (Revenue Dominated Cash Flow Diagram, Cost Dominated Cash Flow Diagram), Rate of Return Method, Examples in all the methods

UNIT - IV

Replacement and Maintenance Analysis : Types of Maintenance, Types of Replacement Problem, Determination of Economic Life of an Asset, Replacement of an Asset with a New Asset – Capital Recovery with Return and Concept of Challenger and Defender, Simple Probabilistic Model for items which fail Completely.

UNIT - V

Depreciation: Introduction, Straight Line Method of Depreciation, Declining Balance Method of Depreciation, Sum-of-the-Years-Digits Method of Depreciation, Sinking Fund Method of Depreciation/Annuity Method of Depreciation, Service Output Method of Depreciation, Evaluation of Public Alternatives- Introduction, Examples, Inflation Adjusted Decisions – Procedure to Adjust Inflation, Examples on comparison of alternatives and Determination of Economics Life of asset.

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Text Books:

1. Panneerselvam. R., Engineering Economics, PHI Learning Pvt. Ltd., New Delhi, 2008.

Reference Books:

1. Degarmo E.P., Sullivan W.G. and Canada, J.R., Engineering Economy, Macmillan, New York.
 2. Grant E.L., Ireson W.G. and Leavenworth R.S., Principles of Engineering Economy, Ronald Press, New York.
 3. Smith G.W., Engineering Economics, Iowa State Press, Iowa.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T72 - MICROWAVE AND OPTICAL ENGINEERING

UNIT - I

Microwave Active Devices: Gunn diode and its mode – PIN modulator - IMPATT and TRAPATT diodes - Bipolar transistor – FET – Transferred electron oscillators – Avalanche diode oscillators – Parametric amplifiers - Two cavity klystron amplifier – Power and efficiency considerations – Reflex Klystron oscillators – Modes and efficiency considerations – Magnetrons – TWT.

UNIT - II

S Parameters: Scattering parameters, properties of S matrix, Conversion of ABCD and S matrix, S matrix representation of Waveguide corners, bends, twists, Directional couplers, Circulators, Isolators, Attenuators, Wave guide Tee, Hybrid Tee, Hybrid rings (rat-race) and Terminator.

UNIT - III

Microwave Measurements: VSWR, power, impedance, insertion loss, scattering parameters and dielectric constant measurement.

Antenna Measurements: Radiation pattern, gain, directivity, phase and polarization measurement

UNIT - IV

Optical Fibers and Devices: Propagation of light - Optical fiber structures, Acceptance angle, Numerical aperture, Optical Windows, Attenuation, Absorption losses - Scattering losses – Dispersion – Radiation losses. Optical Source - LED, ILD characteristics. Optical detectors – PIN – APD characteristics., Erbium Doped Fibre Amplifiers.

UNIT - V

Optical Networks: Optical transmitters and receivers, System block diagram - point to point link – link design, power budget analysis. WDM- DWDM and SONET/SDH. Introduction to AON, PON and FTH.

Text Books:

1. J.Y. Liao, “Microwave devices and circuits”, PHI Learning, 1987.
2. Gerd Keiser, “Optical Fiber Communications”, The McGraw Hill Companies, 4th Edition, 2008.
3. David Poser, Microwave Engineering, John Wiley, 3rd edition 2004.
4. John. D. Kraus, Antennas, McGraw Hill, 2nd Edition, 1998.

Reference Books:

1. K.C. Gupta, “Microwaves”, Wiley Eastern Ltd, 1983,
2. Annapoorna Das and Sisir K. Das, “Microwave Engineering”, TMH.
3. Anoop Singh, “Microwave Engineering”, PHI Learning, 2009.
4. R. F. Collins, “Foundation of Microwave Engineering”, McGraw Hill, 1987.
5. John. M. Senior, “Optical Fiber Communications Principles and Practice”, Second Edition, PHI, 1992.
6. Rajiv Ramaswami and Kumar N. Sivarajan, “Optical Networks – A Practical Curriculum & Syllabi B.Tech. Electronics & Communication Engineering Perspective”, Harcourt Publishers International Company, 2000.
Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC T73 - EMBEDDED SYSTEMS

UNIT - I

Introduction to Embedded Processors: Introduction to Embedded Computing, Issues and Challenges in Embedded system Design, Trends: SC, custom designed chips, configurable designed chips, configurable processors and multi-core processors. Embedded processor architecture: General concepts, instruction sets, Levels in architecture, Functional description-hardware/software trade-off Introduction to RISC architecture, Pipelining, Instruction issue and execution, Instruction formats, Addressing modes, Data alignment and byte ordering, Introduction to VLIW and DSP processors.

UNIT - II

Devices and Buses for Devices Network: I/O Devices:- Types and Examples of I/O devices, Synchronous, Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices:- SPI, UART, Parallel Port Devices - Timer and Counting Devices – Serial Communication using: 'I2C', 'USB', 'CAN' - Advanced I/O Serial high speed buses: ISA, PCI, PCI-X, cPCI and advanced buses.

UNIT - III

Programming Concepts and Embedded Programming in C, C++ : Programming in assembly language (ALP) vs High Level Language - C Program Elements:- Macros and functions, Use of Date Types, Structure, Pointers, Function Calls - Concepts of Embedded Programming in C++:- Objected Oriented Programming, Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory needs.

UNIT - IV

Real Time Operating Systems: Definitions of process, tasks and threads – Inter Process Communication:- Shared data problem, Use of Semaphore(s), Priority Inversion Problem and Deadlock Situations, Message Queues, Mailboxes, Pipes, Virtual (Logical) Sockets, Remote Procedure Calls (RPCs) - Operating System Services:- Goals, Structures, Kernel, Process Management, Memory Management, Device Management - Real Time Operating System - RTOS Task scheduling models:- Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing.

UNIT - V

System Design Techniques: Design Methodologies, Requirement Analysis, Specification, System Analysis and Architecture Design. Design Examples:- Telephone PBX- System Architecture, Ink jet printer - Hardware Design and Software Design, Personal Digital Assistants, Set-top Boxes.

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Textbooks:

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003
2. Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001.

References:

1. Steve Heath, Embedded Systems Design, Second Edition, Elsevier India Pvt. Ltd.,2007.
 2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
 3. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware/Software Introduction, John Wiley, 2002.
- Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P71 - COMMUNICATION LABORATORY - III

1. Reflex Klystron characteristics

Mode characteristics measurement of Reflex Klystron Oscillator and estimation of bandwidth, ETS and ETR.

2. Gunn diode characteristics

a) V-I characteristics of Gunn diode

b) Measurement of wavelength and operating frequency of Gunn diode using slotted waveguide (without frequency meter).

3. Determination of VSWR and impedance of unknown load

4. Radiation pattern measurement of antenna

a) Basic microwave setup establishment using Reflex Klystron oscillator

b) Measurement of E-plane and H-plane radiation patterns of antenna.

c) Estimation of FNBW, HPBW and side lobe level of the antenna

5. Dielectric constant measurements

Measurement of relative and absolute dielectric constant of given dielectric materials using basic microwave setup.

6. Characterization of microwave components

a) Characterization of given passive microwave components (DC, E-plane, Magic Tee etc.).

b) Validation of the results obtained through simulation using any environment.

7. Study of optical fiber characteristics

a) Frequency response

b) Attenuation

c) Coupling loss

d) Numerical aperture

8. Study of fiber fault characteristics using OTDR

9. Study of TDM using optical kit and establishment of a digital link

10. Study of fiber sensors

a) Temperature sensor

b) Pressure sensor

c) Strain sensor

Curriculum & Syllabi B.Tech. Electronics & Communication Engineering

EC P72 - EMBEDDED SYSTEMS LABORATORY

1. Voltage Measurement with display

Designing a voltmeter to measure voltage from 0 to 5 volts and displaying the measured value using 7 segment displays

2. Design of Water Pump Controller to sense the water level in a tank

3. Digital Clock with LCD display

4. Temperature Measurement with 7 segment display

5. PC Communication

Interfacing the microcontroller to a PC through RS232 interface and displaying the messages sent by the microcontroller on the PC using Visual Basic program running in PC

6. Remote Control through FM Link

Establishing an FM link between two microcontrollers for data transfer.

7. Hot Chamber Controller to maintain the temperature at the set point.

8. Obstacle Detector using ultrasonic transmitter- receiver

9. Moisture sensor and sprinkler controller design

10. Designing a lamp controller having a light sensor and a timer

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CURRICULUM AND SYLLABUS

VIII Semester

Sl. No.	Code No.	Subject	Periods			Credits	Marks		
			L	T	P		IA	UE	TM
Theory									
1.	EC T81	Industrial Management	4	-	-	3	25	75	100
2.	EC T82	Telecommunication Switching and Networks	4	-	-	4	25	75	100
3.	EC T83	Elective -IV	4	-	-	3	25	75	100
4.	EC T84	Elective -V	4	-	-	3	25	75	100
Practicals									
5.	EC P81	Advance Communication Lab	-	-	3	2	50	50	100
6.	EC P82	Comprehensive Viva	-	-	3	2	50	100	150
7.	EC P83	Professional Ethics	-	-	3	1	100	-	100
8.	EC P84	Project Work	-	-	9	6	50	50	100
Total			16	-	18	24	350	450	800

EC T81 - INDUSTRIAL MANAGEMENT

UNIT - I

Plant Location, Layout and Material Handling: Plant Location: Influencing factors – evaluation of location alternatives (Simple problems) Plant layout: Classification of production systems – principles of layout – basic types of layout – Line balancing – Ranking Positional weight Method (simple problems) Material Handling: functions – principles – classification of material handling equipments (only classification and no description) – factors to be considered in selection of material handling equipments.

UNIT - II

General Management: Basic concepts of management – Scientific management – Henry Fayal's principles of management – Types and functions of management. Types of organization – characteristics, merits and demerits. Types of industrial ownership – characteristics, merits and demerits.

UNIT - III

Production Management: Production, Planning and control: functions – qualitative and quantitative techniques of forecasting – simple problems in forecasting using moving average, weighted moving average, simple exponential smoothing and regression methods (simple problems) – routing – loading and scheduling – different methods of scheduling – product sequencing (simple problems using Johnson's Algorithm) – expediting – dispatching – Introduction to inventory control and materials management.

UNIT - IV

Financial Management: Fixed and variable costs – cost ladder – Break even analysis (simple problems) – Types of capital – working capital – Sources of finance (internal and external) - Evaluation of investments – Present Worth Method, Future Worth Method, Annuity Method and Rate of return Methods (simple problems) – Preparation of balance sheet and profit and loss statements.

UNIT - V

Marketing and Human Resources Management: Marketing Management: Core concepts of marketing; needs, wants and demands; marketing Vs selling – products and markets - pricing and relative factors: channel of distribution; promotion, advertising; market research. Human Resource Management: individual and group behaviour – motivation and morale - fatigue – accidents: causes and remedies - manpower planning – Job evaluation and merit rating.

Text / Reference Books:

1. O.P. Khanna, "Industrial Engineering and Management", Dhanpat Rai & sons, 1999.
 2. R.Panner Selvam, "Production and Operations Management", PHI Learning, 2002.
 3. Martand Telsang – Industrial Engineering and Production Management, S.Chand and Co., 1998.
 4. Joseph Monks – Operations Management, McGraw Hill, New York, 1986.
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EC T82 - TELECOMMUNICATION SWITCHING NETWORKS

UNIT-I

Principles and Evolution of Switching Systems: Basics of switching system, manual switching system, rotary dial telephone, signaling tones, strowger switching components, step-by-step switching, design for 100 line, 1000 line, 10,000 line exchange, touch tone dial telephone, cross bar switching and exchange organization. Four wire concept, operation of hybrid, echo suppressors. Centralized and distributed SPC, software architecture, application software, enhanced services offered by SPC.

UNIT-II

Space Division Switching: Two, three and multistage space division networks, blocking probability calculations using Lee's method.

Time Division Switching: Basic time division space switching, time division time switching, time multiplexed space switching, time multiplexed time switching.

Combination Switching: S-T, T-S, S-T-S, T-S-T and other multistage combination switching.

UNIT-III

Traffic Engineering: Network traffic load and parameters, GOS and blocking probability, modeling switching systems, incoming traffic and service time characterization, blocking models and loss systems, delay systems.

UNIT-IV

Telephone Networks: Subscriber loop systems, high data rate digital subscriber loop, asymmetric digital subscriber loop, VDSL, transmission plan, transmission systems, numbering plan, charging plan, basics of signalling, In channel signalling, common channel signalling.

UNIT-V

Data Networks: Data transmission in PSTN, switching techniques for data transmission, OSI reference model, Satellite based data networks, fiber optic networks, protocol stacks, internetworking. ISDN services, transmission channels and user network interface in ISDN, ISDN protocol architecture, ISDN standards, ISDN numbering and addressing. Introduction to the basic principles of frame relay, TCP/IP and ATM.

Text Books:

1. Thiagarajan Viswanathan, "Telecommunication Switching Systems and Networks", PHI Learning, New Delhi, 2008.
2. John C. Bellamy, "Digital Telephony", John Wiley and Sons, Third edition, 2000.

Reference Book:

1. J.E.Flood, "Telecommunication switching traffic and networks", Pearson Education Ltd, New Delhi, 2001.

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EC P81 - ADVANCED COMMUNICATION LABORATORY

1. Study of Microwave Communication Systems
2. Demonstration of ISDN concept with optical link or microwave link and the study of link response at various stages.
3. Study of Radio Communication Analyzer (RCA)
4. Spectrum analysis of modulated signals using Spectrum Analyzer and validating the results through simulation.
5. Spectrum analysis of TV signals using Spectrum Analyzer
6. Design and testing of LP/HP/BP/BS filters for FM range using Vector Network Analyzer and validating the results through simulation.
7. Design and testing of antenna using Vector Network Analyzer
 - a) Antenna response (for FM range)
 - b) Impedance measurement of the designed antenna.
8. Study of Radar trainer kit
 - a) Detection of moving/static objects
 - b) Range of the objects
 - c) Velocity of the moving objects
9. Study of computer communication
 - a) A secure PC to PC communication (wire/wireless).
 - b) Voice and data transmission
 - c) Performance evaluation
- 10) a) Simulation of spread spectrum, microwave, optical and satellite communication systems
 - b) Simulation to determine the response of atleast any two of the following using any environment:
 - Error performance of CDMA in AWGN and fading channel for multiuser environment
 - Characterizing the given microwave link and validating through analytical measure
 - Power budget and rise time link analysis of a given optical link
 - A satellite link.

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EC P82 - COMPREHENSIVE VIVA-VOCE

The student will be tested for his understanding of the basic principles of the core engineering subjects. The internal assessment for a total of 50 marks will be made by a committee comprising of the faculty members of the department. The committee will conduct three written examinations of short questions type from the subjects (Test 1-Analog and Digital Electronic Circuits, Electric Circuits, Microprocessor and VLSI; Test 2-Signal Processing, Electromagnetic Waves and Waveguides, Antennas Control Systems; Test 3-Analog and digital communication, Advanced communication systems). The external university examination, which carries a total of 50 marks, will be a Viva Voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university.

EC P83 - PROFESSIONAL ETHICAL PRACTICE

The course should cover the following topics by way of Seminars, Expert Lectures and Assignments:

1. Engineering Ethics – Moral issues, Ethical theories and their uses
2. Engineering as Experimentation – Code of Ethics
3. Engineer's responsibility for safety
4. Responsibilities and rights
5. Global issues of engineering ethics

Reference Book:

1. Charles D.Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999

EC PW8 - PROJECT WORK (PHASE II)

Extension and completion of project work started in the previous semester. On completion of the project work, each student has to prepare a project report and submit the same to the department. In the Phase II, the project work and the report will be evaluated by the internal assessment committee by conducting two reviews and one demo for a total of 50 marks. The external university examination, which carries a total of 50 marks, will have report evaluation and viva voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university.