

ANNA UNIVERSITY TIRUCHIRAPPALLI
Tiruchirappalli - 620024

B.E. (PART TIME) ELECTRONICS AND COMMUNICATION ENGINEERING

Regulations 2007

Curriculum

SEMESTER I

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	MA4101	Mathematics I	3	0	0	100
2	HS4101	Physical Sciences	3	0	0	100
3	CS4103	Digital Computer Principles	3	0	0	100
4	EC4101	Electronic Devices	3	0	0	100
5	EE4103	Measurements and Instrumentation	3	0	0	100

SEMESTER II

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	MA4151	Mathematics II	3	0	0	100
2	EC4151	Electronic Circuits I	3	0	0	100
3	GE4151	Environmental Science and Engineering	3	0	0	100
4	EE4153	Electrical Machines	3	0	0	100
5	EC4152	Electromagnetic Fields and Waves	3	0	0	100

SEMESTER III

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC4201	Signals and Systems	3	0	0	100
2	EC4202	Electronic Circuits II	3	0	0	100
3	EC4203	Linear Integrated Circuits	3	0	0	100
4	EC4204	Transmission Lines and Wave Guides	3	0	0	100
5	EE4204	Control Systems	3	0	0	100

SEMESTER IV

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC4251	Communication Theory and Systems	3	0	0	100
2	EC4252	Microprocessor and its Applications	3	0	0	100
3	EC4253	Digital Signal Processing	3	0	0	100
4	EC4254	Computer Networks	3	0	0	100
Practical						
5	EC4255	Microprocessor and Control Systems Laboratory	0	0	3	100

SEMESTER V

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC4301	Digital Communication	3	0	0	100
2	CS4306	Operating System	3	0	0	100
3	EC4302	RF and Microwave Engineering	3	0	0	100
4	E1****	Elective I	3	0	0	100
Practical						
5	EC4304	Communication System and Network Laboratory	0	0	3	100

SEMESTER VI

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC4351	VLSI Design	3	0	0	100
2	EC4352	Optical Communication and Networking	3	0	0	100
3	EC4353	Antennas and Wave Propagation	3	0	0	100
4	E2****	Elective II	3	0	0	100
Practical						
5	EC4354	VLSI Design Laboratory	0	0	3	100

SEMESTER VII

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	MG4351	Total Quality Management	3	0	0	100
2	E3****	Elective III	3	0	0	100
3	E4****	Elective IV	3	0	0	100
4	E5****	Elective V	3	0	0	100
Practical						
5	EC4405	Project Work	0	0	3	100

LIST OF ELECTIVES

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	CS4021	Object Oriented Programming	3	0	0	100
2	CS4022	Artificial Intelligence	3	0	0	100
3	CS4023	Neural Networks and Fuzzy Systems	3	0	0	100
4	CS4024	Neural Network and its Applications	3	0	0	100
5	CS4025	Parallel and Distributed Processing	3	0	0	100
6	CS4026	Web Technology	3	0	0	100
7	EC4001	Advanced Microprocessors	3	0	0	100
8	EC4002	Power Electronics	3	0	0	100
9	EC4003	Opto Electronic Devices	3	0	0	100
10	EC4004	Advanced Electronic System Design	3	0	0	100
11	EC4005	CAD for VLSI	3	0	0	100
12	EC4006	Real Time Embedded Systems	3	0	0	100
13	EC4007	Micro Electro Mechanical Systems(MEMS)	3	0	0	100
14	EC4008	Satellite Communication	3	0	0	100
15	EC4009	Radar and Navigational Aids	3	0	0	100
16	EC4010	Electromagnetic Interference and Compatibility	3	0	0	100
17	EC4011	Telecommunication System Modeling and Simulation	3	0	0	100
18	EC4012	Digital Image Processing	3	0	0	100
19	EC4013	Advanced Digital Signal Processing	3	0	0	100
20	EC4014	Television and Video Engineering	3	0	0	100
21	EC4015	RF System Design	3	0	0	100
22	EC4016	Speech Technologies	3	0	0	100
23	EC4017	Wireless Network	3	0	0	100
24	EC4018	Radiological Engineering	3	0	0	100
25	MG4001	Hospital Management	3	0	0	100
26	BT4001	Anatomy and Physiology	3	0	0	100
27	EC4019	Robotics	3	0	0	100
28	BT4002	Medical Informatics	3	0	0	100
29	BT4003	Bio Informatics	3	0	0	100
30	CS4027	Computer Architecture and Organization	3	0	0	100
31	CS4028	Programming and Data Structures	3	0	0	100
32	EC4020	Digital Switching and Transmission	3	0	0	100
33	EC4021	Wireless and Mobile Communications	3	0	0	100
34	EC4022	Medical Electronics	3	0	0	100
35	MA4001	Numerical Methods	3	0	0	100
36	MA4002	Random Processes	3	0	0	100
37	GE4201	Professional Ethics in Engineering	3	0	0	100

ANNA UNIVERSITY TIRUCHIRAPPALLI
Tiruchirappalli 620024

B.E. (PART TIME) ELECTRONICS AND COMMUNICATION ENGINEERING

Regulations 2007

SYLLABUS

SEMESTER I

MA4101 – MATHEMATICS I

	L	T	P
UNIT I MATRICES	3	0	0
Characteristic Equation – Eigen Values and Eigen Vectors of a Real Matrix – Properties of Eigen Values – Problem Solving Using Cayley-Hamilton Theorem – Similarity Transformation – Orthogonal Transformation of a Symmetric Matrix to Diagonal Form – Quadratic Form – Orthogonal Reduction to its Canonical Form.			9
UNIT II THREE DIMENSIONAL GEOMETRY			9
Angle Between Two Lines – Coplanar Lines – Shortest Distance between Skew Lines – Equation of a Sphere – Plane Section of a Sphere – Tangent Plane – Equation of a Cone – Right Circular Cone.			
UNIT III DIFFERENTIAL CALCULUS			9
Curvature – Cartesian and Parametric Co-ordinates – Centre and Radius of Curvature – Circle of Curvature – Envelopes – Evolutes.			
UNIT IV FUNCTIONS OF SEVERAL VARIABLES			9
Partial Derivatives – Euler's Theorem for Homogeneous Functions – Total Derivative – Differentiation of Implicit Functions – Jacobians – Maxima / Minima for Functions of Two Variables – Method of Lagrange's Multipliers – Taylor's Expansion.			
UNIT V ORDINARY DIFFERENTIAL EQUATIONS (ODE)			9
Solution of Second and Higher Order Linear ODE with Constant Coefficients – Simultaneous First Order Linear Equations with Constant Coefficients – Linear Equations of Second Order with Variable Coefficients – Cauchy's and Legendre's Linear Equations – Method of Reduction Order.			

Total: 45

TEXT BOOK

1. Grewal B. S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, New Delhi, 2005.

REFERENCES

1. Glyn James., "Advanced Modern Engineering Mathematics", Third Edition, Pearson Education Ltd, New Delhi, 2004.
2. Venkataraman M. K., "Engineering Mathematics", Volume I and II Revised Enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.
3. Veerarajan. T., "Engineering Mathematics (for first year)", Fourth Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2005.
4. V. Sundaram, R. Balasubramanian and K. A. Lakshminarayanan, "Engineering Mathematics", Fifth Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2006.

HS4101 – PHYSICAL SCIENCES

L	T	P
3	0	0

UNIT I PROPERTIES OF MATTER AND HYDRODYNAMICS 9

Properties of Matter – Stress – Strain – Hooke's Law – Types of Moduli of Elasticity – Torsional Pendulum – Determination of Rigidity Modulus of a Wire – Bending of Beams – Expression for Bending Moment – Measurement of Young's Modulus by Uniform and Non-Uniform Bending.

Hydrodynamics: Stream Line Flow – Turbulent Flow – Poiseuille's Formula for Flow of Liquid through a Capillary Tube – Determination of Coefficient of Viscosity of a Liquid.

UNIT II OPTICS AND PHOTOELASTICITY 9

Interference: Air Wedge – Testing of Flat Surfaces – Michelson's Interferometer – Types of Fringes – Applications – Wavelength Determination – Thickness of a Transparent Medium.

Optical Instruments: Metallurgical Microscope and Scanning Electron Microscope – Applications.

Photo Elasticity: Theory of Photo Elasticity – Stress Optic Law – Isoclinic and Isochromatic Fringes – Photoelastic Bench and its Use.

UNIT III SEMICONDUCTING AND SUPERCONDUCTING MATERIALS 9

Intrinsic Semiconductor: Expressions for the Carrier Concentration – Calculation of Density of Holes and Electrons – Fermi Level and its Variation with Temperature – Determination of B and Gap Energy.

Extrinsic Semiconductors: Carrier Concentration in N-Type and P-Type Semiconductors (No Derivation – Qualitative) – Variation of Fermi Level with Temperature and Impurity Concentration – Hall Effect – Determination of Hall Coefficient.

Super Conductors: Super Conductivity – Properties – Meissner Effect – Type I and Type II Superconductors – High Temperature Super Conductors – Applications – Magnetic Levitation – Josephson effect – SQUID.

UNIT IV WATER TREATMENT PROCESS 9

Hardness of Water – CaCO_3 Equivalents – Ethylene Diamine Tetra – Acetic Acid (EDTA) Method of Estimation of Hardness – Troubles of Boiler Feed Water – Demineralization – Zeolite Process – Desalination – Reverse Osmosis – Electro Dialysis – Water Conditioning (Colloidal, Phosphate, Calgon, Carbonate) – Treatment of Domestic Water (UV And Ozone).

UNIT V THERMODYNAMICS 9

Thermodynamic Processes – First Law of Thermodynamics – Limitations – Second Law of Thermodynamics – Clausius and Kelvin Statement – Entropy – Mathematical Expressions – Changes in Entropy for Isothermal Expansion – Reversible and Irreversible Processes – Free Energy – Gibbs Helmholtz Equation – Application and Simple Problems – Van't Hoff Isotherm and Isochore – Simple Problems.

Total: 45

TEXT BOOKS

1. Avadhanulu M. N. and Kshirsagar P. G., "A Text Book of Engineering Physics", S.Chand & Company Ltd., Seventh Enlarged Revised Ed., 2005.
2. Gaur R. K. and Gupta S. L., "Engineering Physics", Dhanpat Rai Publishers, New Delhi, 2001.
3. P. C. Jain and Monika Jain., "Engineering Chemistry", Thirteenth Edition, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2004.

REFERENCES

1. Pillai S. O., "Solid State Physics", Sixth Edition, New Age International Publications, New Delhi, 2005,
2. Arumugam M., "Engineering Physics", Second Edition, Anuradha Agencies, Kumbakonam, 2005.
3. Palanisamy P. K., "Physics for Engineers", Second Edition, Scitech Publications (India) Pvt. Ltd., Chennai, 2005.
4. J. C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata McGraw Hill Publishing Company (P) Ltd., New Delhi, 1996.
5. B. K. Sharma, "Engineering Chemistry", Krishna Prakasam Media (P) Ltd., Meerut, 2001.

CS4103 – DIGITAL COMPUTER PRINCIPLES

L	T	P
3	0	0

UNIT I DIGITAL COMPUTERS 9

Digital Computer Fundamentals – Block Diagram of a Computer – Components of a Computer System (CPU, Memory, Input/Output) – Categories of Software – Booting – Installing and Uninstalling Software – Software Terminologies – Applications of Computers – Role of Information Technology – History of Internet – Internet Services.

UNIT II NUMBER SYSTEMS AND BINARY ARITHMETIC 9

Number Systems – Number Representation – Decimal, Binary, Octal, Hexadecimal and BCD Numbers – Binary Arithmetic – Binary Addition – Arithmetic Number Representations – Unsigned and Signed Numbers – One's and Two's Complement – Sign Extended Two's Complement for Arithmetic Operations – Binary Subtraction – Binary Multiplication – Binary Division – Number System Conversions.

UNIT III BOOLEAN ALGEBRA AND LOGIC SIMPLIFICATION 9

Logic Operations – AND, OR, NOT, NAND, NOR, XOR and XNOR Gates – Boolean Algebra Rules and Laws – Commutative, Associative and Distributive – De Morgan's Theorems – Standard Forms of Boolean Expression – Sum of Products – Product of Sums – Boolean Expression Minimization Using Boolean Laws – Karnaugh Map Minimization for Three and Four Variables in SOP and POS Forms – Don't Care Conditions – NAND and NOR Implementations.

UNIT IV COMBINATIONAL LOGIC 9

Basic Combinational Logic Circuits – Implementing Combinational Logic – Binary Adder – Subtractor – Multiplier – Comparators – Encoders – Decoders – Code Converters – Multiplexers – Demultiplexers – Parity Generators – Read Only Memories – Programmable Logic – Abel.

UNIT V INTEGRATED CIRCUIT TECHNOLOGIES 9

Basic Operational Characteristics and Parameters – Standard TTL Circuits – CMOS Circuits – TTL to CMOS Interface – CMOS to TTL Interface – Emitter Coupled Logic Circuits – Comparison of CMOS, TTL and ECL Performance – PMOS, NMOS and E²CMOS Circuits.

Total: 45

TEXT BOOKS

1. Albert Paul Malvino, Donald P. Leech, "Digital Principles and Applications", Sixth Edition, Mc Graw Hill Publishers, 2006.
2. Thomas L. Floyd, "Digital Fundamentals" Eight Edition, Pearson Education Publishers, 2003.

REFERENCES

1. Morris Mano, "Digital Design", Third Edition, Prentice Hall India, 2002.
2. Rajkamal, "Digital Systems: Principles and Design", First Edition, Pearson Education, 2007.

EC4101 – ELECTRONIC DEVICES

L T P
3 0 0

UNIT I SEMICONDUCTOR DIODE 9

Theory of P–N Junction – P-N Junction as Diode – P-N Diode Currents – Volt-Amp Characteristics – Diode Resistance – Temperature Effect of P-N Junction – Transition and Diffusion Capacitance of P-N Diode – Diode Switching Times.

UNIT II BI - POLAR TRANSISTOR 9

Junction Transistor – Transistor Construction – Detailed Study of Currents in Transistor – Input and Output Characteristics of CE, CB and CC Configurations – Transistor Hybrid Model for CE Configuration – Analytical Expressions for Transistor Characteristics – Transistor Switching Times – Voltage Rating – Power Transistors.

UNIT III FIELD EFFECT TRANSISTORS 9

Junction Field Effect Transistor – Pinch off Voltage – JFET Volt – Ampere Characteristics – JFET Small Signal Model – MOSFETS and Their Characteristics – FET as a Variable Resistor – Unijunction Transistor.

UNIT IV OPTO ELECTRONIC DEVICES 9

Photo Emissivity and Photo Electric Theory – Theory – Construction and Characteristics – Light Emitting Diodes – Liquid Crystal Cell – Seven Segment Display – Photo Conductive Cell – Photodiode – Solar Cell – Photo Transistor – Opto Couplers and Laser Diode.

UNIT V MISCELLANEOUS 9

Theory, Characteristics and Application – SCR – TRIAC – PUT – Tunnel Diode – Thermistors – Piezo Electric Devices – Zener Diode – Charge Coupled Devices – Varactor Diode and LDR.

Total: 45

TEXT BOOKS

1. Jacob Millman, Christos C. Halkias, "Electronic Devices and Circuits", Tata Mcgraw Hill Publishing Limited, New Delhi, 2003.
2. David A. Bell, "Electronic Devices and Circuits", Prentice Hall of India Private Limited, New Delhi, 2003.

REFERENCES

1. Theodore F. Boghert, "Electronic Devices & Circuits", Sixth Edition, Pearson Education, 2003.
2. Ben G. Streetman and Sanjay Banerjee, "Solid State Electronic Devices", Pearson Education, 2002.
3. Allen Mottershead, "Electronic Devices and Circuits – An Introduction", Prentice Hall of India Private Limited, New Delhi, 2003.

EE4103 – MEASUREMENTS AND INSTRUMENTATION

L	T	P
3	0	0

UNIT I BASIC CONCEPTS 9

Functional Elements of an Instrument – Static and Dynamic Characteristics – Errors In Measurement – Statistical Evaluation of Measurement Data – Standards and Calibration.

UNIT II ELECTRICAL AND ELECTRONICS INSTRUMENTS 9

Principle And Types of Analog and Digital Voltmeters – Ammeters – Multi Meters – Single And Three Phase Watt Meters and Energy Meters – Magnetic Measurements – Determination of B-H Curve and Measurements of Iron Loss – Instrument Transformers – Instruments for Measurement of Frequency and Phase.

UNIT III COMPARISON METHODS OF MEASUREMENTS 9

D.C and A.C Potentiometers – D.C and A.C Bridges – Transformer Ratio Bridges – Self -Balancing Bridges – Interference and Screening – Multiple Earth and Earth Loops – Electrostatic and Electromagnetic Interference – Grounding Techniques.

UNIT IV STORAGE AND DISPLAY DEVICES 9

Magnetic Disk and Tape – Recorders – Digital Plotters – Printers – CRT Display – Digital CRO – LED – LCD and Dot Matrix Display.

UNIT V TRANSDUCERS AND DATA ACQUISITION 9

Classification of Transducers – Selection of Transducers – Resistive – Capacitive and Inductive Transducers – Piezoelectric – Optical and Digital Transducers – Elements of Data Acquisition System – A/D – D/A Converters.

Total: 45

TEXT BOOKS

1. E. O. Doebelin, "Measurement Systems – Application and Design", Tata McGraw Hill Publishing Company, 2003.
2. A. K. Sawhney, "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai Co, 2004.

REFERENCES

1. A. J. Bounwens, "Digital Instrumentation", Tata McGraw Hill, 1997.
2. D. V. S. Moorthy, "Transducers and Instrumentation", Prentice Hall of India Pvt Ltd, 2003.
3. H. S. Kalsi, "Electronic Instrumentation", Tata McGraw Hill, 1995.
4. Martin Reissland, "Electrical Measurements", New Age International(P) Ltd., Delhi, 2001.
5. J. B. Gupta, "A Course in Electronic and Electrical Measurements", S .K. Kataria and Sons, Delhi, 2003.

SEMESTER II

MA4151 – MATHEMATICS II

L	T	P
3	0	0

UNIT I **MULTIPLE INTEGRALS** 9

Double Integration – Cartesian and Polar Co–Ordinates – Change of Order of Integration – Area as a Double Integral – Change of Variables Between Cartesian and Polar Coordinates – Triple Integration – Volume as a Triple Integral.

UNIT II **VECTOR CALCULUS** 9

Gradient, Divergence and Curl – Directional Derivative – Irrotational and Solenoidal Vector Fields – Vector Integration – Problem Solving Using Green's Theorem, Gauss Divergence Theorem and Stoke's Theorem – Simple Applications and Verifications.

UNIT III **FOURIER SERIES AND TRANSFORMS** 9

Dirichlet's Conditions – General Fourier Series – Odd and Even Functions – Half Range Sine Series and Cosine Series – Fourier Transform Pair – Sine and Cosine Transforms – Properties – Transforms of Simple Functions – Parseval's Identity for Series and Transforms.

UNIT IV **COMPLEX INTEGRATION** 9

Problems Solving Using Cauchy's Integral Theorem and Integral Formula – Taylor's and Laurent's Expansions – Residues – Cauchy's Residue Theorem – Contour Integration over Unit Circle – Semicircular Contours with no Pole on Real Axis.

UNIT V **LAPLACE TRANSFORMS** 9

Transforms of Elementary Functions – Basic Properties – Transforms of Derivatives and Integrals – Initial and Final Value Theorems – Inverse Laplace Transforms – Convolution Theorem – Solution of Ordinary Differential Equations with Constant Coefficients Using Laplace Transforms.

Total: 45

TEXT BOOK

1. Grewal, B. S, "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, New Delhi, 2005.

REFERENCES

1. Glyn James, "Advanced Modern Engineering Mathematics", Third Edition, Pearson Education Ltd, New Delhi, 2004.
2. Venkataraman M. K., "Engineering Mathematics", Volume I and II Revised Enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.
3. Veerarajan. T., "Engineering Mathematics (For First Year)", Fourth Edition, Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2005.
4. V.Sundaram, R. Balasubramanian and K. A. Lakshminarayanan, "Engineering Mathematics", Fifth Edition, Vikas Publishing House Pvt, Ltd., New Delhi, 2006.

GE4151 – ENVIRONMENTAL SCIENCE AND ENGINEERING

L	T	P
3	0	0

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 10

Definition – Scope and Importance – Need for Public Awareness – Forest Resources – Use and Over-Exploitation – Deforestation – Case Studies – Timber Extraction, Mining, Dams and Their Effects on Forests and Tribal People – Water Resources – Use and Over-Utilization of Surface and Ground Water, Floods, Drought, Conflicts Over Water, Dams – Benefits and Problems – Mineral Resources – Use and Exploitation, Environmental Effects of Extracting and Using Mineral Resources, Case Studies – Food Resources – World Food Problems, Changes Caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer – Pesticide Problems, Water Logging, Salinity, Case Studies – Energy Resources – Growing Energy Needs, Renewable and Non Renewable Energy Sources, Use of Alternate Energy Sources – Case Studies – Land Resources – Land as a Resource, Land Degradation, Man Induced Landslides, Soil Erosion and Desertification – Role of an Individual in Conservation of Natural Resources – Equitable Use of Resources for Sustainable Lifestyles

Field Study of Local Area to Document Environmental Assets – River / Forest / Grassland / Hill / Mountain

UNIT II ECOSYSTEMS AND BIODIVERSITY 14

Concept of an Ecosystem – Structure and Function of an Ecosystem – Producers, Consumers and Decomposers – Energy Flow in the Ecosystem – Ecological Succession – Food Chains – Food Webs and Ecological Pyramids – Types – Characteristic Features – Structure and Function of the Forest Ecosystem, Grassland, Ecosystem, Desert Ecosystem, Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries) – Biodiversity – Definition – Genetic – Species and Ecosystem Diversity – Biogeographical Classification of India – Value of Biodiversity Consumptive Use – Productive Use – Social – Ethical – Aesthetic and Option Values – Biodiversity at Global – National and Local Levels – India as a Mega – Diversity Nation – Hot – Spots of Biodiversity – Threats to Biodiversity: Habitat Loss – Poaching of Wildlife – Man – Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity – In-Situ and Ex-Situ Conservation of Biodiversity .

Field Study of Common Plants, Insects, Birds.

Field Study of Simple Ecosystems – Pond, River, Hill Slopes, Etc.

UNIT III ENVIRONMENTAL POLLUTION 8

Definition – Causes, Effects and Control Measures of Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear Hazards – Soil Waste Management: Causes, Effects and Control Measures of Urban and Industrial Wastes – Role of an Individual in Prevention of Pollution – Pollution Case Studies – Disaster Management: Floods, Earthquake, Cyclone and Landslides.

Field Study of Local Polluted Site – Urban / Rural / Industrial / Agricultural.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

7

From Unsustainable to Sustainable Development – Urban Problems Related to Energy – Water Conservation – Rain Water Harvesting – Watershed Management – Resettlement and Rehabilitation of People – its Problems and Concerns, Case Studies – Environmental Ethics: Issues and Possible Solutions – Climate Change, Global Warming – Acid Rain – Ozone Layer Depletion – Nuclear Accidents and Holocaust – Case Studies – Wasteland Reclamation – Consumerism and Waste Products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues Involved in Enforcement of Environmental Legislation – Public Awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

6

Population Growth, Variation among Nations – Population Explosion – Family Welfare Programme – Environment and Human Health – Human Rights – Value Education – HIV / AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health – Case Studies.

Total: 45

TEXT BOOKS

1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", Second Edition, Pearson Education Pvt. Ltd., Isbn 81 – 297 – 0277 – 0, 2004.
2. T. G. Jr. Miller, "Environmental Science", Wadsworth Publishing Co.
3. Townsend C, Harper J and Michael Begon, "Essentials of Ecology", Second Edition, Blackwell Science, 2003.
4. R. K. Trivedi and P. K. Goel, "Introduction to Air Pollution", Techno-Science Publications.

REFERENCES

1. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt., Ltd., Ahmedabad India, 2002.
2. Trivedi R. K, "Handbook Of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
3. Cunningham, W. P. Cooper, T. H. Gorhani, "Environmental Encyclopedia", Jaico Publication, House, Mumbai, 2001.
4. Wager K. D, "Environmental Management", W. B, Saudners Co., Philadelphia, USA, 1998.

EE4153 – ELECTRICAL MACHINES

L	T	P
3	0	0

UNIT I D.C. MACHINES 9

Construction of D.C. Machines – Theory of Operation Of D.C. Generator – Characteristics of D.C. Generators – Armature Reaction – Commutation – Principle of Operation of D.C. Motor – Voltage Equation – Type of D.C. Motor and Their Characteristics – Speed Control of D.C. Motors.

UNIT II TRANSFORMER 9

Principle of Transformer – Ideal Transformer – EMF Equation – Constructional Details of Shell and Core Type Transformer – OC and SC Test – Equivalent Circuit – Regulation And Efficiency of a Transformer.

UNIT III SYNCHRONOUS MACHINES 9

Principle of Alternators – Construction Details – Equation of Induced EMF – Vector Diagram – Method of Starting of Synchronous Motor – Torque Developed by the Motor – V Curves – Speed Control.

UNIT IV INDUCTION MACHINES 9

Construction – Principle of Operation of 3 Phase Induction Motors – Classification of Induction Motors – Relation Between Torque and Rotor Power Factor – Equivalent Circuit – Performance Calculation – Starting and Speed Control.

UNIT V SPECIAL MACHINES 9

Types of Single Phase Motor – Double Revolving Field Theory – Cross Field Theory – Capacitor Start Capacitor Run Motors – Shaded Pole Motor – Repulsion Type Motor – Universal Motor – Hysteresis Motor – Stepper Motor.

Total: 45

TEXT BOOK

1. D. P. Kothari and I .J. Nagrath, "Electrical Machines", Tata McGraw Hill Publishing Company Ltd, 2002.

REFERENCES

1. Fitzgerald A. E., Kingsly C, and Umans S. D, "Electrical Machinery", McGraw Hill, Singapore, 1990.
2. Cotton H, "Advanced Electrical Technology", Sir Isaac Pitman and Sons Ltd., London, 1971.
3. Theraja, B. L, "A Text Book of Electrical Technology", Vol. II, S. Chand and Co., New Delhi, 1997.
4. Smarajit Ghosh, "Electrical Machines", Pearson Education, South Asia, 2007.

EC4152 – ELECTROMAGNETIC FIELDS AND WAVES

L	T	P
3	0	0

UNIT I **STATIC ELECTRIC FIELD** **9**

Co-ordinate Systems – Gradient – Divergence – Curl – Divergence Theorem – Stokes Theorem – Coulombs Law – Electric Field Intensity – Principle of Superposition – Electric Scalar Potential – Electric Flux Density – Gauss's Law and its Application – Field Computation Methods.

UNIT II **STATIC MAGNETIC FIELD** **9**

Magnetic Field of a Current Carrying Element – Amperes Law – The Biot Savart Law – Magnetic Flux Density and Field Intensity – Gauss Law for Magnetic Fields – Torque on a Loop – Magnetic Moment – Magneto Motive Force – Permeability – Vector Potential – Field Computation.

UNIT III **FIELDS IN DIELECTRIC AND MAGNETIC MATERIALS** **9**

Permittivity – Polarization – Boundary Relation – Capacitance – Dielectric Strength – Energy and Energy Density – Poisson and Laplace Equation and Their Application – Inductance – Energy in an Inductor and Energy Density – Boundary Relation – Hysterisis – Reluctance and Permeance.

UNIT IV **TIME VARYING ELECTRIC AND MAGNETIC FIELDS** **9**

Faradays Law – Transformer and Mutual Induction – Maxwell's Equation – Self and Mutual Inductance – Displacement Current – Amperes Law and its Inconsistency for Time Varying Field – Boundary Relation – Poynting Vector – Comparison of Field and Circuit Theory.

UNIT V **PLANE EM WAVE IN ISOTROPIC MEDIA** **9**

Wave Equation from Maxwell's Equation – Uniform Plane Waves in Perfect Dielectric and Conductors – Polarization – Reflection and Refraction of Plane Waves at Different Boundaries – Surface Impedance.

Total: 45

TEXT BOOKS

1. Hayt. W. H, "Engineering Electromagnetics", McGraw Hill, 1995.
2. David. K. Cheng, "Field and Wave Electromagnetics", Second Edition, Pearson, 2004.

REFERENCES

1. Edward C. Jordon and Keith G. Balmain, "Electromagnetic Waves and Radiating Systems", Second Edition, Prentice Hall of India, 2004.
2. Kraus and Fleisch, "Electromagnetics with Applications", McGraw Hill, 1999.
3. Guru and Hiziroglu, "Electromagnetic Field Theory Fundamentals", Brooks/Cole Thomson Learning, 2007.
4. David. J. Griffiths, "Introduction to Electrodynamics", Third Edition, Pearson, 2003.

SEMESTER III

EC4201 – SIGNALS AND SYSTEMS

L	T	P
3	0	0

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Continuous Time Signals (CT Signals) – Discrete Time Signals (DT Signals) – Step Ramp – Pulse – Impulse – Exponential – Classification of CT and DT Signals – Periodic and Aperiodic Signals – Random Signals – Energy & Power Signals – CT System and DT Systems – Classification of Systems.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS 9

Fourier Series Analysis – Spectrum of Continuous Time (CT) Signals – Fourier and Laplace Transforms in Signal Analysis.

UNIT III LINEAR TIME INVARIANT – CONTINUOUS TIME SYSTEMS 9

Differential Equation – Block Diagram Representation – Impulse Response, Convolution Integrals – Fourier and Laplace Transforms in Analysis – State Variable Equations and Matrix Representation of Systems.

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS 9

DTFT and Properties – Z Transform & Properties – Base Band Sampling of CT Signals – Aliasing.

UNIT V LINEAR TIME INVARIANT – DISCRETE TIME SYSTEMS 9

Difference Equations – Block Diagram Representation – Impulse Response – Convolution Sum – Fourier and Z Transform Analysis of Recursive & Non – Recursive Systems – State Variable Equations and Matrix Representation of Systems

Total: 45

TEXT BOOKS

1. Allan V. Oppenheim, S. Wilsky and S. H. Nawab, "Signals and Systems", Pearson Education, 2000.
2. Simon Haykins and Barry Van Veen, "Signals & Systems", John Wiley & Sons, Inc, 1999.

REFERENCES

1. M .J. Roberts, "Signals and Systems, Analysis Using Transform Methods and MATLAB", Tata McGraw Hill (India), 2003.
2. Robert A. Gabel and Richard A. Roberts, "Signals and Linear Systems", Third Edition, John Wiley, 1987.
3. Douglas K. Linder, "Signals and Systems", McGraw Hill International, 1999.
4. R. E. Zeimer, W. H. Tranter and R. D. Fannin, "Signals and Systems – Continuous and Discrete", Pearson, 2001.

EC4202 – ELECTRONIC CIRCUITS II

L	T	P
3	0	0

UNIT I FEEDBACK AMPLIFIERS AND STABILITY 9

Basic Feedback Concepts – Properties of Negative Feedback – Four Feedback Topologies With Amplifier Circuit – Examples – Analysis of Series – Shunt Feedback Amplifiers – Stability Problem – Frequency Compensation.

UNIT II OSCILLATORS 9

Barkhausen Criteria for Oscillations – Analysis of RC Oscillators – Phase Shift and Wein Bridge Oscillators – LC Oscillators – Colpitt's – Hartley – Clapp – Crystal – Ring Oscillators.

UNIT III TUNED AMPLIFIERS 9

Basic Principles – Inductor Losses – Use of Transformers – Amplifier with Multiple Tuned Circuits – Cascade – Synchronous Tuning – Stagger Tuning – Stability of Tuned Amplifiers using Neutralization Techniques.

UNIT IV SIGNAL GENERATOR AND WAVE SHAPING CIRCUITS 9

Switching Characteristics of Transistors – Bistable Multivibrators – Transfer Characteristics and Application of Bistable and Astable Multivibrator – Square and Triangular Wave Generation – Monostable Multivibrator – Pulse Generation – Wave Shaping Networks – RC, RL.

UNIT V POWER DEVICES 9

Power Transistors – Steady State and Switching Characteristics Power MOSFET – Steady State and Switching Characteristics of IGBT – A.C Voltage Control and Phase Control Rectifiers using Thyristors and TRIAC – DC/DC Converters – Buck – Boost and Buck – Boost.

Total: 45

TEXT BOOK

1. Adel .S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits", Fourth Edition, Oxford University Press, 1998.

REFERENCES

1. Richard .C. Jaeger. Travis and N. Blalock, "Micro Electronic Circuit Design", Second Edition, Tata McGraw Hill, 2003.
2. Denal. A. Neamen, "Electronic Circuit Analysis and Design", Second Edition, Tata McGraw Hill, 2002.
3. David. A. Bell, "Solid State Pulse Circuits", Prentice Hall of India, 1992.
4. Muhammed H. Rashid, "Power Electronics", Pearson Education / Prentice Hall of India, 2004.

EC4203 – LINEAR INTEGRATED CIRCUITS

L T P
3 0 0

UNIT I OPERATIONAL AMPLIFIER 9

Integrated Circuits – Types – Development of ICs – Basic Information of OP-AMP – Internal Circuit – DC Characteristics – Input Offset Voltage – Input Bias Current – Input Offset Current – Thermal Drift – AC Characteristics – Frequency Response – Stability – Frequency Compensation Methods – Slew Rate.

UNIT II OP -AMP APPLICATIONS 9

Summer – Subtractor – Adder and Subtractor – Instrumentation Amplifier – AC Amplifier – DC Amplifier – V to I and I to V Converters – OP-AMP Circuits Using Diodes – Sample and Hold Circuits – Log and Antilog Amplifiers – Multipliers and Dividers – Differentiator and Integrator – Monolithic Power Amplifiers.

UNIT III COMPARATORS AND VOLTAGE REGULATORS 9

Comparator – Regenerative Comparator – Square Wave Generator – Regulators – Series OP – AMP Regulator – IC Voltage Regulators – 723 General Purpose Regulator – Switching Regulator.

UNIT IV 555 TIMER AND PLL 9

555 Timer – Functional Diagram – Multivibrators using Transistor and 555 – Schmitt Trigger using Transistor and 555 – PLL – Principle of PLL – Phase Detector – VCO – Monolithic PLL – PLL Applications.

UNIT V BASIC ACTIVE FILTER DESIGN – OP-AMP, ADC/DAC TECHNIQUES 9

First Order LPF and HPF – Butterworth Filters – Chebyshev Filters – ADC/DAC Specifications – A/D Converter – Flash – Single Slope – Dual Slope – Successive Approximation – Voltage to Frequency and Frequency to Voltage Converters – Switched Capacitors Filter.

Total: 45

TEXT BOOKS

1. D. Roy Choudhury and Shail Jain, "Linear Integrated Circuits", New Age International(P) Ltd., 2006.
2. Ramakant and A. Gayakwad, "OP-Amps and Linear Circuits", Prentice Hall of India 1997.

REFERENCES

1. Y. N. Bapat, "Electronic Circuits and Systems – Analog and Digital", Tata McGraw Hill, 1992.
2. Robert F. Goughlin and Frederick F. Dniscoll, "Operational Amplifiers Linear Integrated Circuits", PHI, 1996.

EC4204 – TRANSMISSION LINES AND WAVE GUIDES

L	T	P
3	0	0

UNIT I TRANSMISSION LINE THEORY & PARAMETERS 8

Different Types of Transmission Lines – Transmission Line Equation – Solution – Infinite Line Concept – Distortion Less Line – Loading – Input Impedance – Losses in Transmission Lines – Reflection Loss – Insertion Loss – Return Loss – Transmission Line Parameters at Radio Frequencies.

UNIT II IMPEDENCE MATCHING AND TRANSFORMATION 9

Reflection Phenomena – Standing Waves – $\lambda/8$ – $\lambda/4$ – $\lambda/2$ Lines – $\lambda/4$ Impedance Transformers – Stub Matching – Single and Double Stub – Smith Chart and Applications.

UNIT III NETWORK COMPONENTS 9

Filter Fundamentals – Constant K – LPF and HPF Filter Design – Fundamentals of Attenuators and Equalizers – Lattice Type – Concept of Inverse Networks – Transients in Transmission Lines.

UNIT IV RECTANGULAR WAVE GUIDES 10

Waves Between Parallel Planes – Characteristic of TE and TM and TEM Waves – Velocities of Propagation – Solution of Wave Equation in Rectangular Guides – TE and TM Modes – Dominant Modes – Attenuation – Mode Excitations – Rectangular Cavity Resonator and Q For Dominant Mode – Problems.

UNIT V CYLINDRICAL WAVE GUIDES 9

Solution of Wave Equation in Circular Guides – TE and TM and TEM Wave in Circular Guides – Wave Impedance – Attenuation – Mode Excitation – Formation of Cylindrical Cavity – Application – Problems.

Total: 45

TEXT BOOKS

1. David K. Cheng, "Field and Wave Electromagnetics", Addison Wesley, New Delhi, 1999.
2. John D Ryder, "Networks Lines and Fields", Prentice Hall of India, 2000.

REFERENCES

1. Guru and Hiziroglu, "Electromagnetic Field Theory Fundamentals", Brooks/Cole Thomson learning, 2000.
2. Annapuraa Das, Sisir K Das, "Microwave Engineering", McGraw Hill, 2004.
3. S. Baskaran and S. Mary Joans, "Transmission Lines and Network", Scitech Publications (India) Pvt.Ltd., 2003.
4. W. L. Everitt and G. Anner, "Communication Systems", McGraw Hill, 1956.
5. James L. Potter and Sylan J. Fich, "Theory of Networks and Lines", Prentice Hall of India, 1965.

EE4204 – CONTROL SYSTEMS

L	T	P
3	0	0

UNIT I CONTROL SYSTEM MODELING 9

Basic Elements of Control System – Open Loop and Closed Loop Systems – Differential Equation – Transfer Function, Modeling of Electric Systems – Translational and Rotational Mechanical Systems – Block Diagram Reduction Techniques – Signal Flow Graph.

UNIT II TIME RESPONSE ANALYSIS 9

Time Response Analysis – First Order Systems – Impulse and Step Response Analysis of Second Order Systems – Steady State Errors – P – PI – PD and PID Compensation.

UNIT III FREQUENCY RESPONSE ANALYSIS 9

Frequency Response – Bode Plot – Polar Plot – Nyquist Plot – Frequency Domain Specifications From the Plots – Constant M and N Circles – Nichol's Chart – Use of Nichol's Chart in Control System Analysis – Series – Parallel – Series – Parallel Compensators – Lead – Lag – and Lead Lag Compensators.

UNIT IV STABILITY ANALYSIS 9

Stability – Routh-Hurwitz Criterion – Root Locus Technique – Construction of Root Locus Plots – Stability – Dominant Poles – Application of Root Locus Diagram – Nyquist Stability Criterion – Relative Stability.

UNIT V STATE VARIABLE ANALYSIS 9

State Space Representation of Continuous Time Systems – State Equations – Transfer Function From State Variable Representation – Solutions of the State Equations – Concepts of Controllability and Observability – State Space Representation for Discrete Time Systems – Sampled Data Control Systems – Sampling Theorem – Sampler and Hold – Open Loop and Closed Loop Sampled Data Systems.

Total: 45

TEXT BOOK

1. I J. Nagrath and M. Gopal, "Control System Engineering", Wiley Eastern, 1992.

REFERENCES

1. M. Gopal, "Control System Analysis and Design", Tata McGraw Hill, 2003.
2. Benjamin.C. Kuo, "Automatic Control System", Prentice Hall of India, 1995.
3. Richard C. Dorf and Robert H. Bishop, "Modern Control Systems", Addison Wesley, 1999.
4. John J. Diazo and Constantine H. Houppis, "Linear Control System Analysis and Design", Tata McGraw Hill, 1995.

SEMESTER IV

EC4251 – COMMUNICATION THEORY AND SYSTEMS

L	T	P
3	0	0

UNIT I AMPLITUDE MODULATION 9

Generation and Detection of AM Wave – Spectra – DSBSC – Hilbert Transform – Pre-Envelope and Complex Envelope – SSB and VSB Signals – Comparison – FDM Principles – Superheterodyne Receiver.

UNIT II ANGLE MODULATION 9

Phase and Frequency Modulation – Narrow Band and Wide Band FM – Spectrum – FM Modulation and Demodulation – PLL as FM Demodulator – Transmission Bandwidth.

UNIT III PERFORMANCE OF AM AND FM 9

Review of Random Process – Noise – White and Narrow Band Noise – Noise Figure – Noise Temperature and Equivalent Noise Bandwidth – Noise Performance of AM and FM – FM Threshold Effect – Pre-Emphasis and De-Emphasis in FM.

UNIT IV SAMPLING AND QUANTIZATION 9

Review of Lowpass Sampling – Band Pass and Quadrature Sampling – Quantization – Uniform and Non-Uniform Quantization – Quantization Noise – Logarithmic Companding of Speech Signal – Vector Quantization – Analog Pulse Modulation.

UNIT V SOURCE CODING TECHNIQUES 9

PCM – Time Multiplexing – Prediction Filtering and DPCM – Delta Modulation – ADPCM and ADM.

Principles – LPC and Subband Coding of Speech Signal – Transform Coding.

Total: 45

TEXT BOOKS

1. Lathi B. P, "Modern Digital and Analog Communication Systems", Oxford University Press, 1998.
2. Carlson A. B, "Communication System", McGraw Hill International Edition, New York, 1986.
3. Haykin S, "Communication Systems", John Wiley, 2001.

REFERENCES

1. Couch L, "Modern communication system", Pearson, 2001.
2. Sklar B, "Digital Communication Fundamentals and Applications", Pearson, 2001.
3. Rao K. R., and Hwang, J. J, "Techniques and Standards for Image and Video Coding", Prentice Hall, 1996.
4. Jayant N. S., and Noll P, "Digital Coding of Waveforms - Principles and Applications to Speech and Video", Prentice Hall, 1984.

EC4252 – MICROPROCESSOR AND ITS APPLICATIONS

L	T	P
3	0	0

UNIT I 8/16 BIT MICROPROCESSOR 9

8085 Architecture – Memory and I / O Interfacing – Instruction Set – Addressing Modes – Interrupts – Timing Diagram – 8086 Architecture – Instruction Set – Addressing Modes.

UNIT II PROGRAMMING AND APPLICATIONS OF 8086 PROCESSORS 9

8086 Minimum and Maximum Mode Configurations – Assembly Language Programming Interrupts – Memory and I / O Interfacing – Interrupts – 80186.

UNIT III MICROCONTROLLER 9

Intel 8031/8051 Architecture – Special Function Registers (SFR) – I / O Pins – Ports and Circuits – Instruction Set – Addressing Modes – Assembly Language Programming – Timer and Counter Programming – Serial Communication – Connection to RS 232 – Interrupts Programming – External Memory Interfacing – Introduction to 16 Bit Microcontroller.

UNIT IV PERIPHERALS AND INTERFACING 9

Serial and Parallel I / O (8251 and 8255) – Programmable DMA Controller (8257) – Programmable Interrupt Controller (8259) – Keyboard Display Controller (8279) – ADC/DAC Interfacing – Inter Integrated Circuits Interfacing (I²C Standard).

UNIT V MICROPROCESSOR BASED SYSTEMS DESIGN AND DIGITAL INTERFACING 9

Interfacing to Alpha Numeric Displays – Interfacing to Liquid Crystal Display (LCD 16 * 2 Line) – High Power Devices and Optical Motor Shaft Encoders – Stepper Motor Interfacing – Analog Interfacing and Industrial Control – Microcomputer Based Smart Scale – Industrial Process Control System.

Total: 45

TEXT BOOKS

1. Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Application with 8085", Fourth Edition, Penram International Publishing, 2000.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi, "The 8051 Microcontroller, and Embedded Systems", Prentice Hall, 2000.
3. Douglas V. Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second Edition, 1999.

REFERENCES

1. Kenneth J. Ayala., "The 8051 Microcontroller Architecture Programming and Applications", Penram International Publishing (India), 1996.
2. Kenneth J. Ayala., "The 8086 Microprocessor, Programming and Interfacing the PC", Penram International Publishing, 1995.
3. Barry.B. Brey., "The Intel Microprocessor 8086/8088, 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing", Prentice Hall of India Pvt. Ltd, 1995.
4. Ray A. K. Bhurchandi K. M, "Advanced Microprocessor and Peripherals", Tata McGraw Hill, 2002.

EC4253 – DIGITAL SIGNAL PROCESSING

L	T	P
3	0	0

UNIT I DISCRETE TIME SIGNALS AND SYSTEMS 9

Review of Discrete – Time Signals and Systems – Overlap – Add and Overlap Save Methods – DFT and its Properties – FFT Algorithms and its Application to Convolution.

UNIT II DESIGN OF INFINITE IMPULSE RESPONSE FILTERS 9

Calculation of IIR Coefficients using Pole-Zero Placement Method – Analog Filters – Butter Worth and Chebyshev Type I – Analog Transformation of Prototype LPF to BPF / BSF / HPF – Transformation of Analog Filters into Equivalent Digital Filters using Impulse Invariant Method and Bilinear Z Transform Method – Realization Structures for IIR Filters – Direct – Cascade – Parallel and Lattice Forms.

UNIT III DESIGN OF FINITE IMPULSE RESPONSE FILTERS 9

Linear Phase Response of FIR – FIR Design using Window Method Frequency Sampling Method – Design of Optimal Linear Phase FIR Filters – Realization Structures for FIR Filters – Transversal and Linear Phase Lattice Structure – Comparison of FIR and IIR.

UNIT IV QUANTIZATION EFFECTS AND DSP ARCHITECTURE 9

Representation of Numbers – ADC Quantization Noise – Coefficient Quantization Error – Product Quantization Error – Truncation and Rounding off – Limit Cycle due to Product Roundoff Error – Round off Noise Power – Limit Cycle Oscillation due to Overflow in Digital Filters – Principle of Scaling – General and Special Purpose Hardware for DSP – Harvard Architecture – Pipelining – Special Instruction – Replication.

UNIT V MULTIRATE SIGNAL PROCESSING 9

Multirate Signal Processing – Decimation – Interpolation – Polyphase Decomposition of FIR Filter – Multistage Implementation of Sampling Rate Conversion – Applications of Multirate Signal Processing.

Total: 45

TEXT BOOKS

1. A. V. Oppenheim, R. W. Schaffer and J. R. Buck, "Discrete – Time Signal Processing", Eighth Indian Reprint, Pearson, 2004.
2. S. K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata McGraw Hill, 1998.
3. P. P. Vaidyanathan, "Multirate System and Filter Banks", Prentice Hall, Englewood Cliffs, NJ, 1993.

REFERENCES

1. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing, Algorithms and Applications", Pearson, 2003.
2. I. C. Ifeachor and B. W. Jervis, "Digital Signal Processing – A Practical Approach", Pearson, 2002.
3. D. J. De Fatta, J. G. Lucas and W. S. Hodgkiss, "Digital Signal Processing – A System Design Approach", John Wiley and Sons, Singapore, 1988.

EC4254 – COMPUTER NETWORKS

L T P
3 0 0

UNIT I NETWORK FUNDAMENTALS 10

Networks – Definition of Layers – Services – Interfaces and Protocols Communication Themes – Switching Technique, OSI Reference Model – Layers and Duties, TCP/IP Reference Model – Layers and Duties – Layers and Sub – Layers – ATM Reference Model – Layers and Duties – Comparison of Models.

UNIT II DATA LINK LAYER PROTOCOLS 10

Physical Layer – General Description – Characteristics – Signaling Limits – Media Types and Comparison – Topologies – Examples of Physical Layer (RS232-C, ISDN, ATM, Wireless, SONET) – Data Link Layer – MAC Layer – Sliding Window Protocols – ALOHA Protocols – LAN Protocols and Standards ETHERNET – 802.3 – TOKEN BUS, TOKEN RING.

UNIT III NETWORK INTERCONNECTION 5

Internetworking – Interconnection Issues – Bridges – Transparent and Source Routing Bridges – Routers – Flow and Congestion Control Algorithms – Gateways.

UNIT IV MESSAGE ROUTING TECHNOLOGIES 10

Circuit Switching – Packet Switching – Network Layer Protocols – Internet Protocol – IPV4 – IPV6 – ARP – RARP – ICMP – VPN.

UNIT V END-TO-END PROTOCOLS 10

UDP – TCP – SNMP – DNS – TELNET – FTP – NFS – RPC – HTTP – WWW – Networking Security.

Total: 45

TEXT BOOK

1. Stallings W., "Data and Computer Communications", Fourth Edition, Prentice Hall of India, 1996.

REFERENCES

1. Forouzan B., "Introduction to Data Communication and Networking", McGraw Hill, 1998.
2. Keshav. S., "An Engineering Approach to Computer Networking", Addison - Wesley, 1999.
3. Tanenbaum A. S., "Computer Networks", Third Edition, Prentice Hall of India, 1996.
4. Kelsner, "Local Area Network", Tata McGraw Hill, 1997.
5. Stevens R. W., "TCP/IP Illustrated Volume I The Protocols", Addison – Wesley, 1999.
6. Come D. E., "Internetworking with TCP/IP Volume I", Prentice Hall of India, 1999.

EC4255 – MICROPROCESSOR AND CONTROL SYSTEM LABORATORY

L	T	P
0	0	3

1. Programming using 8086
2. Programming using Micro Controller.
3. PC Based Control Systems.
4. Stepper Motor Control.
5. PC Interfacing.
6. LVDT Position Control.
7. AC And DC Motor Speed Motor Control.

SEMESTER V

EC4301 – DIGITAL COMMUNICATION

L	T	P
3	0	0

UNIT I **BASEBAND SIGNALING** **10**

Baseband Data Formats and Their Properties – Matched Filter – ISI – Nyquist's Criterion for Distortionless Transmission – Correlative Coding – M-ary Schemes – Eye Pattern – Equalization – Adaptive Equalization – Bit Synchronization.

UNIT II **BANDPASS SIGNALING** **10**

Geometric Representation of Signals – Generation, Detection, PSD & BER of Coherent BPSK, BFSK and QPSK – Principles of CPFSK (MSK and GMSK) and QAM Carrier Synchronization – Structure of Non-Coherent Receivers – Principle of DPSK.

UNIT III **INFORMATION THEORY** **10**

Entropy – Discrete Memoryless Channels – Mutual Information Channel Capacity Channel Transition Matrices – Channel Capacity Continuous Channels – Hartley – Shannon Law – Source Coding Theorem – Huffman and Shannon – Fano Codes.

UNIT IV **ERROR CONTROL CODING** **11**

Channel Coding Theorem – Linear Block Codes – Hamming Codes – Cyclic Codes Convolution Codes – Viterbi Decoder – Trellis Coded Modulation.

UNIT V **SPREAD SPECTRUM TECHNIQUES** **4**

Spread Spectrum Codes – PN Sequence – Autocorrelation and Cross Correlation Properties – M-Sequences – Direct Sequence Spread Spectrum – Code Synchronization Processing Gain – Jamming Resistance – CDMA – Frequency Hop Spread Spectrum.

Total : 45

TEXT BOOK

1. Haykin S., "Communication Systems", Fourth Edition, John Wiley, 2001.

REFERENCES

1. Couch L., "Modern Communication System", Pearson, 2001.
2. Lathi B. P., "Modern Digital and Analog Communication Systems", Oxford University Press, 1998.
3. Sklar B., "Digital Communication Fundamentals and Applications", Pearson, 2001.
4. Ziemer R. E., & Peterson R. L., "Introduction to Digital Communication", Prentice Hall, Inc. NJ, 2001.
5. S. Lin and D. L Costello, Jr., "Error Control Coding - Fundamentals and Applications", Prentice Hall: Englewood Cliffs, NI, 1983.
6. Proakis J. G, "Digital Communication", McGraw Hill, 2000.

CS4306 – OPERATING SYSTEM

L	T	P
3	0	0

UNIT I	OPERATING SYSTEM OVERVIEW	5
Multiprogramming – Time Sharing – Multi-User Operating Systems – System Call – Structure of Operating Systems.		
UNIT II	PROCESS MANAGEMENT	10
Concept of Processes – Interprocess Communication – Racing Synchronization – Mutual Exclusion – Scheduling – Implementation Issues – IPC in Multiprocessor System.		
UNIT III	MEMORY MANAGEMENT	10
Partition – Paging – Segmentation – Virtual Memory Concepts – Relocation Algorithms – Buddy Systems Free Space Management – Case Study.		
UNIT IV	DEVICE MANAGEMENT AND FILE	10
Deadlock and Starvation – Various I/O Devices – Spooling – File System Design – Directory Management.		
UNIT V	MODERN OPERATING SYSTEMS	10
Concepts of Distributed Operating Systems – Real Time Operating Systems – Case Studies – UNIX , LINUX, Windows2000.		
		Total: 45

TEXT BOOKS

1. Abraham Silberchatz and Peter Galvin, “Operating System Concepts”, Sixth Edition, John Wiley, 2002.
2. Andrew Tanenbaum, “Modern Operating Systems”, Second Edition, Prentice Hall, 2003.

REFERENCES

1. Stallings W., “Operating Systems”, Fifth Edition, Prentice Hall, 2004 .
2. Ellen Siever, Aaron Weber, Stephen Figgins, “Linux in Nutshell”, Fourth Edition, O' Reilly, 2004.

EC4302 – RF AND MICROWAVE ENGINEERING

L	T	P
3	0	0

UNIT I RF AND MW TRANSMISSION LINES AND CIRCUIT THEORY 8

Characteristics of Coaxial, Strip and Microstrip Lines – Lumped Elements R, L, C High Frequency Equivalent and Simulation – S-Matrix Formulation of Multiport Network Properties of S-Matrix – RF/MW Applications – Radar, Communication, Domestic/ Industrial and Medical – Numerical Examples.

UNIT II PASSIVE DEVICES AND CIRCUITS 10

Open, Short and Matched Terminations – Coupling Probes and Loops – Power Divider; Directional Coupler – Attenuators – Phase Shifter – Circulator – Isolator – Impedance Matching Turning Screw, Stub and Quarter-Wave Transformers – Filter – Theory and Design.

UNIT III SOLID STATE DEVICES AND CIRCUITS 10

Crystal Diodes and Schottkey Diode Detector and Mixers – PIN Diode Switch, Phase Shifter and Attenuators – Gunn Diode Oscillator – IMP ATT Diode Oscillator and Amplifier – Varactor Diode and Parametric Amplification – Transistors Amplifier and Oscillator – Theory and Design.

UNIT IV VACUUM TUBES AND CIRCUITS 8

RF Effects in Tubes – Two Cavity Klystron Amplifier; Reflex Klystron Oscillator – TWT Amplifier – Magnetron Oscillator – Theory and Applications.

UNIT V MEASUREMENTS 9

Measuring Instruments – VSWR Meter – Power Meter – Spectrum Analyzer – Network Analyzer – Principles – Measurement of Impedance, Frequency, Power, VSWR, Q Factor, Dielectric Constant and S Parameter.

Total : 45

TEXT BOOKS

1. Annapurna Das and Sisir K Das, "Microwave Engineering", Tata McGraw Hill Inc., 2004
2. M. M. Radmanesh, "RF and Microwave Electronics", Pearson Education, Inc., 2001.

REFERENCES

1. S. Y. Liao, "Microwave Devices and Circuits", Pearson Education Limited, 2003.
2. Robert E. Colin, "Foundations for Microwave Engineering", McGraw Hill, 1992.
3. D. M. Pozar, "Microwave Engineering", John Wiley and Sons, Inc., 1999.
4. Reich J. H , "Microwaves", East West Press, 1978.
5. K. C. Gupta, "Microwaves", Wiley Eastern Ltd., 1995.

EC4303 – WIRELESS NETWORKS

L T P
3 0 0

UNIT I WIRELESS ACCESS 9

Medium Access Alternatives – Fixed-Assignment for Voice Oriented Networks – Random Access for Data Oriented Networks – Integration of Voice and Data Traffic.

UNIT II WIRELESS NETWORK FUNDAMENTALS 9

Principles of Wireless Network Operation – Wireless Network Topologies Cellular Topology – Cell Fundamentals – Signal to Interference Ratio Calculation – Capacity Expansion Techniques – Network Planning for CDMA Systems – Mobility Management Radio Resources and Power Management – Security in Wireless Networks.

UNIT III WIRELESS WANS 9

Communication in the Infrastructures – Reference Architecture for North American Systems – GSM – CDMA – IMT 2000 – The Data Oriented CDPD Network GPRS and High Data Rates – Short Messaging Service in GSM – Mobile Application Protocols.

UNIT IV WLANs AND HIPERLANs 9

Wireless LANs – IEEE 802.11 WLANs – Physical Layer – MAC Sublayer – MAC Management Sublayer – Wireless ATM – HIPERLAN – HIPERLAN-2.

UNIT V ADHOC NETWORKING 9

IEEE 802.15 WPAN – Home RF Bluetooth – Wireless Geolocation System Architecture – Technologies for Wireless Geolocation Standards – Performance Measures for Geolocation Systems.

Total : 45

TEXTBOOK

1. Kaveth Pahlavan, K. Prashanth Krishnamoorthy, “Principles of Wireless Networks”, Pearson Education Asia, 2002.

REFERENCES

1. Leon Garcia, Widjaja, "Communication Networks", Tata McGraw Hill, New Delhi, 2000.
2. William Stallings, “Wireless Communications and Networks”, Prentice Hall, 2002.

EC4304 – COMMUNICATION SYSTEM AND NETWORK LABORATORY

L	T	P
0	0	3

1. Signal Sampling, Reconstruction and Time Division Multiplexing.
2. AM / FM Modulator and Demodulator.
3. Pulse Code Modulation and Demodulation.
4. Delta Modulation and Demodulation.
5. FSK, PSK and DPSK Schemes (Simulation) .
6. Analysis of Logical Link Control Layer Protocols – Stop & Wait, Sliding Window.
7. Analysis of MAC Protocols – ALOHA, SLOTTED ALOHA, CSMA, CSMA/CD, TOKEN BUS, TOKEN RING.
8. Client / Server Communication using TCP / UDP Socket Programming.
9. Data Packet Scheduling, Congestion Control, Transmission Flow Control Algorithms.

EC4352 – OPTICAL COMMUNICATION AND NETWORKING

L	T	P
3	0	0

UNIT I OPTICAL FIBERS 9

Overview – Light Propagation in Optical Fibers, Ray and Mode Theory of Light, Optical Fiber Structure and Characteristics – Fiber Materials – Fiber Fabrication Techniques – Optical Signal Attenuation Mechanisms – Merits and Demerits of Guided and Unguided Optical Signal Transmissions.

UNIT II TRANSMISSION CHARACTERISTICS 9

Optical Signal Distortion – Group Delay – Material Dispersion – Waveguide Dispersion – Polarization Mode Dispersion – Intermodal Dispersion – Profile Dispersion – Fiber Types – Standard Singlemode Fibers – Dispersion Shifted Fibers – Dispersion Flattened Fibers – Non-Zero Dispersion Fibers – Polarization Maintaining Fibers – Dispersion Compensation Techniques – Nonlinear Effects in Optical Fibers.

UNIT III OPTICAL TRANSMITTERS 9

Physics of Light Emission and Amplification in Semiconductors – Light-Emitting Diodes – Semiconductor Laser Diodes – Longitudinal Modes – Gain and Index-Guiding – Radiation Pattern – Light-Current Characteristic – Spectral Behaviour – Longitudinal Mode Control and Tunability – Noise - Direct and External Modulation – Laser Sources and Transmitters for Free Space Communication.

UNIT IV OPTICAL RECEIVERS 9

Principles of Optical Detection – Spectral Responsivity – PIN – APD – Preamplifier Types – Receiver Noises – Signal to Noise Ratio (SNR) and Bit Error Rate (BER) – Direct and Coherent Detection Principles – Practical Constraints in Coherent Detection – Power and Noise Budget – Jitter and Rise-Time Budget.

UNIT V OPTICAL NETWORKING PRINCIPLES AND COMPONENTS 9

WDM Optical Networks – SONET / SDH / FDDI Optical Networks – Layered Optical Network Architecture – Optical Couplers – Filters – Isolators – Switches – Optical Amplifiers – Erbium Doped Fiber Amplifiers – Semiconductor Optical Amplifiers.

Total:45

TEXT BOOKS

1. Gerd Kaiser, "Optical Fiber Communication", Third Edition, McGraw Hill Publisher, NewYork, 2000.
2. Govind P. Agrawal, "Fiber–Optic Communication Systems", Second Edition Wiley and Sons, NewYork, 1997.

REFERENCES

1. John M. Senior, "Optical Fiber Communications Principles and Practice", Second Edition, Prentice Hall of India Pvt. Ltd, NewDelhi, 2003.
2. Rajiv Ramasamy and Kumar N. Sivarajan, "Optical Networks – A Practical Perspective", Harcourt Asia Private Limited, Singapore, 1998.

EC4354 – VLSI DESIGN LABORATORY

L	T	P
0	0	3

VLSI BASED EXPERIMENTS USING MAGMA/CADENCE /TANNER /XILINX

1. Design Entry using VHDL or Verilog, Examples for Circuit Descriptions using HDL Languages Sequential and Concurrent Statements.
2. Structural and Behavioral Descriptions, Principles of Operation and Limitations of HDL Simulators. Examples of Sequential and Combinational Logic Design and Simulation. Test Vector Generation.
3. Synthesis Principles Logical Effort, Standard Cell Based Design and Synthesis, Interpretation Synthesis Scripts, Constraint Introduction and Library Preparation and Generation.
4. Interpretation of Standard Cell Library Descriptions, Boolean Optimization, Optimization for Area, Power.
5. Scan Chain Insertion, Floor Planning Routing and Placement Procedures and Alternatives. Back Annotation, Layout Generation, LVS, Formal Verification.
6. FPGA Architectures, Design Entry, Simulation, Synthesis, P and R, Back Annotation and Timing Verification, Board Level Testing of Examples, Designs using Logic Analyzers.
7. Complete ASIC Design Example Implementation.
8. SPICE Simulations for Small Size Standard Cells.

SEMESTER VII

MG4351 – TOTAL QUALITY MANAGEMENT

L	T	P
3	0	0

UNIT I OVERVIEW OF TQM 9

Definition of Quality – Dimensions of Quality – Quality planning – Quality costs – Analysis – Techniques for Quality Costs – Basic concepts of Total Quality Management – Historical Review – Principles of TQM – Leadership Concepts – Role of Senior Management – Quality Council – Quality Statements – Strategic planning – Deming Philosophy – Barriers to TQM Implementation.

UNIT II TQM PRINCIPLES 9

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality – Custom Retention, Employee Involvement – Motivation – Empowerment – Teams – Recognition and Reward – Performance Appraisal – Benefits – Continuous Process Improvement – Juran Trilogy – PDCA Cycle – 5S – Kaizen – Supplier Partnership – Partnering – Sourcing – Supplier Selection – Supplier Rating – Relationship Development – Performance Measures – Basic Concepts – Strategy – Performance Measure.

UNIT III STATISTICAL PROCESS CONTROL (SPC) 9

The seven tools of quality – Statistical Fundamentals – Measures of central Tendency and dispersion – Population and Sample – Normal Curve – Control charts for variables and attributes – Process capability – Concept of six sigma – New seven Management tools.

UNIT IV TQM TOOLS 9

Benchmarking – Reasons to Benchmark – Benchmarking Process – Quality Function Deployment (QFD) – House of Quality – QFD Process – Benefits – Taguchi Quality Loss Function – Total Productive Maintenance (TPM) – Concept – Improvement Needs – FMEA – Stages of FMEA.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000 and Other Quality Systems – ISO 9000:2000 Quality System – Elements – Implementation of Quality System – Documentation – Quality Auditing – QS 9000 – ISO 14000 – Concept – Requirements and Benefits.

Total: 45

TEXT BOOKS

1. Dale H. Besterfield , "Total Quality Management", Pearson Education Asia, Indian reprint 2002.

REFERENCES

1. James R. Evans and William M. Lidsay, "The Management and Control of Quality", Fifth Edition, South-Western (Thomson Learning), 2002 (ISBN 0-32406680).
2. Feigenbaum A. V., "Total Quality Management", McGraw Hill , 1991.
3. Oakland J. S. "Total Quality Management", Butterworth-Heinemann Ltd., Oxford, 1989 .
4. Narayana V. and Sreenivasan N. S., "Quality Management – Concepts and Tasks", New Age International 1996.
5. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

LIST OF ELECTIVES

CS4021 – OBJECT ORIENTED PROGRAMMING

L	T	P
3	0	0

UNIT I FUNDAMENTALS 9

Object-Oriented Programming Concepts – Encapsulation – Constructors and Destructors – Programming Elements – Program Structure – Enumeration Types – Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference Assertions – Standard Template Library.

UNIT II IMPLEMENTING ADTs AND ENCAPSULATION 9

Aggregate Type Struct – Structure Pointer Operators – Unions – Bit Fields Data Handling and Member Functions – Classes – Static Member – This Pointer Reference Semantics – Implementation of Simple ADTs.

UNIT III POLYMORPHISM 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – Containers – List – List Iterators .

UNIT IV TEMPLATES 9

Template Class – Function Templates – Class Templates – Parameterizing STL – Algorithms – Function Adaptors.

UNIT V INHERITANCE 9

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

Total: 45

TEXT BOOK

1. Ira Pohl, "Object-Oriented Programming using C++", Second Edition, Pearson Education, 2003.

REFERENCES

1. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Third Edition, Pearson Education, 2004.
2. Kamthane, "Object Oriented Programming with ANSI and Turbo C++", Pearson Education, 2002.

CS4022 – ARTIFICIAL INTELLIGENCE

L T P
3 0 0

UNIT I PROBLEMS – PROBLEM SPACES AND PROBLEM SOLVING 9

State Space Search – Production Systems – Forward and Backward Reasoning Hill Climbing Technique – Breadth First Search – Best First Search – Problem Reduction – Means-Ends Analysis – Constraint Satisfaction.

UNIT II KNOWLEGDE REPRESENTATION 9

Predicate Logic – Resolution – Conversion to Clause Form – Unification Algorithm – Question Answering – Natural Deduction – Non-Monotonic Reasoning – Statistical and Probabilistic Reasoning – Semantic Nets – Conceptual Dependency Frames – Scripts – Procedural Representation – Forward Backward Chains.

UNIT III GAME PLAYING 9

Minimax Search Procedure – Alpha-Beta Cut Offs – Additional Refinement Waiting for Quiescence – Secondary Search – Using Books Moves – Limitations of the Methods – Specific Games like Chess etc.

UNIT IV ADVANCED PROBLEM SOLVING 9

Simple Planning – Non-Linear Planning – Hierarchical Planning – Backward Approach – Delta – Min Expert Systems – Structure of an Expert System – Interacting with an Expert System – TMS – MYCIN.

UNIT V APPLICATIONS AND LANGUAGES 9

Natural Languages Understanding – Language Generation – Machine Translation – Perception – Waltz Algorithm Learning – Rote Learning – Learning in GPS – Concept – Learning – Discovery as Learning – AI Languages – LISP – PROLOG.

Total: 45

TEXTBOOKS

1. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Second Edition, TMH, 1991.
2. N.J. Nilsson, “Principles of Artificial Intelligence”, Tioga, 1990.

REFERENCES

1. Charniak. E. Riesbeck. C. K. and Mcdermott, “Artificial Intelligence Programming”, Erlbaum Hillsdale, New Jersey, 1985.
2. Barr.A. and Feigenbaum. E.A, “The Handbook of Artificial Intelligence”, Kaufman, 1981.

CS4023 – NEURAL NETWORKS AND FUZZY SYSTEMS

L	T	P
3	0	0

UNIT I NEURAL NETWORKS 6

Biological Neural Networks – Artificial Neural Network – Typical Architectures – Types of Training – Common Activation Function – Different Types of Learning – Linear Separability – McCulloch Pitts.

UNIT II NEURAL NETWORK ARCHITECTURES I 12

Perceptrons – Adaline – Madaline – Associative Nets – Hop Field Nets – BAM.

UNIT III NEURAL NETWORK ARCHITECTURES II 12

Maxnet – Kohonen Self-Organizing Maps – LVQ – CPN – BPN – ART 1 – ART 2.

UNIT IV CLASSICAL AND FUZZY SETS 7

Classical Sets and Fuzzy Sets – Classical Relations and Fuzzy Relations – Membership Functions.

UNIT V FUZZY BASED APPLICATIONS 8

Fuzzy-To-Crisp Conversions – Classical Logic and Fuzzy Logic – Fuzzy Rule Based Systems – Fuzzy Decision Making – Fuzzy Pattern Recognition – Fuzzy Control Systems.

Total: 45

TEXTBOOK

1. Laurene Fausett, “Fundamentals of Neural Networks, Algorithms and Applications”, Prentice Hall, 1993.

REFERENCE

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill.

CS4024 – NEURAL NETWORK AND ITS APPLICATIONS

L	T	P
3	0	0

UNIT I ARTIFICIAL NEURAL NETWORKS 6

Neuro-Physiology General Processing Element – ADALINE – LMS Learning Rule – MADALINE – MR2 Training Algorithm.

UNIT II BPN AND BAM 12

Back Propagation Network – Updating of Output and Hidden Layer Weights Application of BPN – Associative Memory – Bi-directional Associative Memory Hopfield Memory – Traveling Sales Man Problem.

UNIT III SIMULATE ANNEALING AND CPN 12

Annealing – Boltzmann Machine – Learning – Application – Counter Propagation Network – Architecture – Training – Applications.

UNIT IV SOM AND ART 7

Self Organizing Map – Learning Algorithm – Feature Map Classifier – Applications Architecture of Adaptive Resonance Theory – Pattern Matching in ART Network.

UNIT V NEOCOGNITRON 8

Architecture of Neocognitron – Data Processing and Performance of Architecture of Spacio-Temporal Networks for Speech Recognition.

Total: 45

TEXTBOOK

1. J. A. Freeman and B. M. Skapura , "Neural Networks - Applications and Programming Techniques", Addison–Wesley, 2003.

REFERENCE

1. Laurene Fausett, "Fundamentals of Neural Networks – Architecture, Algorithms and Applications", Prentice Hall, 1994.

CS4025 – PARALLEL AND DISTRIBUTED PROCESSING

L	T	P
3	0	0

UNIT I PARALLEL ARCHITECTURE 9

Parallel Computer Models – Program and Network Properties – Principles of Scalable Performance.

UNIT II PROCESSORS AND MEMORY HIERARCHY, BUS 9

Advanced Processor Technology – Super Scalar and Vector Processor – Memory Hierarchy Technology – Virtual Memory Technology – Backplane Bus Systems.

UNIT III PIPELINING AND SUPER SCALAR TECHNIQUES 9

Linear Pipeline – Nonlinear Pipeline – Instruction Pipeline – Arithmetic Pipeline – Superscalar and Super Pipeline Design – Parallel and Scalable Architectures – Multiprocessor and Multicomputers.

UNIT IV SOFTWARE FOR PARALLEL PROGRAMMING 9

Parallel Programming Models – Languages – Compilers – Parallel Program Development and Environments.

UNIT V DISTRIBUTED SYSTEMS 9

Models – Hardware Concepts – Communication. Synchronization Mechanism – Case Study – MPI and PVM – Distributed File Systems

Total: 45

TEXTBOOKS

1. Hwang K., “Advanced Computer Architecture – Parallelism, Scalability, Parallelism, Scalability, Programmability”, Tata McGraw Hill, 1993.
2. Tanenbaum A. S., “Distributed Operating Systems”, Pearson Education Asia, 2002.

REFERENCES

1. V. Rajaraman and C. Siva Ram Murthy, “Parallel Computers Architecture and Programming”, PHI, 2000.
2. Hwang K, Briggs F. A., “Computer Architecture and Parallel Processing”, Tata McGraw Hill, 1989.
3. Quinn, M. J, “Designing Efficient Algorithms for Parallel Computers”, McGraw Hill, 1995.
4. Culler, D. E, “Parallel Computer Architecture, A Hardware-Software Approach”, Harcourt Asia Pvt. Ltd., 1999.

CS4026 – WEB TECHNOLOGY

L T P
3 0 0

UNIT I INTERNET PRINCIPLES 9

Internet Principles – Basic Web Concepts – Client Server Model – Retrieving Data from Internet – Protocols and Applications.

UNIT II FUNDAMENTALS OF JAVA 9

Statements – Expressions – Arrays – Classes – Objects – Packages – Inheritance – Interface – Multithreading – Applets – AWT – JDBC.

UNIT III SOCKET PROGRAMMING 9

Streaming – Networking Principles – Sockets – Protocol Handlers – Content Handlers – Multicasting – Remote Method Invocation – Activation – Serialization Marshal Streams.

UNIT IV MARKUP LANGUAGES AND SCRIPTING 9

HTML and Scripting Languages – SGML Dynamic Web Contents – Cascading Style Sheets – XML – DTD – Schemas – Document Object Model – SOAP.

UNIT V SERVER SIDE PROGRAMMING 9

Server Side Includes – Communication – TCP and UDP – CGI Concepts – Servlet Programming – Active Server Pages – Java Server Pages – Firewalls – Proxy Server, Online Applications.

Total: 45

TEXTBOOK

1. Deitel and Deitel, Nieto, Sadhu, “XML How to Program”, Pearson Education Publishers, 2001.

REFERENCES

1. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and Java", Prentice Hall of India QUE, 1999.
2. Jeffy Dwight, Michael Erwin and Robert Niles, "Using CGI", Prentice Hall of India, QUE, 1999.
3. Scot Johnson, Keith Ballinger, Davis Chapman, "Using Active Server Pages", Prentice Hall of India, 1999.
4. A.Keyton Weissinger, "ASP in a Nutshell", O'Reilly Publications, 1999.
5. Elliotte Rusty Harold, “Java Network Programming”, Second Edition, O'Reilly Publications, 2000.

EC4001 – ADVANCED MICROPROCESSORS

L	T	P
3	0	0

UNIT I THE INTEL X86 FAMILY 9

The Intel X86 Family Architecture – 32 Bit Processor Evaluation – System Connection and Tuning – Instruction and Data Formats – Instruction Wt of X86 Processor Addressing Modes.

UNIT II INTEL X86 ASSEMBLY LANGUAGE PROGRAMMING 9

Implementation of Strings – Procedures – Macros – BIOS and DOS Services using X86 Assembly Language Programming Memory and I/O Interfacing – Analog Interfacing and Industrial Control.

UNIT III SYSTEM DEVELOPMENT 9

Microprocessor Based System Design – TMS 320 Series DSP Based Signal Processing – Microcontroller 8096 – 8096 Based System Design.

UNIT IV THE MOTOROLA MC 68000 FAMILY 9

The MC 68000 Architecture – CPU Registers – Data Formats – Addressing Modes – Instruction Sets and Assembler Directives – Memory Management Instruction and Data – Cache – Exception Processing.

UNIT V RISC PROCESSORS 9

RISC vs CISC – RISC Properties and Evaluation Advanced RISC Microprocessors – DECALPHA – The Power PC Family – The SUN SPARC Family – The MIPS Rxoofamily.

Total: 45

TEXTBOOK

1. R. B. Bery, “The Intel Microprocessor 8086 / 8088 / 80186 / 80188, 80286, 80386, 80483 PENTIUM, PENTIUM Pro, PII, PIII and IV Architecture, Programming and Interfacing”, Pearson 2004.

REFERENCES

1. Daniel Tabak, "Advanced Microprocessors", McGraw Hill, 1999.
2. Douglas V Hall, “Microprocessor and Interfacing Programming Hardware McGraw Hill”, 1992.
3. Antonakos, “The 6800 Microprocessor, Hardware and Software Principles and Applications”, Fourth Edition, Pearson 2004.

EC4002 – POWER ELECTRONICS

L	T	P
3	0	0

UNIT I POWER SEMICONDUCTOR DEVICES 9

Power Transistors – Fast Recovery Diodes – Thyristors – Power TRIAC – MOSFET – IGBT – GTO – Characteristics – Rating – Protection Circuits – Driver Circuits.

UNIT II CONTROLLED RECTIFIERS AND AC VOLTAGE CONTROLLERS 9

Single Phase and Three Phase Controlled Rectifiers – Design of Trigger Circuits Dual Converters – AC Voltage Controllers.

UNIT III POWER SUPPLIES 9

DC – DC Converters – Gating Requirements – Switching Mode Regulators Boost – Buck – Buck – Boost and Cub Regulators – DC and AC Power Supplies – Switched Mode – Resonant and Bidirectional Power Supplies.

UNIT IV INVERTERS 9

Voltage and Current Source Inverters – Resonant-Series Inverter – PWM Inverter.

UNIT V APPLICATIONS 9

DC Motor Drives – Induction and Synchronous Motor Drives – Switched Reluctance and Brushless Motor Drives – Solid State Relays – Microelectronic Relays.

Total: 45

TEXTBOOK

1. Muhammad H. Rashid, "Power Electronics-Circuits, Devices and Applications", Third Edition, Prentice Hall of India, 2004.

REFERENCES

1. M. D. Singh, K. B. Khanchandani, "Power Electronics", Tata McGraw Hill, 1998.
2. Ned Mohan, Tore M. Undeland, William P. Robbins, "Power Electronics, Converters, Applications and Design", John Wiley and Sons, 1994.
3. B. K. Bose, "Modern Power Electronics", Jaico Publishing House, 1999.
4. Sen, "Power Electronics", Tata McGraw Hill, 1987.

EC4003 – ADVANCED ELECTRONIC SYSTEM DESIGN

L	T	P
3	0	0

UNIT I DESIGN OF AMPLIFIERS 11

Noise Sources Considerations – Noise Considerations in Bipolar and MOS Transistors and Operational Amplifiers – Voltage and Current Noise Source Representations – High Voltage and High Power Amplifier Design Considerations Very High Input Impedance Amplifier Design Considerations – Amplifiers Design for Very Low Dc Voltage and Current Measurement – Lock in Amplifier Principles – Chopper Stabilized Amplifiers.

UNIT II DESIGN OF POWER SUPPLIES 7

DC Power Supply Design using Transistors and SCRs – Current Mirrors and References – Supply and Temperature Independent Bias Circuits (Bandgap References-Constant Gm Bias) – Design of Crowbar and Foldback Protection Circuits – Switched Mode Power Supplies – Forward – Flyback – Buck and Boost Converters – Design of Inductors – Transformers and Control Circuits for SMPS – Low Dropout Regulators (LDO).

UNIT III DESIGN OF DATA ACQUISITION SYSTEMS 9

Fundamentals of Noise in Digital and Analog Systems – Amplification of Low Level Signals – Grounding and Shielding and Guarding Techniques – Dual Slope – Quad Slope – Sigma Delta – Pipeline Multiplying and Flash AID Converters – Microprocessors Compatible AID Converters and Logarithmic AID Converters – Design Of Two – and One-Wire Transmitters / Receivers.

UNIT IV DESIGN OF PRINTED CIRCUIT BOARDS 7

Technology of Printed Circuit Boards (PCB) – General Layout and Rules and Parameters – PCB Design Rules for Digital – High Frequency Analog – Power Electronics and Microwave Circuits – Computer Aided Design of PCBS – PCB's Guidelines for Gigabit Logic Systems.

UNIT V SYSTEM DESIGN PROJECT USING ICS 11

Design of Auto Ranging Digital Multimeter and Design Issues of 6 1/2 Digit Multi Meter – Design of Function and Signal Sources – Frequency Synthesizers (Phase Noise and Timing Jitter) – PLL and DC Motor Speed Control Design Using PLL – Digital Frequency and Time-Interval Meter – Design Principles of Spectrum – Network and Logic Analyzers and Digital Storage Oscilloscopes.

Total: 45

TEXTBOOKS

1. Horowitz and Hill, "The Art of Electronics".
2. Henry Ott, "Noise Reduction Techniques in Electronic Systems".
3. Sydney Soclof, "Applications of Analog Integrated Circuits", Prentice Hall of India, 1990.
4. Keith H. Billings, "Handbook of Switched Mode Supplies", McGraw Hill Publishing Co., 1989.
5. Howard Johnson and Martin Graham, "High Speed Digital Design", Prentice Hall of India, 1993.
6. Howard Johnson and Martin Graham, "High Speed Signal Propagation", Prentice Hall of India, 2003.

REFERENCES

1. Selected Articles from "Review of Scientific Instruments", Journal Published by American Institute of Physics.
2. James K. Hardy, "High Frequency Circuit Design", Reston Publishing Company, 1979.
3. Michael Jaacob, "Applications and Design with Analog Integrated Circuits", Prentice Hall of India, 1991.
4. Walter C. Bosshart, "Printed Circuit Boards-Design and Technology", Tata McGraw Hill, 1983.
5. Otmar Kigenstein, "Switched Mode Power Supplies in Practice", John Wiley and Sons, 1989.
6. J. D Greenfield, "Practical Digital Design Using IC's", Prentice Hall of India, USA.

EC4005 – CAD FOR VLSI

L	T	P
3	0	0

UNIT I VLSI DESIGN METHODOLOGIES 9

VLSI Design Methodologies – Review of Data Structures and Algorithms – Review of VLSI Design Automation Tools – Algorithmic Graph Theory and Computational Complexity – Tractable and Intractable Problems – General Purpose Methods for Combinatorial Optimization.

UNIT II DESIGN RULES 9

Layout Compaction – Design Rules – Problem Formulation – Algorithms for Constraint Graph Compaction – Placement and Partitioning – Circuit Representation Placement Algorithms – Partitioning.

UNIT III FLOOR PLANNING 9

Floor Planning Concepts – Shape Functions and Floorplan Sizing – Types of Local Routing Problems – Area Routing – Channel Routing – Global Routing – Algorithms for Global Routing.

UNIT IV SIMULATION 9

Simulation – Gate-Level Modeling and Simulation – Switch-Level Modeling and Simulation – Combinational Logic Synthesis – Bina Decision Diagrams – Two Level Logic Synthesis.

UNIT V MODELING AND SYNTHESIS 9

High Level Synthesis – Hardware Models – Internal Representation – Allocation Assignment and Scheduling – Simple Scheduling Algorithm – Assignment Problem – High Level Transformations.

Total: 45

TEXTBOOK

1. S. H. Gerez, “Algorithms for VLSI Design Automation”, John Wiley and Sons, 2002.

REFERENCE

1. N. A. Sherwani, "Algorithms for VLSI Physical Design Automation", Kluwer Academic Publishers, 2002.

UNIT I REVIEW OF EMBEDDED HARDWARE 9

Terminology – Gates – Timing Diagram – Memory – Microprocessor Buses – Direct Memory Access Interrupts – Built-ins on the Microprocessor – Conventions used on Schematic – Schematic – Interrupts – Microprocessor Architecture – Interrupt Basics – Shared Data Problem – Interrupt Latency.

UNIT II PIC MICROCONTROLLER AND INTERFACING 9

CPU Architecture – Registers – Instruction Sets Addressing Modes – Loop Timing – Timers – Interrupts – Interrupt Timing – I/O Expansion – 12C Bus Operation Serial EEPROM – Analog to Digital Converter – UART – Baud Rate – Data Handling – Initialization – Special Features – Serial Programming – Parallel Slave Port.

UNIT III PROGRAMMABLE DIGITAL SIGNAL PROCESSORS 9

Family Architecture Registers – Addressing Modes Programs – Interfacing Methods Parallel I / O Interface – Parallel Port Interfaces – Memory Interfacing. Interrupts – Interrupt Service Routine – Features of Interrupts – Interfacing Serial Converters to a Programmable DSP Device – Applications of Programmable DSP Device.

UNIT IV SOFTWARE DEVELOPMENT AND TOOLS 9

Embedded System Revolution Trends – Round-Robin – Round Robin with Interrupts – Function or E Scheduling Architecture – Algorithms – Assembler – Compiler – Cross Compilers and Integrated Development Environment (IDE) – Object Oriented Interlacing – Recursion – Debugging Strategies – Simulators – Embedded Linux – Basic Concepts – Hardware Support – Kernel Considerations.

UNIT V REALTIME OPERATING SYSTEMS 9

Task and Task States – Tasks and Data – Semaphores and Shared Data Operating System Services – Message Queues – Timer Function – Events – Memory Management – Interrupt Routines in an RTOS Environment – Basic Design using RTOS.

Total: 45

TEXTBOOKS

1. David Simon, “An Embedded Software Primers”, Pearson Education, Asia, 2000.
2. John B Peat Man, “Design With Microcontroller”, Pearson Education, Asia, 1998.
3. S. Srinivasan, Avatar Singh, "Digital Signal Processing", Thomson Brooks / Cole, 2004.

REFERENCES

1. Bums, Alan and Wellings, Andy, “Real-Time Systems and Programming Languages”, Second Edition, Harlow: Addison – Wesley – Longman, 1997.
2. Raymond J. A. Bhur and Donald L. Bialek, "An Introduction to Real Time Systems – Design to Networking with C / C++ “, Prentice Hall Inc, New Jersey, 1999.
3. Grehan Moore and Cyliax, “Real Time Programming – A Guide to 32 Bit Embedded Development. Reading”, Addison–Wesley–Longman, 1998.
4. Steve Heath, “Embedded Systems Design”, Newnes, 1997.
5. Karim Yahmour, “Building Embedded LINUX Systems”, Shroff Publishers, 2003.
6. Tim Wilmshurst, "An Introduction to the Design of Small Scale Embedded Systems", Palgrave, 2003.

EC4007 – MICRO ELECTROMECHANICAL SYSTEMS (MEMS)

L T P
3 0 0

UNIT I MEMS 9

MEMS and Microsystems – Miniaturization – Typical Products – Micro Sensors – Micro Actuation – MEMS with Micro Actuators – Microaccelerometers and Micro Fluidics – MEMS Materials – Micro Fabrication.

UNIT II MECHANICS FOR MEMS DESIGN 9

Elasticity – Stress – Strain and Material Properties – Bending of Thin Plates – Spring Configurations – Torsional Deflection – Mechanical Vibration – Resonance – Thermo Mechanics – Actuators – Force and Response Time – Fracture and Thin Film Mechanics.

UNIT III ELECTROSTATIC DESIGN 9

Electrostatics – Basic Theory – Electrostatic Instability – Surface Tension – Gap and Finger Pull Up – Electro Static Actuators – Comb Generators – Gap Closers – Rotary Motors – Inch Worms – Electromagnetic Actuators – Bistable Actuators.

UNIT IV CIRCUIT AND SYSTEM ISSUES 9

Electronic interfaces – Feed Back Systems – Noise – Circuit and System issues – Case Studies Capacitive Accelerometer – Piezo Electric Pressure Sensor – Modelling of MEMS Systems – CAD for MEMS.

UNIT V OPTICAL AND RF MEMS 9

Optical MEMS – System Design Basics – Gaussian Optics – Matrix Operations – Resolution – Case Studies – MEMS Scanners and Retinal Scanning Display – Digital Micro Mirror Devices – RF Memes – Design Basics – Case Study – Capacitive RF MEMS Switch – Performance issues.

Total: 45

TEXTBOOK

1. Stephen Santeria, “Microsystems Design”, Kluwer Publishers, 2000.

REFERENCES

1. Nadim Maluf, " An Introduction to Micro Electro Mechanical System Design", Artech House, 2000.
2. Mohamed Gad-El-Hak, Editor, “The MEMS and Book”, CRC Press Baco Raton, 2000.
3. Tai Ran Hsu, "MEMS and Micro Systems Design and Manufacture", Tata McGraw Hill New Delhi, 2002.

EC4009 – RADAR AND NAVIGATIONAL AIDS

L	T	P
3	0	0

UNIT I RANGE EQUATION AND TYPES OF RADAR 8

Basic Radar – Simple Form of Radar Equation – Radar Parameters affecting range and resolution – Radar System Block Diagram – Radar Frequencies – Types of Radar – CW – Doppler – MTI – FMCW – Pulsed-Tracking Radar – DSP in Radar / (MTDL).

UNIT II RADAR SYSTEM CONCEPTS 12

Different Types of Noise – Basic Concepts of Thermal Noise – Noise Figure – LNA. Basic Concepts of False Alarm and Missed Detection – Concepts of Radar Cross Section – TR – ATR – Types of Displays – Tracking of Targets in Range and Angle.

UNIT III MICROWAVE POWER SOURCES, ANTENNAS AND SIGNAL PROCESSING 8

Klystron – Reflex Klystron – Magnetron and TWT – Antenna Parameters – Types of Antenna – Parabolic – Cassegrain and Electronically Steered Phased Array Antennas – Analog and Digital Processing of Signals.

UNIT IV TERRESTRIAL AND SPACE RADIO NAVIGATION SYSTEM 8

General Principles – Radio Compass (NDB) – VOR – DME – Doppler and Inertial Navigation.

UNIT V SATELLITE NAVIGATION AND LANDING SYSTEMS 9

Basics of Satellite Navigation – NA VSTAR Global Positioning System – Landing Systems – Mechanics of Landing – Instrument Landing System – Microwave Landing System – Satellite Landing System and Carrier Landing System.

Total : 45

TEXTBOOKS

1. M. I. Skolnik, "Introduction to Radar Systems", Tata McGraw Hill, 2002.
2. Myron Kyton and W. R. Fried, "Avionics Navigation Systems", John Wiley and Sons, 1997.

REFERENCES

1. Nagaraja, "Elements of Electronic Navigation", Tata McGraw Hill.
2. Albert Helfrick, "Principles of Avionics", Third Edition, ISBN 1-885544-20-0.

EC4010 – ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

L	T	P
3	0	0

UNIT I BASIC CONCEPTS 7

Definition of EMI and EMC – Intra and Inter System EMI – Sources and Victims of EMI – Conducted and Radiated EMI Emission and Susceptibility – Transient and ESD Case Histories – Radiation Hazards to Humans.

UNIT II COUPLING MECHANISM 9

Common Mode Coupling – Differential Mode Coupling – Common Impedance Coupling – Ground Loop Coupling – Field to Cable Coupling – Cable to Cable Coupling – Power Mains and Power Supply Coupling.

UNIT III EMI MITIGATION TECHNIQUES 10

Shielding – Principle Choice of Materials for H, E and Free Space Fields and Thickness – EMI Gaskets – Bonding Grounding – Circuits, System and Cable Grounding – Filtering – Transient EMI Control Devices and Applications – PCB Zoning – Component Selection – Mounting – Trace Routing.

UNIT IV STANDARDS AND REGULATION 7

Units of EMI National and International EMI Standardizing Organizations – IEC, ANSI, FCC, CISPR, BIS, CENELEC – FCC Standards – EN Emission and Susceptibility Standards and Specifications – MIL461 E Standards.

UNIT V EMITEST METHODS AND INSTRUMENTATION 12

EMI Test Sites – Open Area Site – TEM Cell – Shielded Chamber – Shielded Anechoic Chamber – EMI Test Receivers – Spectrum Analyzer – Transient EMI Test Wave Simulators – EMI Coupling Networks – Line Impedance Stabilization Networks – Feed through Capacitors – Antennas and Factors – Current Probes and Calibration Factor – MIL – STD Test Methods – Civilian STD Test Methods.

Total: 45

TEXT BOOKS

1. V. P. Kodali, "Engineering EMC Principles, Measurements and Technologies", IEEE Press, NewYork, 1996.
2. Henry W. Ott, "Noise Reduction Techniques In Electronic Systems", A Wiley Inter Science Publications, John Wiley and Sons, NewYork, 1988.
3. C. R.. Paul, "Principles of EMC".

REFERENCES

1. Don R. J. White Consultant Incorporate, "Handbook of EMI/EMC", Vol I–IV, 1988.
2. Bernhard Keiser, "Principles of Electromagnetic Compatibility", Third Edition, Artech Hourse, Norwood, 1986.

EC4011 – TELECOMMUNICATION SYSTEM MODELING AND SIMULATION

L	T	P
3	0	0

UNIT I SIMULATION METHOD 8

Aspects of Methodology – Performance Estimation – Simulation Sampling Frequency – Low Pass Equivalent Simulation Models for Bandpass Signals – Multicarrier Signals – Non-Linear and Time-Varying Systems – Post Processing – Basic Graphical Techniques and Estimations.

UNIT II RANDOM SIGNAL GENERATION and PROCESSING 8

Uniform Random Number Generation – Mapping Uniform Random Variables to an Arbitrary Pdf – Correlated and Uncorrelated Gaussian Random Number Generation – PN Sequence Generation – Random Signal Processing – Testing of Random Number Generators.

UNIT III MONTE CARLO SIMULATION 9

Fundamental Concepts – Application to Communication Systems – Monte Carlo Integration – Semi Analytic Techniques – Case Study – Performance Estimation of a Wireless System.

UNIT IV ADVANCED MODELS and SIMULATION TECHNIQUES 10

Modeling and Simulation of Nonlinearities – Types – Memoryless Nonlinearities – Nonlinearities with Memory – Modeling and Simulation of Time Varying Systems – Random Process Models – Tapped Delay Line Model – Modeling and Simulation of Waveform Channels – Discrete Memoryless Channel Models – Markov Model for Discrete Channels with Memory.

UNIT V EFFICIENT SIMULATION TECHNIQUES 10

Tail Extrapolation – Pdf Estimators – Importance Sampling Methods – Case Study – Simulation of a Cellular Radio System.

Total: 45

TEXT BOOK

1. William.H. Tranter, K. Sam Shanmugam, Theodore. S. Rappaport, Kurt L. Kosbar, “Principles of Communication Systems Simulation”, Pearson Education (Singapore) Pvt. Ltd, 2004.

REFERENCES

1. M. C. Jeruchim, P. Balaban and K. Sam Shanmugam, “Simulation of Communication Systems - Modeling, Methodology and Techniques”, Plenum Press, New York, 2001.
2. Averill.M. Law and W. David Kelton, “Simulation Modeling and Analysis”, McGraw Hill Inc., 2000.
3. Geoffrey Gorden, “System Simulation”, Second Edition, Prentice Hall of India, , 1992.
4. Jerry Banks and John S. Carson, “Discrete Event System Simulation”, Prentice Hall of India, 1984.

EC4012 – DIGITAL IMAGE PROCESSING

L	T	P
3	0	0

UNIT I DIGITAL IMAGE FUNDAMENTALS 9

Elements of Digital Image Processing Systems – Vidicon and Digital Camera Working Principles – Elements of Visual Perception – Brightness – Contrast – Hue – Saturation – Mach Band Effect – Color Image Fundamentals – RGB – HSI Models – Image Sampling – Quantization – Dither – Two-Dimensional Mathematical Preliminaries.

UNIT II IMAGE TRANSFORMS 9

ID DFT – 2D Transforms – DFT – DCT – Discrete Sine – Walsh – Hadamard – Slant – Haar – KLT – SVD – Wavelet Transform.

UNIT III IMAGE ENHANCEMENT 9

Histogram Modification and Specification Techniques – Noise Distributions – Spatial Averaging – Directional Smoothing – Median – Geometric Mean – Harmonic Mean – Contraharmonic and Y P Mean Filters – Homomorphic Filtering – Design of 2D FIR Filters using McClellan's Transformation – Color Image Enhancement.

UNIT IV IMAGE RESTORATION AND RECOGNITION 9

Image Restoration – Degradation Model – Unconstrained and Constrained Restoration – Inverse Filtering – Removal of Blur Caused by Uniform Linear Motion – Wiener Filtering – Geometric Transformations – Spatial Transformations – Gray Level Interpolation – Edge Detection.

Image Recognition – Patterns and Pattern Classes – Matching by Minimum Distance Classifier – Matching by Correlation. – Neural Networks Back Propagation Network and Training – Neural Network to Recognize Shapes.

UNIT V IMAGE COMPRESSION 9

Need for Data Compression – Huffman – Run Length Encoding – Shift Codes – Arithmetic Coding – Vector Quantization – Block Truncation Coding – Transform Coding – JPEG Standard – MPEG.

Total: 45

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, " Digital Image Processing", Second Edition, Pearson Education, Inc., 2004.
2. Anil K. Jain, "Fundamentals of Digital Image Processing", Pearson Education, Inc., 2002.

REFERENCES

1. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, " Digital Image Processing Using MATLAB", Pearson Education, Inc., 2004.
2. William K. Pratt, "Digital Image Processing", John Wiley, New York, 2002.
3. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Brookes/Cole, Vikas Publishing House, 1999.
4. Sid Ahmed M. A., "Image Processing Theory, Algorithms and Architectures", McGraw Hill, 2000.

EC4013 – ADVANCED DIGITAL SIGNAL PROCESSING

L	T	P
3	0	0

UNIT I DISCRETE TIME RANDOM SIGNALS 9

Review of Discrete Time Deterministic Signals in Time and Frequency Domains – Discrete Time Random Signals – Mean – Variance – Covariance – PSD – Energy of Discrete Time Signals – Parseval's Theorem – Wiener Kintine Relations – Simulation of White Noise.

UNIT II PROCESSING OF DISCRETE TIME RANDOM SIGNAL 9

Review of Recursive and Non-Recursive Filters – Properties of Transfer Functions of Recursive and Non-Recursive Filters – Low Pass Filtering of White Noise – Discrete Random Signal Processing by Linear Systems – Spectral Factorization.

UNIT III SPECTRUM ESTIMATION 9

Non-Parametric Methods – Correlation Method – Co-Variance Method – Periodogram Estimator – Performance Analysis of Estimators – Unbiased and Consistent Estimators – WELCH PSD Estimation – Model Based Approach – AR, MA, ARMA Signal Modeling Parameter Estimation using Yule-Walker Method.

UNIT IV LINEAR ESTIMATION, PREDICTION, ADAPTIVE FILTERING 10

Least Mean Squared Criterion – Wiener Filter – Discrete Wiener Hopt Equation – Concept of Kalman Filter – Linear Prediction – Levinson Durbin Recursion – Adaptive Filters Based on Newton's Steepest Descent Method – Widrow Hoff LMS Adaptation Algorithm – Application Examples.

UNIT V WAVELET TRANSFORM 8

DFT Filter Bank – Short Time Fourier Transform – Wavelet Transform – Cepstrum and Homomorphic Filtering.

Total: 45

TEXTBOOKS

1. Monson H. Hayes, “Statistical Digital Signal Processing and Modelling”, John Wiley and Sons Inc., New York, 1996.
2. P. P. Vaidyanabhan, “Multirate Systems and Filterbanks”, PH, 1992.

REFERENCES

1. Dimitris G. Manolakis, Vinay K. Lngle, Stephen M. Kogon, “Statistical and Adaptive Signal Processing”, McGraw Hill, NewYork, 2000.
2. John G. Proakis, Dimitris G. Manolakis, “Digital Signal Processing”, Pearson, 2004.

EC4014 – TELEVISION AND VIDEO ENGINEERING

L T P
3 0 0

UNIT I FUNDAMENTALS OF TELEVISION 9

Characteristics of Eye and Television Pictures – Resolution and Brightness Gradation Theory of Scanning – Camera Tubes – Vidicon and Silicon Diode Array Vidicon – Monochrome Picture Tube, Composite.

UNIT II MONOCHROME TELEVISION RECEIVER 9

Transmission and Propagation of TV Signal – TV Antenna – Receiver – VHF Tuners – Vision IF Subsystem – Inter Carrier Sound System – Video Amplifiers – Synchronous Separation AFC and Deflection Oscillators Frame and Line Deflection Circuits.

UNIT III COLOR TELEVISION SYSTEMS 9

Color Characteristics – Color Cameras – Color Picture Tubes – Color Signal Generation and Encoding – NTSC – PAL and SECAM Systems.

UNIT IV COLOR TELEVISION RECEIVERS 9

Block Diagram of PAL-D Receivers – Luminance Channel – Chrominance Amplifier – Color Burst Separation and Burst Phase Discriminator – Sub Carrier Oscillator AGC Circuits – Ident and Color Killer Circuits – U and V Demodulators – R, G, B Matrix and Drivers.

UNIT V SPECIAL TOPICS IN TELEVISION 9

Digital Tuning Techniques – Remote Control – Cable and Satellite Television – Video Tape Recorders – Videodisc System – Fundamental of Digital TV and High Definition Television.

Total: 45

TEXTBOOK

1. Gulati R. R., "Modern Television Practice, Principles of Technology and Servicing", New Age International Pvt. Ltd., 2002.

REFERENCES

1. Dhake A. M, "Television and Video Engineering", Tata McGraw Hill, 1995.
2. Grob B, Herndon G. E., "Basic Television and Video Systems", McGraw Hill, 1999.

EC4015 – RF SYSTEM DESIGN

L	T	P
3	0	0

UNIT I RF CHARACTERISTICS OF PASSIVE COMPONENTS 8

RF Characteristics of Chip Resistor, Capacitor and Inductors – Semiconductor Realization of Resistors, Capacitors, Inductors, Transformers – Coaxial, Stripline and Microstrip Line Design Guidelines and Behavior at RF.

UNIT II MOS CHARACTERISTICS AT RF 9

Long and Short Channel Approximations – Bandwidth Estimation Techniques – Open and Short Circuit Time Constant Procedures – High Frequency Amplifier Design – IT Doublers – Tuned Amplifiers – Cascaded Amplifiers – AM-PM Conversion Issues – Biasing Techniques for RF ICs.

UNIT III RF LNA AND POWER AMPLIFIER DESIGN 12

Noise Definitions and Noise Models – Two Port Noise Parameters of MOSFET – LNA Topologies – Noise Match and Power Match Design Considerations – Linearity and Large Signal Performance of LNAs – Feedback and RF Stability Criteria – Gain and Phase Margins – Compensation Techniques – Class A, B, C, D, E, F Power Amplifier Definitions – PA Characteristics – RF PA Design Examples.

UNIT IV RF BUILDING BLOCKS 9

Mixer Fundamentals – Nonlinear Mixers – Multiplier Based Mixers – Sub-Sampling Mixers – Linearized PLL Models – Noise Properties of PLLs – Phase Detectors – Loop Filters – Charge Pumps – PLL Design Examples – Oscillators Describing Functions – Resonators – Detailed Considerations of Phase Noise.

UNIT V RF SYSTEM ARCHITECTURE AND CASE STUDIES 7

Dynamic Range – Subsampling – Transmitter Architectures – Oscillator Stability – Chip Design Examples.

Total : 45

TEXTBOOK

1. Thomas Lee, "The Design of Radio Frequency CMOS Integrated Circuits", Second Edition, Cambridge University Press, 2004.

REFERENCES

1. Reinhold Ludwig, Pavel Bretchko, "RF Circuit Design", Pearson Education, 2001.
2. Ulrich Rohde, "RF Microwave Circuit Design for Wireless Applications", John Wiley, 2000.

EC4016 – SPEECH TECHNOLOGIES

L	T	P
3	0	0

UNIT I BASIC CONCEPTS 10

Speech Fundamentals – Articulatory Phonetics – Production and Classification of Speech Sounds – Acoustic Phonetics – Acoustics of Speech Production – Review of Digital Signal Processing Concepts – Short-Time Fourier Transform – Filter-Bank and LPC Methods.

UNIT II SPEECH ANALYSIS 12

Features – Feature Extraction and Pattern Comparison Techniques – Speech Distortion Measures – Mathematical and Perceptual – Log Spectral Distance – Cepstral Distances – Weighted Cepstral Distances and Liftering – Likelihood Distortions – Spectral Distortion using a Warped Frequency Scale – LPC, PLP and MFCC Coefficients – Time Alignment and Normalization – Dynamic Time Warping – Multiple Time – Alignment Paths.

UNIT III SPEECH MODELING 6

Hidden Markov Models – Markov Processes – Hams – Evaluation – Optimal State Sequence – Viterbi Search – Baum – Welch Parameter Re-Estimation – Implementation Issues.

UNIT IV SPEECH RECOGNITION 8

Large Vocabulary Continuous Speech Recognition – Architecture of a Large Vocabulary Continuous Speech Recognition System – Acoustics and Language Models – N-Grams – Context Dependent Sub-Word Units – Applications and Present Status.

UNIT V SPEECH SYNTHESIS 9

Text-to-Speech Synthesis – Concatenative and Waveform Synthesis Methods – Sub Word Units for TTS – Intelligibility and Naturalness – Role of Prosody – Applications and Present Status.

Total: 45

TEXTBOOKS

1. Lawrence Rabiner and Biing – Hwang Juang, "Fundamentals of Speech Recognition", Pearson Education, 2003.
2. Daniel Jurafsky and James H. Martin, "Speech and Language Processing – An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition", Pearson Education, 2002.

REFERENCES

1. Steven W. Smith, "The Scientist and Engineer's Guide to Digital Signal Processing", California Technical Publishing, 1997.
2. Thomas F. Quatieri, "Discrete Time Speech Signal Processing – Principles and Practice", Pearson Education, 2004.
3. Claudio Becchetti and Lucio Prina Ricotti, "Speech Recognition", John Wiley and Sons, 1999.

EC4017 – WIRELESS NETWORK

L	T	P
3	0	0

UNIT I WIRELESS ACCESS 9

Medium Access Alternatives – Fixed-Assignment for Voice Oriented Networks – Random Access for Data Oriented Networks – Integration of Voice and Data Traffic.

UNIT II WIRELESS NETWORK FUNDAMENTALS 9

Principles of Wireless Network Operation – Wireless Network Topologies Cellular Topology – Cell Fundamentals – Signal to Interference Ratio Calculation – Capacity Expansion Techniques – Network Planning for CDMA Systems – Mobility Management Radio Resources and Power Management – Security in Wireless Networks.

UNIT III WIRELESS WANS 9

Communication in the Infrastructures – Reference Architecture for North American Systems – GSM – CDMA – IMT 2000 – The Data Oriented CDPD Network GPRS and High Data Rates – Short Messaging Service in GSM – Mobile Application Protocols.

UNIT IV WLANs AND HIPERLANs 9

Wireless LANs – IEEE 802.11 WLANs – Physical Layer – MAC Sublayer – MAC Management Sublayer – Wireless ATM – HIPERLAN – HIPERLAN-2.

UNIT V ADHOC NETWORKING 9

IEEE 802.15 WPAN – Home RF Bluetooth – Wireless Geolocation System Architecture – Technologies for Wireless Geolocation Standards – Performance Measures for Geolocation Systems.

Total : 45

TEXTBOOK

1. Kaveth Pahlavan, K. Prashanth Krishnamoorthy, “Principles of Wireless Networks”, Pearson Education Asia, 2002.

REFERENCES

1. Leon Garcia, Widjaja, "Communication Networks", Tata McGraw Hill, New Delhi, 2000.
2. William Stallings, “Wireless Communications and Networks”, Prentice Hall, 2002.

EC4018 – RADIOLOGICAL ENGINEERING

L T P
3 0 0

UNIT I X - RAY GENERATION 9

Principle of Production of Soft and Hard X-Rays – Selection of Anodes – Cooling System – Heel Pattern – Porter Buckey System.

UNIT II RADIO DIAGNOSIS AND RADIOTHERAPY 9

Radiography – Angiography – Fluoroscopy – Image Intensifier – Multi Section Radiography – Depth Dose Curves – Linear Accelerators.

UNIT III SPECIAL RADIOLOGICAL EQUIPMENTS 9

Principle of Tomography – Plane of Movement – CAT – Principle of NMR – MRI – Tissue Characterization – Functional MRI.

UNIT IV APPLICATION OF ISOTOPES FOR DIAGNOSIS AD THERAPY 9

Alpha, Beta and Gamma Emission – Principle of Radiation Detectors – Dot Scanners – PET and SPECT – Cobalt and Cesium Therapy.

UNIT V RADIATION THERAPY 9

Safe Limits – Radiation Protection Techniques.

Total : 45

TEXTBOOKS

1. R. S. Khandpur, "Handbook of Biomedical Instrumentation", Second Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2003.
2. Steve Webb, "The Physics of Medical Imaging", Revised Edition, Adam Hilger Philadelphia, 1990.

REFERENCES

1. William R. Hendee, E. Russell Ritenour, "Medical Imaging Physics", Third Edition, Mosby Year Book, St.Louis, 1992.
2. Erich Krestel, "Imaging Systems for Medical Diagnostics", Siemens Aktiengesellschaft, Berline and Munich, Federal Republic of Germany, 1990.
3. Jacob Kline, "Handbook of Bio Medical Engineering", Academic Press, San Diego, 1988.
4. Joachim Alexander, Will Kalendar and Gehard Linke, "Computed Tomography", John Wiley, Chichester, 1986.
5. Wagner H. N., "Principles of Nuclear Medicine", Second Edition, W. B. Saunders Company, Philadelphia, 1995.

EC4019 – ROBOTICS

L	T	P
3	0	0

UNIT I	SCOPE OF ROBOTS	4
The Scope of Industrial Robots – Definition of an Industrial Robot – Need for Industrial Robots – Applications.		
UNIT II	ROBOT COMPONENTS	9
Fundamentals of Robot Technology – Automation and Robotics – Robot Anatomy Work Volume – Precision of Movement – End Effectors – Sensors.		
UNIT III	ROBOT PROGRAMMING	9
Robot Programming – Methods – Interlocks Textual Languages – Characteristics of Robot Level Languages – Characteristic of Task Level Languages.		
UNIT IV	ROBOT WORK CELL	9
Robot Cell Design and Control – Remote Center Compliance – Safety in Robotics.		
UNIT V	FUTURE TRENDS	14
Advanced Robotics – Advanced Robotics in Space – Specific Features of Space Robotics Systems – Long-Term Technical Developments – Advanced Robotics in Under-Water Operations – Robotics Technology of the Future – Future Applications.		

Total: 45

TEXTBOOK

1. Barry Leatham – Jones, "Elements of Industrial Robotics", Pitman Publishing, 1987.

REFERENCES

1. Mikell P. Groover, Mitchell Weiss, Roger N. Nagel Nicholas G. Odrey, "Industrial Robotics Technology, Programming and Applications", McGraw Hill Book Company, 1986.
2. Fu K. S. Gonzateaz R. C. and Lee C. S. G., "Robotics Control Sensing, Vision and Intelligence", McGraw Hill International Editions, 1987.
3. Bernard Hodges and Paul Hallam, "Industrial Robotics", British Library Cataloging in Publication, 1990.
4. Deb S. R., "Robotics Technology and Flexible Automation", Tata McGraw Hill, 1994.

BT4003 – BIO INFORMATICS

L T P
3 0 0

UNIT I BASIC CONCEPTS 9

Life in Space and Time – Dogmas – Data Archives – WWW – Computers – Biological Classification – Use of Sequences – Protein Structure – Clinical Implications.

UNIT II GENOME ORGANIZATION 9

Genomics and Proteomics – Eavesdropping of Transmission of Genetic Information – Genomes of Prokaryotes – Genomes of Eukaryotes – Human Genome – SNPs – Genetic Diversity – Evolution of Genomes .

UNIT III ARCHIVES AND INFORMATION RETRIEVAL 9

The Archives – Gateways to Archives.

UNIT IV ALIGNMENTS AND PHYLOGENETICS TREES 9

Sequence Alignment – The Dotplot – Dotplots. and Sequence Alignments – Measures of Sequence Similarity – Computing the Alignment – The Dynamic Programming Algorithm – Significance of Alignments – Multiple Sequence Alignment – Applications – Phylogeny – Phylogenetic Trees.

UNIT V PROTEIN STRUCTURE AND DRUG DISCOVERY 9

Protein Stability and Folding – Applications of Hydrophobicity – Superposition of Structures – DALI – Evolution of Protein Structures – Classification of Protein Structures – Protein Structure Prediction and Modeling – Assignment of Protein Structures to Genomes – Prediction of Protein Function – Drug Discovery and Development

Total: 45

TEXTBOOK

1. Arthur M. Lesk, "Introduction to Bioinformatics", Oxford University Press, India, 2004.

REFERENCES

1. Altwood T. K and Parry-Smith D. J, "Introduction to Bioinformatics", Pearson Education Asia, New Delhi, 2001.

CS4027 – COMPUTER ARCHITECTURE AND ORGANIZATION

L	T	P
3	0	0

UNIT I BASIC CONCEPTS 9

Computing and Computers – Evolution of Computers – VLSI Era – System Design Register Level – Processor Level – CPU Organization – Data Representation – Fixed-Point Numbers – Floating Point Numbers – Instruction Formats – Instruction Types – Addressing Modes.

UNIT II CONTROL DESIGN 9

Hardwired Control – Micro Programmed Control – Multiplier Control Unit – CPU Control Unit – Pipeline Control – Instruction Pipelines – Pipeline Performance – Super Scaling Processing – Nano Programming.

UNIT III DATA PATH DESIGN 9

Fixed Point Arithmetic – Addition – Subtraction – Multiplication and Division – Combinational and Sequential Adder – Carry Look Ahead Adder – Robertson Algorithm – Booth's Algorithms – Non-Restoring Division Algorithm – Floating Point Arithmetic – Coprocessor Pipeline Processing – Pipeline Design – Modified Booth's Algorithm.

UNIT IV MEMORY ORGANIZATION 9

Random Access Memories – Serial Access Memories – RAM Interfaces – Magnetic Surface Recording – Optical Memories – Multilevel Memories – Cache and Virtual Memory – Memory Allocation – Associative Memory.

UNIT V SYSTEM ORGANIZATION 9

Communication Methods – Buses – Bus Control – Bus Interfacing – Bus Arbitration – I / O And System Control – I / O Interface Circuits – Handshaking – DMA and Interrupts – Vectored Interrupts – PCI Interrupts – Pipeline Interrupts – IOP Organization – Operation Systems – Multiprocessors – Fault Tolerance – RISC and CISC Processors – Superscalar and Vector Processor.

Total: 45

TEXTBOOKS

1. John P. Hayes, "Computer Architecture and Organisation", Third Edition, Tata McGraw Hill, 1998.
2. Morris Mano, "Computer System Architecture", Prentice Hall of India, 2000.

REFERENCES

1. V. Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, "Computer Organisation", Fourth Edition, McGraw Hill Inc, 1996.
2. G. Kane and J. Heinrich., "MIPS RISC Architecture", Englewood Cliffs, New Jersey, Prentice Hall, 1992.

CS4028 – PROGRAMMING AND DATA STRUCTURES

L T P
3 0 0

UNIT I PROBLEM SOLVING 9

Problem Solving – Top-Down Design – Implementation – Verification – Efficiency – Analysis – Sample Algorithms.

UNIT II LISTS – STACKS AND QUEUES 8

Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT.

UNIT III TREES 10

Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Priority Queues (Heaps) – Model – Simple Implementations – Binary Heap.

UNIT IV SORTING 9

Insertion Sort – Shell Sort – Heap Sort – Merge Sort – Quick Sort – External Sorting.

UNIT V GRAPHS 9

Topological Sort – Shortest Path Algorithms – Unweighted Shortest Paths – Dijkstra’s Algorithm – Minimum Spanning Tree – Prim’s Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity – NP Completeness.

Total: 45

TEXT BOOKS

1. R. G. Dromey, “How to Solve it by Computer” (Chapters 1 –2), Prentice Hall of India, 2002.
2. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education, 2002.

REFERENCES

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, “Data Structures Using C”, Pearson Education, 2004.
2. Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures - A Pseudocode Approach with C”, Thomson Brooks / Cole, 1998.
3. Aho J. E. Hopcroft and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, 1983.
4. Harowitz, Sahani and Anderson Freed, “Fundamentals of Data Structures in C”, Second Edition, 2007.

EC4020 – DIGITAL SWITCHING AND TRANSMISSION

L	T	P
3	0	0

UNIT I MULTIPLEXING 9

Transmission Systems – FDM Multiplexing and Modulation – Time Division Multiplexing – Digital Transmission and Multiplexing – Pulse Transmission – Line Coding – Binary N-Zero Substitution – Digital Biphasic – Differential Encoding – Time Division Multiplexing – Time Division Multiplex Loops and Rings.

SONET/SDH: SONET Multiplexing Overview – SONET Frame Formats – SONET Operations – Administration and Maintenance – Payload Framing and Frequency Justification – Virtual Tributaries – DS3 Payload Mapping – E4 Payload Mapping – SONET Optical Standards – SONET Networks – SONET Rings – Unidirectional Path-Switched Ring – Bidirectional Line-Switched Ring.

UNIT II DIGITAL SWITCHING 9

Switching Functions – Space Division Switching – Time Division Switching – Two-Dimensional Switching – STS Switching – TST Switching – No.4 ESS Toll Switch – Digital Cross-Connect Systems – Digital Switching in an Analog Environment – Elements of SSN07 Signaling.

UNIT III NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT 9

Timing – Timing Recovery: Phase – Locked Loop – Clock Instability – Jitter Measurements – Systematic Jitter – Timing Inaccuracies – Slips – Asynchronous Multiplexing – Network Synchronization – U.S. Network Synchronization – Network Control – Network Management.

UNIT IV DIGITAL SUBSCRIBER ACCESS 9

ISDN – ISDN Basic Rate Access Architecture – ISDN U Interface – ISDN D Channel Protocol. High Data-Rate Digital Subscriber Loops – Asymmetric Digital Subscriber Line – VDSL – Digital Loop Carrier Systems – Universal Digital Loop Carrier Systems – Integrated Digital Loop Carrier Systems – Next-Generation Digital Loop Carrier – Fiber in the Loop – Hybrid Fiber Coax Systems – Voice band Modems – PCM Modems – Local Microwave Distribution Service – Digital Satellite Services.

UNIT V TRAFFIC ANALYSIS 9

Traffic Characterization – Arrival Distributions – Holding Time Distributions – Loss Systems – Network Blocking Probabilities – End-to-End Blocking Probabilities – Overflow Traffic – Delay Systems – Exponential Service Times – Constant Service Times – Finite Queues.

Total:45

TEXTBOOK

1. Bellamy John, “Digital Telephony”, Third Edition, John Wiley and Sons Inc., 2000.

REFERENCE

1. Viswanathan T., “Telecommunication Switching System and Networks”, Prentice Hall of India Ltd., 1994.

EC4021 – WIRELESS AND MOBILE COMMUNICATIONS

L T P
3 0 0

UNIT I PRINCIPLES OF WIRELESS COMMUNICATION 10

Digital Modulation Techniques – Linear Modulation Techniques – Spread Spectrum Modulation – Performance of Modulation – Multiple Access Techniques – TDMA – FHMA – CDMA – SDMA – Overview of Cellular Networks – Cellular Concept – Handoff Strategies – Path Loss – Fading and Doppler Effect.

UNIT II WIRELESS PROTOCOLS 11

Issues and Challenges of Wireless Networks – Location Management – Resource Management – Routing – Power Management – Security – Wireless Media Access Techniques – ALOHA – CSMA – Wireless LAN – MAN – IEEE 802.11 (A–B–E–F–G–H–I) – Bluetooth – Wireless Routing Protocols – Mobile IP – IPv4 – IPv6 – Wireless TCP Protocols for 3G and 4G Cellular Networks – IMT – 2000 – UMTS – CDMA2000 – Mobility Management and Handover Technologies – All-IP Based Cellular Network

UNIT III TYPES OF WIRELESS NETWORKS 9

Mobile Networks – Ad-hoc Networks – Ad-hoc Routing – Sensor Networks – Peer-to-Peer Networks – Mobile Routing Protocols – DSR – AODV – Reactive Routing – Location Aided Routing – Mobility Models – Entity Based – Group Mobility – Random Way – Point Mobility Model.

UNIT IV ISSUES AND CHALLENGES 9

Issues and Challenges of Mobile Networks – Security Issues – Authentication in Mobile Applications – Privacy Issues – Power Management – Energy Awareness Computing – Mobile IP and Ad-hoc Networks – VoIP Applications.

UNIT V SIMULATION 6

Study of Various Network Simulators (Glomosim – NS2 – Opnet) – Designing and Evaluating The Performance of Various Transport and Routing Protocols of Mobile and Wireless Networks using Network Simulator(Any One).

Total: 45

REFERENCES

1. Theodore S. Rappaport, “Wireless Communications, Principles and Practice”, Prentice Hall, 1996.
2. W. Stallings, “Wireless Communications and Networks”, Prentice Hall, 2001.
3. J. Schiller, “Mobile Communications”, Addison Wesley, 2000.
4. W. C. Y. Lee, “Mobile Communications Engineering -Theory and Applications”, Second Edition, McGraw Hill, 1997.
5. K. Pahlavan and P. Krishnamurthy, ”Principles of Wireless Networks”, Prentice Hall, 2002.
6. U. D. Black, “Mobile and Wireless Networks”, Prentice Hall, 1996.
7. Charles E.Perkins, “Ad-hoc Networking”, Addison – Wesley, IEEE Journals and Proceedings, December 2000.

EC4022 – MEDICAL ELECTRONICS

L T P
3 0 0

UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING 9

The Origin of Bio-Potentials – Biopotential Electrodes – Biological Amplifiers – ECG – EEG – EMG – PCG – EOG – Lead Systems and Recording Methods – Typical Waveforms and Signal Characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT 9

PH – PO₂ – PCO₂ – PHCO₃ – Electrophoresis – Colorimeter – Photometer – Auto Analyzer – Blood Flow Meter – Cardiac Output – Respiratory Measurement – Blood Pressure – Temperature – Pulse – Blood Cell Counters.

UNIT III ASSIST DEVICES AND BIO-TELEMETRY 9

Cardiac Pacemakers – DC Defibrillator – Telemetry Principles – Frequency Selection – Bio-Telemetry – Radio-Pill and Tele-Stimulation.

UNIT IV RADIOLOGICAL EQUIPMENTS 9

Ionising Radiation – Diagnostic X-Ray Equipments – Use of Radio Isotope in Diagnosis – Radiation Therapy.

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION 9

Thermograph – Endoscopy Unit – Laser in Medicine – Diathermy Units – Electrical Safety in Medical Equipment.

Total: 45

TEXTBOOK

1. Leislle Cromwell, “Biomedical Instrumentation and Measurement”, Prentice Hall of India, New Delhi, 2002.

REFERENCES

1. Khandpur R. S., “Handbook of Biomedical Instrumentation”, Tata McGraw Hill, New Delhi, 1997.
2. Joseph J. Carr and John M. Brown, “Introduction to Biomedical Equipment Technology”, John Wiley and Sons, New York, 1997.

MA4001 – NUMERICAL METHODS

L	T	P
3	0	0

UNIT I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9

Linear Interpolation Methods (Method of False Position) – Newton’s Method – Solution of Linear System by Gaussian Elimination and Gauss-Jordan Methods – Iterative Methods – Gauss Jacobi and Gauss-Seidel Methods – Inverse of a Matrix by Gauss-Jordan Method – Eigen Value of a Matrix by Power Method.

UNIT II INTERPOLATION AND APPROXIMATION 9

Lagrangian Polynomials – Divided Differences – Interpolating with a Cubic Spline – Newton's Forward and Backward Difference Formulae.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Derivatives from Difference Tables – Divided Differences and Finite Differences – Numerical Integration by Trapezoidal and Simpson's 1 / 3 and 3 / 8 Rules – Romberg's Method – Double Integrals using Trapezoidal and Simpson's Rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single Step Methods – Taylor Series Method – Euler’s Method – Modified and Improved Euler’s Method – Fourth Order Runge-Kutta Method for Solving First and Second Order Equations – Multi-Step Methods – Milne’s and Adam’s Predictor and Corrector Methods.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

Finite Difference Solution of Second Order Ordinary Differential Equation – Finite Difference Solution of One Dimensional Heat Equation by Implicit and Explicit Methods – One Dimensional Wave Equation and Two Dimensional Laplace and Poisson Equations.

Total: 45

TEXT BOOK

1. C. F. Gerald and P. O. Wheatley “Applied Numerical Analysis”, Sixth Edition, Pearson Education, 2005.

REFERENCES

1. M. K. Jain, S. R. K. Iyengar and R. K. Jain, “Numerical Methods for Scientific and Engineering Computation”, Fourth Edition, New Age International Publishers, 2003.
2. M. K. Venkatraman, “Numerical Methods”, National Publication Company, 1991.
3. P. Kandasamy, K. Thilakavathy and K. Gunavathy, “Numerical Methods”, Second Edition, S. Chand and Co., 2003.

MA4002 – RANDOM PROCESSES

L T P
3 0 0

UNIT I PROBABILITY AND RANDOM VARIABLE 9

Axioms of Probability – Conditional Probability – Total Probability – Baye’s Theorem – Random Variable – Probability Mass Function – Probability Density Functions – Properties – Moments – Moment Generating Functions and their Properties.

UNIT II STANDARD DISTRIBUTIONS 9

Binomial – Poisson – Uniform – Exponential – Gamma – Normal Distributions and their Properties – Functions of a Random Variable – Chebyshev Inequality.

UNIT III TWO DIMENSIONAL RANDOM VARIABLES 9

Joint Distributions – Marginal and Conditional Distributions – Covariance – Correlation and Regression – Transformation of Random Variables – Central Limit Theorem.

UNIT IV CLASSIFICATION OF RANDOM PROCESSES 9

Definition and Examples – First Order – Second Order – Strictly Stationary – Wide – Sense Stationary and Ergodic Processes – Markov Process – Binomial – Poisson and Normal Processes – Sine Wave Process.

UNIT V CORRELATION AND SPECTRAL DENSITIES 9

Auto Correlation – Cross Correlation – Properties – Power Spectral Density – Cross Spectral Density – Properties – Wiener – Khintchine Relation – Relationship Between Cross Power Spectrum and Cross Correlation Function – Linear Time Invariant System – System Transfer Function – Linear Systems with Random Inputs – Auto Correlation and Cross Correlation Functions of Input and Output.

Total: 45

TEXT BOOKS

1. Ross S., “A First Course in Probability”, Seventh Edition, Pearson Education, 2006.
2. S. Karlin and H. M. Taylor, “An Introduction to Stochastic Modeling”, Academic Press, 2007.

REFERENCES

1. Veerarajan T., “Probability - Statistics and Random Process”, Second Edition , Tata McGraw Hill, 2006.
2. Richard A. Johnson, “Probability and Statistics For Engineers”, Seventh Edition , Pearson Education, 2005.
3. Mood, Alexander McFarlane, “Introduction to Theory of Statistics”, Tata McGraw Hill, 1974.

UNIT I HUMAN VALUES 10

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-confidence – Character – Spirituality.

UNIT II ENGINEERING ETHICS 9

Senses of Engineering Ethics – Variety of Moral issued – Types of Inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Gilligan's Theory – Consensus and Controversy – Models of Professional Roles – Theories about Right Action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Engineers as Responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study.

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies.

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

UNIT V GLOBAL ISSUES 8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of Electronics and Telecommunication Engineers (IETE), India.

Total : 45**TEXT BOOKS**

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint).
2. Charles E. Harris, Michael S. Prochard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available).
3. John R. Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
4. Edmund G. Seebauer and Robert L. Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.