

ANNA UNIVERSITY TIRUCHIRAPPALLI

Tiruchirappalli – 620 024

Regulations 2007

Curriculum

B.E. BIOMEDICAL ENGINEERING

SEMESTER III

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	MA1202	Transforms and Random Process	3	1	0	100
2	BM1201	Human Anatomy and Physiology	3	0	0	100
3	EE1206	Electric Circuits and Networks	3	1	0	100
4	EC1206	Electronic Devices and Circuits	3	1	0	100
5	EC1205	Signals and Systems	3	1	0	100
6	BM1202	Biochemistry	3	0	0	100
Practical						
7	BM1203	Biochemistry and Human Physiology Laboratory	0	0	4	100
8	EE1207	Circuits and Networks Laboratory	0	0	3	100
9	EC1208	Electronic Devices and Circuits Laboratory	0	0	3	100

SEMESTER IV

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EE1261	Electrical Machines	3	1	0	100
2	BM1251	Sensors and Measuring Techniques	3	0	0	100
3	BM1252	Medical Physics	3	0	0	100
4	EC1258	Analog and Digital Integrated Circuits	3	1	0	100
5	EC1207	Principles of Communication Engineering	3	1	0	100
6	BM1253	Pathology and Microbiology	3	1	0	100
Practical						
7	EE1260	Electrical Machines Laboratory	0	0	3	100
8	EC1259	Integrated Circuits Laboratory	0	0	3	100
9	BM1254	Pathology and Microbiology Laboratory	0	0	4	100

SEMESTER V

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC1301	Microprocessors and Microcontrollers	3	1	0	100
2	BM1301	Biomedical Instrumentation	3	0	0	100
3	EC1303	Digital Signal Processing	3	1	0	100
4	BM1302	Bio Control systems	3	1	0	100
5	BM1303	Biomaterials and Artificial organs	3	0	0	100
6	HS1201	Environmental Science and Engineering	3	0	0	100
Practical						
7	EC1305	Microprocessors and Microcontrollers Laboratory	0	0	3	100
8	BM1304	Biomedical Instrumentation Laboratory	0	0	3	100
9	EC1306	Digital Signal Processing Laboratory	0	0	3	100

SEMESTER VI

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC1361	Digital Image Processing	3	0	0	100
2	BM1351	Biomechanics	3	0	0	100
3	BM1352	Radiological Equipments	3	1	0	100
4	BM1353	Diagnostic and Therapeutic Equipments I	3	1	0	100
5	CS1364	Object Oriented Programming and Java	3	0	0	100
6	BM1354	Medical Informatics	3	0	0	100
Practical						
7	EC1362	Digital Image Processing Laboratory	0	0	3	100
8	CS1365	Object Oriented Programming Laboratory	0	0	3	100
9	HS1301	Communication and Soft Skills Laboratory	1	0	3	100

SEMESTER VII

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	MG1352	Total Quality Management	3	0	0	100
2	CS1408	Pattern Recognition and Neural Networks	3	0	0	100
3	CS1409	Internet Programming	3	1	0	100
4	BM1401	Diagnostic and Therapeutic Equipments II	3	0	0	100
5	E1****	Elective I	3	0	0	100
6	E2****	Elective II	3	0	0	100
Practical						
7	BM1402	Hospital Training**	0	0	4	100
8	BM1403	Diagnostic and Therapeutic Equipments Laboratory	0	0	3	100
9	CS1410	Internet Programming Laboratory	0	0	3	100

**** No Examination**

SEMESTER VIII

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	BM1451	Hospital Management	3	0	0	100
2	BM1452	Medical Optics	3	0	0	100
3	E3****	Elective III	3	0	0	100
4	E4****	Elective IV	3	0	0	100
Practical						
5	BM1455	Project Work	0	0	12	100

ELECTIVES ODD SEMESTER

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	EC1023	Analog and Digital Communication	3	0	0	100
2	GE1001	Intellectual Property Rights (IPR)	3	0	0	100
3	GE1002	Indian Constitution and Society	3	0	0	100
4	CS1021	Soft Computing	3	0	0	100
5	BM1001	Physiological Modeling	3	0	0	100
6	BM1002	Bioinformatics	3	0	0	100
7	IC1007	Refrigeration and Air-Conditioning	3	0	0	100

ELECTIVES EVEN SEMESTER

S.No.	Subject Code	Subject	L	T	P	Max. Marks
Theory						
1	BM1003	Biofluids and Dynamics	3	0	0	100
2	BM1004	Tele-Health Technology	3	0	0	100
3	BM1005	Assist Devices	3	0	0	100
4	EC1024	VLSI Design	3	0	0	100
5	CS1030	Computer Networks	3	0	0	100
6	BM1006	Rapid Prototyping	3	0	0	100
7	GE1351	Professional Ethics and Human values	3	0	0	100
8	BM1007	Nano Electronics	3	0	0	100
9	CS1201	Data Structures	3	0	0	100

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Regulations 2007

Syllabus
B.E. BioMedical Engineering

SEMESTER III

MA1202 – TRANSFORMS AND RANDOM PROCESSES

L	T	P
3	1	0

UNIT I FOURIER TRANSFORMS 9

Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Transforms of derivative – Convolution theorem – Evaluation of integrals using fourier transform – Parseval's identity.

UNIT II FOURIER SERIES 9

Dirichlet's conditions – General fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of fourier Series – Parseval's identity – Harmonic analysis.

UNIT III PROBABILITY AND RANDOM VARIABLES 8

Probability concepts – Random variables – Moments – Moment generating function – Binomial – Poisson – Uniform – Normal distributions – Functions of a random variable.

UNIT IV TWO DIMENSIONAL RANDOM VARIABLES 8

Joint distribution – Marginal and conditional distributions – Covariance – Correlation and regression.

UNIT V RANDOM PROCESSES 11

Classification – Stationary and markov processes – Poisson pProcess – Properties – Pure Birth Process – Birth and death process – Markov chain – Auto – Correlation and cross – Correlation functions – Properties.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Grewal, B.S., “Higher Engineering Mathematics”, 40th Edition, Khanna Publishers, 2007.
2. Karlin, S. and Taylor, H.M., “An Introduction to Stochastic Modeling”, Academic Press, 2007.

REFERENCES

1. Veerarajan, T., “Probability, Statistics and Random Processes”, 2nd Edition, Tata McGraw Hill, 2006.
2. Richard A. Johnson, “Probability and Statistics for Engineers”, 7th Edition, Pearson Education, 2005.
3. Ramana, B.V., “Higher Engineering Mathematics”, Tata McGraw - Hill, 2007

BM1201 – HUMAN ANATOMY AND PHYSIOLOGY

L	T	P
3	0	0

UNIT I CELL AND NERVOUS SYSTEM 9

Cell Structure and organelles functions of each component in the cell – Different types of cells – Cell membrane – Transport across membrane – Origin of cell membrane potential – Action potential components – Nervous system – Structure of a neuron – Classification of neurons – Parts of brain cortical localization of functions – Conduction of action potential in neuron – Synaptic transmission – Parts of spinal cord, simple reflex, withdrawal reflex and autonomic nervous system.

UNIT II BLOOD 9

Blood composition – Functions of blood – RBC structure – Production of RBC. WBC types – productions of WBC cells and their functions – Blood groups – Importance of blood groups – Identification of blood groups – Platelet production and its functions.

UNIT III RESPIRATORY SYSTEM 9

Respiratory system parts of respiratory system (Trachea, Bronchi, muscle of respiration, thoracic cage, pleural membranes) – Mechanics of respiration – Volumes and capacities of lung – Carbon dioxide and oxygen transport – Types of hypoxia – Regulation of respiration – Circulatory system – parts, Structure of heart – Cardiac cycle – ECG – Heart sound – volume and pressure changes.

UNIT IV BONES AND MUSCLE 9

Bones and muscle – Orientation of body planes Classification of bones and types of joints – Types of muscles skeletal, cardiac and smooth muscle structure and their differences – Motor unit – Structure of neuro muscular junction – Excitation motor neuron and skeletal muscle contraction (change in potential – mechanical – energy changes – thermal – pH changes) – Effect of second stimulus – Fasciculation – Fibrillation – EMG.

UNIT V DIGESTIVE SYSTEM, EXCRETORY SYSTEM, VISION AND AUDITORY SYSTEMS 9

Digestive system parts (oral cavity, stomach, intestine, large intestine and accessory glands) – Digestion and absorption of carbohydrates, lipids and proteins
Excretory system – Parts, Structure of Kidney and nephron – Blood supply to kidney – Mechanism of urine formation – Vision and auditory systems – Structure of eye and ear, auditory and visual pathways.

Total: 45

TEXT BOOK

1. Elaine. N. Marieb, “Essential of human Anatomy and Physiology”, Pearson Education, 80th Edition, 2007.

REFERENCES

1. William F. Ganong, “Review of Medical Physiology”, 22nd Edition, Mc Graw Hill.
2. Jain, A.K., “Text Book of Physiology”, Vol. I and II, 3rd Edition, Avichal Publishing Company

EE1206 – ELECTRIC CIRCUITS AND NETWORKS

L T P
3 1 0

UNIT I BASICS OF CIRCUIT ANALYSIS 9

Kirchoff's laws – DC and AC excitation – Series and parallel circuits – Sinusoidal steady state analysis – Mesh current and node voltage method of analysis – Matrix method of analysis

UNIT II NETWORK THEOREMS AND RESONANCE CIRCUITS 9

Thevenin's and norton's theorems – Superposition theorem – Compensation theorem – Reciprocity theorem – Maximum power transfer theorem – Series and parallel resonance – Quality factor and bandwidth

UNIT III ANALYSIS OF NETWORKS IN 'S' DOMAIN 9

Network elements – Transient response of RL – RC and RLC Circuits to DC excitation – Natural and forced oscillations – Two-port networks – Parameters and transfer function – Interconnection of two-ports.

UNIT IV ELEMENTS OF NETWORK SYNTHESIS 9

Network realizability – Hurwitz polynomials – Positive real functions – Properties of RL – RC and LC networks – Foster and cauer forms of realization – Transmission zeroes – Synthesis of transfer functions.

UNIT V FILTER DESIGN 9

Butterworth and chebyshev approximation – Normalized specifications – Lowpass filter design – Frequency transformations – Frequency and Impedance denormalisation – Types of frequency selective filters – Linear phase filters – Active filter design concepts.

L:45 T:15 Total: 60

TEXT BOOKS

1. Sudhakar, A. and Shyammohan S. Palli, "Circuits and Networks Analysis and Synthesis", 2nd Edition, Tata McGraw-Hill, 2002.
2. Vasudev K. Aartre, "Network Theory and Filter Design", Wiley - Eastern Ltd, 2nd Edition, 1993.

REFERENCES

1. William H. Hayt and Jack E. Kermmerly, "Engineering Circuit Analysis", McGraw-Hill, 1993.
2. Joseph Edminister and Mahmood Nahri, "Electric Circuits", 3rd Edition, Tata McGraw-Hill, 1999.
3. Umesh Sinha, "Network Analysis and Synthesis", 5th Edition, Satyaprakashan, 2001
4. Franklin. F. Kuo, "Network Analysis and Synthesis", John Wiley, 1996.
5. Vanval Kenburg, "Network Analysis", Prentice Hall of India, 1994.

EC1206 – ELECTRONIC DEVICES AND CIRCUITS

L T P
3 1 0

UNIT I ELECTRON BALLISTICS AND APPLICATIONS 9

Force on charged particles in an electric field – Magnetic field – Calculation of electrostatic and magnetic deflection sensitivity in cathode ray tube – Analysis of parallel and perpendicular electric and magnetic fields – Cyclotron – Energy band structure of conductors – Intrinsic and extrinsic semiconductor – N and P type – Insulators – Hall effect.

UNIT II SEMICONDUCTOR DIODES 9

PN junction – Derivation of diode equation – Current components – Switching characteristics of diode – common diode applications – Characteristics and applications of varactor diode and zener diode – Mechanism of avalanche and zener breakdown – Backward diode – Tunnel diode – PIN diode – Point contact diode – Schottky barrier diode – Photo diode – APD – Light emitting diodes.

UNIT III BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS 9

Bipolar junction transistor – PNP and NPN action – Current components – Eber-Moll model – transistor switching times – Comparison of CE, CB and CC configuration – BJT applications – construction and characteristics of JFET – Relation between pinch-off voltage and drain current – MOSFET – Enhancement and depletion types – MESFET – Introduction to VMOS and CMOS devices.

UNIT IV TRANSISTOR BIASING 9

BJT – Operating point – Need for biasing – Various biasing methods of BJT – Bias stability – stability parameters – Biasing methods of FET – Use of JFET as a voltage variable resistor (VVR).

UNIT V POWER SUPPLY AND POWER AMPLIFIERS 9

Basic elements of regulated power supply system – Stabilization – Series and shunt voltage regulators – General purpose and monolithic linear regulators – Switching regulators – Classification of power amplifiers (Class A, B, AB, C and D) – Efficiency of class A – RC coupled and transformer – Coupled power amplifiers – Class B complementary – Symmetry – Push-pull power amplifiers.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Jacob Millman and Christos C.Halkias, “Electronic Devices and Circuits” Tata McGraw–Hill, 1991.
2. Robert T. Paynter, “Introductory Electronic Devices and Circuits”, 7th Edition, Pearson Education, 2006.

REFERENCES

1. Boylestad, R.L. and Nashelsky, L., “Electronic Devices and Circuit Theory”, Pearson Education, 1997
2. Donald A. Neaman, “Semiconductor Physics and Devices” 3rd Edition, Tata McGraw-Hill, 2002.
3. Salivahanan, S., Sureshkumar, N. and Vallavaraj, A., “Electronic Devices and Circuits”, TMH, 1998.

EC1205 – SIGNALS AND SYSTEMS

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3	1	0

UNIT I REPRESENTATION OF SIGNALS 9

Continuous and discrete time signals: Classification of signals – Periodic – Aperiodic even – Odd – Energy and power signals – Deterministic and random signals – Complex exponential and sinusoidal signals – Periodicity – Properties of discrete time – Complex Sulse – Unit step impulse functions – Transformation in independent variable of signals: Time scaling – Time shifting – Determination of fourier series representation of continuous time and discrete time periodic signals – Properties of continuous time and discrete time fourier series.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS 9

Continuous time fourier transform and laplace transform analysis with examples – Properties, parseval's relation – Convolution in time and frequency domains – Basic properties of continuous Time systems: Linearity – Causality – Time invariance – Stability – Magnitude and phase representations of frequency response of LTI systems – Analysis and characterization of LTI systems using laplace transform: Computation of impulse response and transfer function using laplace transform.

UNIT III SAMPLING THEOREM AND Z - TRANSFORMS 9

Representation of continuous time signals by its sample – Sampling theorem – Reconstruction of a signal from its samples – Aliasing – Discrete time processing of continuous time signals – Sampling of band pass signals – Basic principles of Z-transform – Definition – Region of convergence – Properties of ROC – Properties of Z-transform – Poles and zeros – Inverse Z- transform using contour integration – Residue theorem – Power series expansion and partial fraction expansion – Relationship between Z-transform and fourier transform.

UNIT IV DISCRETE TIME SYSTEMS 9

Computation of impulse response and transfer function using Z-transform – DTFT properties and examples – LTI – DT systems – Characterization using difference equation – Block diagram representation – Properties of convolution and the interconnection of LTI systems – Causality and stability of LTI systems.

UNIT V SYSTEMS WITH FINITE AND INFINITE DURATION IMPULSE RESPONSE 9

Systems with finite duration and infinite duration impulse response – Recursive and non-recursive discrete time system – Realization structures – Direct form – I-direct Form – II-transpose – Cascade and parallel forms.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Alan V. Oppenheim, Alan S. Willsky and S.Hamid Nawab, “Signals and Systems”, 2nd Edition, Pearson Education, 1997.
2. John G. Proakis and Dimitris G.Manolakis, “Digital Signal Processing-Principles, Algorithms and Applications”, 3rd Edition ,PHI, 2000.

REFERENCES

1. Roberts, M.J., “Signals and Systems Analysis using Transform Method and MATLAB”, TMH, 2003.
3. Simon Haykin and Barry Van Veen, “Signals and Systems”, John Wiley, 1999.
4. Moman H. Hays, “Digital Signal Processing”, Schaum’s outlines, Tata McGraw-Hill, 2004.
5. Ashok Amhardar, “Analog and Digital Signal Processing”, 2nd Edition, Thomson, 2002.

BM1202 – BIOCHEMISTRY

L T P
3 0 0

UNIT I FUNDAMENTALS 9

Biochemistry of living cell – Sub cellular fractionation using the differential centrifugation method – Function of each organelle Redox Potential – Oxidative Phosphorylation – Transport of substances across biological membrane

Nucleic Acid – Composition and Function – Genes – Outline of DNA Structure – Re – Combinant DNA and its applications

UNIT II ENZYMES AND HORMONES 9

Enzymes – Chemical Nature – General Properties – Spectrophotometric measurement of enzymes – Isolation techniques – Diagnostic enzymes – Enzyme biotechnology – Hormones – Chemical Nature – Properties of hormones – Hormonal Assay and their Significance.

UNIT III CARBOHYDRATE, LIPID, PROTEIN 9

- (i) Carbohydrate – Classification – Metabolism of carbohydrate and its dysfunction. Uses of Carbohydrates.
- (ii) Lipids – Classification – Metabolism of lipids – Cholesterol – bile acids – Transport of lipids – Lipid metabolism dysfunction.
- (iii) Protein – Classification – Amino acids – Chromatography – electrophoresis and architecture of protein molecules.

UNIT IV BIOFLUIDS 9

- (i) Bio Chemistry of Blood and Body Fluids
Liver Function tests – Renal Function Tests – Blood gas Analysis – Measurement of Electrolytes – Their abnormal and Normal Values and Conditions.
- (ii) Biochemistry of Urine and Stools testing.

UNIT V DIAGNOSTIC TOOL 9

Principles and Application of Photometry – Spectrophotometry – Flurometry– Flame Photometry – Densitometry – Calorimetry – Automation in Clinical Laboratory – Use of Isotopes in Biochemistry

Total: 45

TEXT BOOK

1. Dr. Ambiga Shanmugam, “Fundamentals of Bio Chemistry for Medical Students”, Karthic Printers, Madras, 1997.

BM1203 – BIO CHEMISTRY AND HUMAN PHYSIOLOGY LABORATORY

L	T	P
0	0	4

1. Recording of Muscle Response to Induced Electrical Stimulation
2. Study of rate of Conduction of Nerve Impulses.
3. Isolated Frog Heart Perfusion and Effect of ionic Changes.
4. Testing of Hearing using Tuning Fork.
5. Testing of various parameters of Vision and Errors of Refraction.
6. Testing for Detection of Glucose– Fructose and Starch.
7. General Test for Proteins
8. Testing of Urine for presence of Sugar – Protein
9. Estimation using Spectrophotometer

Total: 60

EE1207 – CIRCUITS AND NETWORKS LABORATORY

L	T	P
0	0	3

1. Verification of Kirchoff's Laws
2. Verification of Thevenin's and Norton' Theorem
3. Verification of Superposition and Reciprocity Theorem
4. Verification of Maximum power transfer and compensation theorem
5. Resonance circuits
6. Study of Transients
7. Study of Bridge Circuits
8. Filter design using Butterworth Approximation
9. Filter design using Chebyshev Approximation

Total: 45

EC1208 – ELECTRONIC DEVICES AND CIRCUITS LABORATORY

L	T	P
0	0	3

1. Measurement of characteristics of PN Junction Diode.
2. Measurement of characteristics of Zener Diode
3. Measurement of characteristics of Special Diodes such as
 1. Varactor Diode
 2. Tunnel Diode
 3. Photo Diode
2. Schottky Diode
4. Clipper and Clamper Circuits using Diode.
5. Design and testing of Rectifiers with and without Filters.
6. Input and Output characteristics of BJT and determination of h- parameters from the graph.
7. Output characteristics of JFET.
 - a.. Plot of Transfer characteristics from the output characteristics.
 - b. Determination of pinch off voltage and Ids
8. Fixed Bias amplifier circuits using BJT.
9. BJT Amplifier using voltage divider bias (self bias) with unbypassed emitter resistor.
10. Source follower with Bootstrapped gate resistance.
11. Measurement of UJT and SCR Characteristics.
 - a. Firing Characteristics of SCR.
 - b. Measurement of Intrinsic stands off ratio of UJT.
 - c. Measurement of DIAC and TRIAC Characteristics.
12. Measurement of Characteristics of Power Amplifiers (Class A, B and C)

Total: 45

SEMESTER IV

EE1261 – ELECTRICAL MACHINES

	L	T	P
UNIT I D.C. MACHINES	3	1	0
			9

Constructional details – emf equation – Methods of excitation – Self and separately excited generators – Characteristics of series, shunt and compound generators – Principle of operation of D.C. motor – Back emf and torque equation – Characteristics of series, shunt and compound motors – Starting of D.C. motors – Types of starters – Testing, brake test and Swinburne’s test – Speed control of D.C. shunt motors.

UNIT II TRANSFORMERS **9**

Constructional details – Principle of operation – emf equation – Transformation ratio – Transformer on no load – Parameters referred to HV/LV windings – Equivalent circuit – Transformer on load – Regulation – Testing – Load test, open circuit and short circuit tests.

UNIT III INDUCTION MOTORS **9**

Construction – Types – Principle of operation of three-phase induction motors – Equivalent circuit – Performance calculation – Starting and speed control – Single-phase induction motors (only qualitative treatment).

UNIT IV SYNCHRONOUS AND SPECIAL MACHINES **9**

Construction of synchronous machines–types – Induced emf – Voltage regulation; emf and mmf methods – Brushless alternators – Reluctance motor – Hysteresis motor – Stepper motor.

UNIT V TRANSMISSION AND DISTRIBUTION **9**

Structure of electric power systems – Generation, transmission, sub–transmission and distribution systems – EHVAC and EHVDC transmission systems – Substation layout – Insulators – cables.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. D.P.Kothari and I.J.Nagrath, “Basic Electrical Engineering”, Second Edition, Tata McGraw Hill, 2002.
2. C.L. Wadhwa, “Electrical Power Systems”, Wiley eastern, 1985.

REFERENCES

1. S.K.Bhattacharya, “Electrical Machines”, Second Edition, Tata McGraw Hill, 1998.
2. V.K.Mehta and Rohit Mehta, “Principles of Power System”, Third Edition, S.Chand and Company, 2003.

BM1252 – MEDICAL PHYSICS

L	T	P
3	0	0

UNIT I ATOMIC PHYSICS 10

Traditional definition of atom – periodic system of elements – mechanical properties of atom – emission of light and its frequencies – Electromagnetic spectra.

PRINCIPLES OF NUCLEAR PHYSICS

Natural radioactivity – Decay series – type of radiation and their applications – artificially produced isotopes and its application – accelerator principles – Radionuclides used in Medicine and technology.

UNIT II INTERACTION WITH LIVING CELLS 8

Target theory – single hit and multi target theory – cellular effects of radiation – DNA damage – depression of Macro molecular synthesis – Chromosomal damage.

UNIT III SOMATIC EFFECT OF RADIATION 8

Radio sensitivity protocol of different tissues in human – LD 50/30 effect of radiation on skin – blood forming organs – lenses of eye – embryo and Endocrinal glands.

UNIT IV GENETIC EFFECT OF RADIATION 10

Threshold of linear dose effect – relationship – factors affecting frequency of radiation induced mutation – Gene controlled hereditary diseases – biological effect of microwave and RF wave – Variation in dielectric constant and specific conductivity of tissues – Penetration and propagation of signals effects in various vital organs – Protection standards.

UNIT V PHOTO MEDICINE AND LASER PHYSICS 9

Photo Medicine – Synthesis of Vitamin D in early and late cutaneous effects – Phototherapy – Photo hemotherapy – exposure level – hazards and maximum permissible exposures.

Laser Physics – Characteristics of Laser radiation – Laser speckle – biological effects – laser safety management.

Total: 45

TEXT BOOKS

1. Moselly, “Non ionising Radiation”, Adam Hilgar Brustol, 1988.
2. Branski.S and Cherski.P “Biological effects of Microwave”, Hutchinson and ross, Strondsburg, 1980.

REFERENCE

1. Glasser. O. Medical, “Physics”, Vol.1 -2-3 year Book Publisher, 1980.

EC1258 – ANALOG AND DIGITAL INTEGRATED CIRCUITS

L T P
3 1 0

UNIT I OPERATIONAL AMPLIFIERS AND APPLICATIONS 10

Characteristics of ideal op amp – Virtual Short – differential amplifier – offset currents and voltages – Slew rate – 741 IC Specifications – inverting and non-inverting amplifiers – adder/ subtractor – instrumentation amplifier – voltage to current and current to voltage converters – dc voltage follower – differential dc amplifier – bridge amplifier – integrator – differentiator – active low pass – high pass and band pass active filters – precision diode and clamp – half wave rectifier – average detector – peak detector – log – antilog amplifiers – astable – monostable and triangular wave generators – Schmitt Trigger – analog multiplier.

UNIT II PHASE LOCKED LOOP AND APPLICATIONS D/A AND A/D CONVERTERS 10

Basic Principles – Phase comparator – Voltage controlled Oscillator – Lock Range – Capture Range – PLL IC 565 – Functional block Schematic of PLL – PLL applications – Frequency multiplication – frequency translation – AM – FM detection – D/A converter – A/D converters – Successive approximation – Parallel ADC – V to F ADC – Counter Ramp ADC.

UNIT III NUMBER SYSTEMS 9

Binary – Octal – Hexadecimal – Conversions between Number Systems – BCD – Gray and Excess 3 Representations – r's and (r-1)'s Complements – Subtraction using 1's and 2's. Complements – Binary to Gray – Gray to Binary Conversions – Alpha numeric codes – Boolean theorems – Minterm and maxterm representation – SOP and POS forms – Karnaugh maps – Tabulation methods – Logic gates – Truth tables – Realization of Boolean functions using Gates – Universal Gates.

UNIT IV MSI COMBINATIONAL CIRCUITS 7

Half and Full adders – Parallel binary adder – BCD adder – Half and Full subtractors – magnitude comparator – Decoder – Encoder – Multiplier – ROM – PLA – Boolean –Expression Implementation using these IC's.

UNIT V SEQUENTIAL CIRCUITS 9

Flip Flops – SR – JK – T – D – Characteristic equations – Excitation Tables – Design of counters using Excitation tables – Synchronous and Asynchronous Counters – 7490 – 74161 Counter IC specifications – Ring and Johnson Counters – Shift Registers – 74194 Shift Register IC Specifications.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Ramakant A. Gayakwad, "OP -AMP and Linear IC's", Prentice Hall, 1994.
2. Morris Mano. M, "Digital Logic and Computer Design", Prentice Hall of India, 2001.

REFERENCE

1. Millman. J Halkias. C.C., "Integrated Electronics", McGraw-Hill, 1972.

EC1207 – PRINCIPLES OF COMMUNICATION ENGINEERING

L T P
3 1 0

UNIT I AMPLITUDE MODULATION 9

Principles of Amplitude Modulation – AM Envelope – Frequency Spectrum and Bandwidth – Modulation Index and Percent Modulation – AM Power Distribution – AM Modulator Circuits – Low Level AM Modulator – Medium Power AM Modulator – AM Transmitters – Low Level Transmitters – High Level Transmitters – Receiver Parameters – AM Receivers – TRF – Super Heterodyne Receivers – Double Conversion AM Receivers.

UNIT II ANGLE MODULATION 9

Angle Modulation – FM and PM Waveforms – Phase Deviation and Modulation Index – Frequency Deviation – Phase and Frequency Modulators and Demodulators – Frequency Spectrum of Angle Modulated Waves – Bandwidth Requirement – Broadcast Band FM – Average Power FM and PM Modulators – Direct FM and PM – Direct FM Transmitters – Indirect Transmitters – Angle Modulation Vs. Amplitude Modulation. FM Receivers FM Demodulators – PLL FM Demodulators – FM Noise Suppression – Frequency Vs. Phase Modulation.

UNIT III DIGITAL MODULATION 9

Introduction – Binary PSK – DPSK – Differentially Encoded PSK – QPSK – M-Ary PSK – Binary FSK – MSK – GMSK – Duobinary Encoding – Performance Comparison of Various Systems of Digital Modulation.

UNIT IV BASEBAND DATA TRANSMISSION 9

Sampling Theorem – Quadrature Sampling of Bandpass Signals – Reconstruction of Message from its Samples – Signal Distortion in Sampling – Discrete PAM Signals – Power Spectra of Discrete PAM Signals – ISI Nyquist Criterion for Distortion Less Base Band Binary Transmission – Eye Pattern – Baseband M-ary PAM Systems – Adaptive Equalization for Data Transmission.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

Introduction – Pseudo-Noise Sequence – DS Spread Spectrum With Coherent Binary PSK – Processing Gain – FH Spread Spectrum – Multiple Access Techniques – Wireless Communications – TDMA And CDMA – Wireless Communication Systems – Source Coding of Speech for Wireless Communications.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Wayne Tomasi, "Electronic Communication Systems Fundamentals Through Advanced", Pearson Education, 2001.
2. Simon Haykin, "Digital Communications", John Wiley and Sons, 2003.

REFERENCES

1. Simon Haykin, "Communication Systems", Fourth Edition, John Wiley and Sons, 2001.
2. Taub and Schilling, "Principles of Communication Systems", Second Edition, TMH, 2003.
3. Martin S.Roden, "Analog and Digital Communication System", Third Edition, PHI, 2002.
4. Blake, "Electronic Communication Systems", Second Edition, Thomson Delman, 2002.

EE1260 – ELECTRICAL MACHINES LABORATORY

L T P
0 0 3

1. Open circuit and load characteristics of separately excited and self excited D.C. generator.
2. Load test on D.C. shunt motor.
3. Load test on D.C. series motor.
4. Swinburne's test and speed control of D.C. shunt motor.
5. Load test on single phase transformer and open circuit and short circuit test on single phase transformer
6. Regulation of three phase alternator by EMF and MMF methods.
7. Load test on three phase induction motor.
8. No load and blocked rotor tests on three phase induction motor (Determination of equivalent circuit parameters)
9. Load test on single-phase induction motor.
10. Study of D.C. motor and induction motor starters.

Total: 45

EC1259 – INTEGRATED CIRCUITS LABORATORY

L	T	P
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1. Integrator and Differentiator
2. Multivibrators using IC 555 Timer
1. Schmitt Trigger
2. Instrumentation Amplifier
3. Phase shift Oscillator and Wien Bridge Oscillator
4. Half Adder and Full Adder
5. Encoder and Decoder
6. Multiplexer
7. Shift Register
8. Decade Counter

Total: 45

BM1253 – PATHOLOGY AND MICROBIOLOGY LABORATORY

L T P
0 0 3

1. Haemoglobin Estimation.
2. Peripheral Smear Study.
3. Urine Smear Study
4. Cross matching of Blood.
5. Tissue Biopsy – Benign and Malignant.
6. Simple Stain test
7. Gram Stain test.
8. AFB Stain test.

Total: 45

SEMESTER V

EC1301 – MICROPROCESSORS AND MICROCONTROLLERS

L T P
3 1 0

UNIT I 8085 MICROPROCESSOR 9

8085 Architecture – Instruction Set – Addressing Modes – Timing Diagrams – Assembly Language Programming – Counters – Time Delays – Interrupts – Memory Interfacing – Interfacing , I/O devices.

UNIT II PERIPHERALS INTERFACING OF 8085 9

Interfacing Serial I/O (8251) – Parallel I/O (8255) – Keyboard and Display Controller (8279) – ADC/DAC Interfacing – Inter Integrated Circuits Interfacing (I²C Standard) – Bus: RS232C – RS485 – GPIB

UNIT III 8086 MICROPROCESSOR 9

8086 Internal Architecture – 8086 Addressing modes – Instruction Set – 8086 Assembly Language Programming – Interrupts.

UNIT IV 8051 MICROCONTROLLER 9

8051 Micro Controller Hardware – I/O Pins, Ports and Circuits – External Memory – Counters and Timers – Serial Data I/O – Interrupts – Interfacing to External Memory and 8255.

UNIT V 8051 PROGRAMMING AND APPLICATIONS 9

8051 Instruction Set – Addressing Modes – Assembly Language Programming – I/O Port Programming – Timer and Counter Programming – Serial Communication – Interrupt Programming – 8051 Interfacing – LCD – ADC – Sensors – Stepper Motors – Keyboard and DAC.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Ramesh S Gaonkar, “Microprocessor Architecture, Programming and application with 8085”, Fourth Edition, PHI, New Delhi, 2000.
2. John Uffenbeck, “The 80x86 Families, Design, Programming and Interfacing”, Third Edition, Pearson Education, 2002.
3. Mohammed Ali Mazidi and Janice Gillispie Mazidi, “The 8051 Microcontroller and Embedded Systems”, Pearson Education Asia, New Delhi, 2003.

REFERENCES

1. A.K. Ray and K.M.Burchandi, “Intel Microprocessors Architecture Programming and Interfacing”, TMH International Edition, 2000
2. Kenneth J Ayala, “The 8051 Microcontroller Architecture Programming and Application”, Second Edition, Penram International Publishers (India), New Delhi, 1996.
3. M. Rafiqzhan, “Microprocessors Theory and Applications: Intel and Motorola”, PHI Pvt. Ltd., New Delhi, 2003.

BM1351 – BIOMEDICAL INSTRUMENTATION

L	T	P
3	0	0

UNIT I **BIO–POTENTIAL ELECTRODES** **9**

Electrode Electrolyte Interface – Half–Cell Potential – Polarisation and Non–Polarisable Electrode – Calomel Electrode – Needle and Wire Electrode – Microelectrode – Metal Micropipette.

UNIT II **RECORDING SYSTEM** **9**

Low–Noise Preamplifier – Main Amplifier and Driver Amplifier – Inkjet Recorder– Thermal Array Recorder – Photographic Recorder – Magnetic Tape Recorder – X–Y Recorder – Medical Oscilloscope.

UNIT III **BIO–CHEMICAL MEASUREMENT** **9**

Ph – pO₂ – pCO₂ – pHCO₃ – Electrophoresis – Calorimeter – Spectro Photometer – Flame Photometer – Auto Analyser.

UNIT IV **NON–ELECTRICAL PARAMETER MEASUREMENTS** **9**

Respiration – Heart Rate – Temperature – Pulse Blood Pressure – Cardiac Output – O₂ – CO₂ Measurements.

UNIT V **BLOOD FLOW AND BLOOD CELL COUNTING** **9**

Electromagnetic and Ultrasonic Blood Flowmeter – Indicator Dilution Method – Thermodilution Method – Manual and Automatic Counting Of RBC – WBC and Platelets.

Total : 45

TEXT BOOK

1. Leslie Cromwell, “Biomedical Instrumentation and Measurement”, Prentice Hall of India, New Delhi, 1997.

REFERENCES

1. John G. Webster, “Medical Instrumentation Application and Design”, John Wiley and Sons, New York, 1998.
2. Khandpur R. S, “Handbook of Biomedical Instrumentation”, Tata McGraw–Hill, New Delhi, 1997.
3. Joseph J. carr and John M. Brown, “Introduction to Biomedical Equipment Technology”, John Wiley and Sons, New York, 1997.

UNIT I FAST FOURIER TRANSFORM 9

Introduction to DFT – Efficient Computation of DFT Properties of DFT – FFT Algorithms – Radix-2 FFT Algorithms – Decimation in Time – Decimation in Frequency Algorithms – Use Of FFT Algorithms in Linear Filtering and Correlation.

UNIT II DIGITAL FILTER DESIGN 9

Amplitude and Phase Responses of FIR Filters – Linear Phase Filters – Windowing Techniques for Design of Linear Phase FIR Filters – Rectangular, Hamming, Kaiser Window – Frequency Sampling Techniques – IIR Filters – Magnitude Response – Phase Response – Group Delay – Design of Low Pass Butterworth Filters (Low Pass) – Bilinear Transformation – Prewarping – Impulse Invariant Transformation.

UNIT III FINITE WORD LENGTH EFFECTS 9

Quantization Noise – Derivation for Quantization Noise Power – Fixed Point and Binary Floating Point Number Representation – Comparison – Over Flow Error – Truncation Error – Co-Efficient Quantization Error – Limit Cycle Oscillation – Signal Scaling – Analytical Model of Sample and Hold Operations.

UNIT IV POWER SPECTRUM ESTIMATION 9

Computation of Energy Density Spectrum – Auto Correlation and Power Spectrum of Random Signals. Periodogram – Use of DFT in Power Spectrum Estimation – Non Parametric Methods for Power Spectral Estimation: Bartlett and Welch Methods – Blackman and Tukey Method.

UNIT V DIGITAL SIGNAL PROCESSORS 9

Introduction to DSP Architecture – Harvard Architecture – Dedicated MAC Unit – Multiple Alus, Advanced Addressing Modes – Pipelining – Overview of Instruction Set of TMS320C5X and C54X.

L:45 T:15 TOTAL: 60

TEXT BOOKS

1. John G Proakis, Dimtris G Manolakis, “Digital Signal Processing Principles, Algorithms and Application”, PHI, Third Edition, 2000.
2. B. Venkataramani and M. Bhaskar, “Digital Signal Processor Architecture, Programming and Application”, TMH, 2002.

REFERENCES

1. Alan V Oppenheim, Ronald W Schafer, John R Back, “Discrete Time Signal Processing”, Second Edition, PHI, 2000.
2. Johny R.Johnson, “Introduction to Digital Signal Processing”, PHI, 1984.
3. S. K. Mitra, “Digital Signal Processing– A Computer based approach”, TMH, New Delhi, 1998.

HS1201 – ENVIRONMENTAL SCIENCE AND ENGINEERING

L	T	P
3	0	0

UNIT I IMPORTANCE OF ENVIRONMENTAL STUDIES 9

Definition – Scope and Importance – Need for Public Awareness – Forest Resources – Water Resources – Mineral Resources – Land Resources – Energy Resources – Food Resources – Equitable use of Resources for Sustainable Lifestyles.

UNIT II ECOSYSTEMS AND BIO DIVERSITY 9

Concept of Ecosystem – Structure and Function of an Ecosystem – Energy Flow in the Ecosystem – Food Chains – Food Webs – Ecological Pyramids – Definition of Bio-Diversity – Bio-Geographical Classification in India – Value of Bio-Diversity – Bio-Diversity at Global – National and Local Levels – India as a Mega Diversity Nation – Hot Spots of Bio Diversity – Threats to Bio Diversity – Conservation of Bio-Diversity.

UNIT III ENVIRONMENTAL POLLUTION 9

Definition – Causes and Effects of Environmental Pollution – Air Pollution – Water Pollution – Soil Pollution – Marine Pollution – Noise Pollution – Thermal Pollution – Nuclear Hazards – Solid waste management – Societal role in Pollution prevention – Environmental Disasters and management.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9

Unsustainable to Sustainable Development – Concept of Conservation – Water and Energy Conservation – Rain Water Harvesting – Climate Change – Global Warming – Acid Rain – Ozone Layer Depletion – Nuclear Accidents and Holocaust – Environmental Protection Act – Issues Involved in Enforcement of Environmental Legislation – Public Awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9

Population Growth – Population Explosion – Family Welfare Programme – Environment and Human Health – Human Rights – Value Education – HIV / AIDS – Women and Child Welfare – Role of IT in Environment and Human Health.

Total: 45

TEXT BOOKS

1. Gilbert M. Masters, “Introduction to Environmental Engineering and Science”, Pearson Education, 2nd Edition, 2004.
2. Miller T. G. Jr., “Environmental Science Working With the Earth”, Thomson Learning. 11th edition, 2006.
3. Trivedi R.K and P.K. Goel, “Introduction to Air Pollution”, Techno-Science Publications.

REFERENCES

1. Bharucha Erach, “The Biodiversity of India”, Mapin Publishing, Ahmedabad.
2. Trivedi R. K., “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II Environ Media.
3. Cunningham W. P. Copper, T.H. Gorhani, “Environmental Encyclopaedia”, Jaico Publ., Mumbai, 2001.

EC1305 – MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

L T P
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LIST OF EXPERIMENTS

1. Programs for 8/16 Bit Arithmetic Operations (Using 8085).
2. Programs for Sorting and Searching (Using 8085, 8086).
3. Programs for String Manipulation Operations (Using 8086).
4. Programs for Digital Clock and Stop Watch (Using 8086).
5. Interfacing ADC and DAC.
6. Parallel Communication between Two Microprocessor Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between Two Microprocessor Kits using 8251.
9. Interfacing and Programming of Stepper Motor and DC Motor Speed control.
10. Programming using Arithmetic, Logical and Bit Manipulation Instructions of 8051Microcontroller.
11. Programming and Verifying Timer, Interrupts and UART Operations in 8031 Microcontroller.
12. Communication between 8051 Microcontroller kit and PC.

Total: 45

BM1304 – BIOMEDICAL INSTRUMENTATION LABORATORY

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LIST OF EXPERIMENTS

1. Study of Biological Preamplifiers.
2. Recording of ECG Signal and Analysis.
3. Recording of Audiogram.
4. Recording of EMG.
5. Recording of EEG.
6. Recording of Various Physiological Parameters using Patient Monitoring System and Telemetry Units.
7. Measurement of pH, pO₂ and Conductivity.
8. Study and Analysis of Functioning and Safety Aspects of Surgical Diathermy.
9. Mini Project .

Total: 45

EC1306 – DIGITAL SIGNAL PROCESSING LABORATORY

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LIST OF EXPERIMENTS

USING TMS320C5X

1. Study of various Addressing Modes of DSP using Simple Programming Examples
2. Sampling of Input Signal and Display
3. Implementation of FIR Filter
4. Calculation of FFT

USING MATLAB

5. Generation of Signals
6. Linear and Circular Convolution of Two Sequences
7. Sampling and Effect of Aliasing
8. Design of FIR Filters
9. Design of IIR Filters
10. Calculation of FFT of a Signal

Total: 45

BM1352 – RADIOLOGICAL EQUIPMENTS

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UNIT I X-RAYS 10

Principles and production of soft and hard X-rays – Selection of anodes – Heel pattern – Scattered radiation – Porter bucky system – Cooling system.

UNIT II RADIO DIAGNOSIS 9

Radiography – Angiography – Fluoroscopy – Image intensifier – Multi section radiography.

UNIT III SPECIAL RADIOLOGICAL EQUIPMENTS 10

Principle – Plane of movement – Multi section radiography – CAT – Principle of NMR – MRI.

UNIT IV APPLICATION OF RADIOISOTOPES 10

Alpha, beta and gamma emission – Principle of radiation detectors – DOT scanners – Nuclear angiogram – Principles of radiation therapy.

UNIT V RADIATION SAFETY 6

Hazardous effect of radiation – Radiation protection techniques – Safety limits – Radiation monitoring.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Khandpur, R. S., “Handbook of Biomedical Instrumentation”, Tata McGraw–Hill Publishing Company Ltd., 1997.
2. Steve Webb, “The Physics of Medical Imaging “, Adam Hilger, 1988.

REFERENCE

1. Hendee, W.R. and Ritenour, E. R., “Medical Imaging Physics”, 3rd Edition, Mosby Year Book, 1992.
2. Donald Graham, Paul Cloke, Martin Vosper, “Principles of Radiological Physics”, Elsevier Health Sciences, 2007

CS1364 – OBJECT ORIENTED PROGRAMMING AND JAVA

L	T	P
3	0	0

UNIT I BASIC CONCEPTS 8

Object – Oriented paradigm – Elements of object oriented programming – Merits and demerits of OO methodology – C++ fundamentals – Data types – Operators and expressions – Control flow – Arrays – Strings – Pointers and functions.

UNIT II PROGRAMMING IN C++ 10

Classes and objects – Constructors and destructors – Operator overloading – Inheritance – Virtual functions and polymorphism.

UNIT III FILE HANDLING 9

C++ streams – Console streams – Console stream classes – Formatted and unformatted console I/O operations – Manipulators – File streams – Classes file modes file pointers and manipulations file I/O – Exception handling.

UNIT IV JAVA FUNDAMENTAL 9

Basics of java – Data types – Variables and arrays – Operators – Control statements – Classes – Objects – Methods – Inheritance.

UNIT V JAVA PROGRAMMING 9

Packages and interfaces – Exception handling – Multithreaded programming – Strings – Input / Output.

Total: 45

TEXT BOOKS

1. Venugopal, K. R., Rajkumar Buyya, and Ravishankar, T., “Mastering C++”, TMH, 2003.
2. Herbert Schildt, “The Java 2 Complete Reference”, 4th Edition, TMH, 2002.

REFERENCES

1. Ira Pohl, “Object oriented programming using C++”, Pearson Education, 2003.
2. Bjarne Stroustrup, “The C++ Programming Language”, Addison Wesley, 2000.
3. Balagurusamy, E., “Object Oriented Programming with C++”, TMH, 2nd Edition, 2005.

EC1362 – DIGITAL IMAGE PROCESSING LABORATORY

L	T	P
0	0	3

1. To Study the Image Fundamentals.
2. To Convert Between Color Models.
3. To Learn Mathematical Transforms Necessary for Image Processing.
4. To Perform Edge Detection Algorithm.
5. Types of Filters in Spatial Domain.
6. To Study the Image Enhancement Techniques.
7. To Study Image Restoration Procedures.
8. To Perform Text and Image Compression Procedures.

Total: 45

CS1365 – OBJECT ORIENTED PROGRAMMING LABORATORY

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C++

- 1. Programs Using Functions**
 - Functions with Default Arguments
 - Implementation of Call by Value , Call by Address and Call by Reference
- 2. Simple Classes for understanding objects – member functions and Constructors**
 - Classes with Primitive Data Members
 - Classes with Arrays as Data Members
 - Classes with Pointers as Data Members – String Class
 - Classes with Constant Data Members
 - Classes with Static Member Functions
- 3. Compile time Polymorphism**
 - Operator Overloading including Unary and Binary Operators.
 - Function Overloading
- 4. Runtime Polymorphism**
 - Inheritance
 - Virtual Functions
 - Virtual Base Classes
 - Templates
- 5. File Handling**
 - Sequential Access
 - Random Access

JAVA

- 6. Simple Java applications**
 - for Understanding Reference to an Instance of a Class (object) – Methods
 - Handling Strings in Java
- 7. Simple Package creation**
 - Developing user Defined Packages in Java
- 8. Interfaces**
 - Developing User – Defined Interfaces and Implementation
 - Use of Predefined Interfaces
- 9. Threading**
 - Creation of Thread in Java Applications
 - Multithreading
- 10. Exception Handling Mechanism in Java**
 - Handling Pre - defined Exceptions
 - Handling User - defined Exceptions

Total: 45

HS1301 – COMMUNICATION AND SOFT SKILLS LABORATORY

L T P

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(Common to All Branches of III Year B.E./ B.Tech students of Anna University Tiruchirappalli and affiliated colleges)

The aim of the course is two-fold: to enable the students to develop communication skills in the language laboratory and to arrange discussions for developing soft skills in the lab and/or classroom. Each lab session shall last for three periods.

List of activities that are to be carried out: (15 sessions x 3 periods = 45)

Lab session # 1: Listening and speaking practice exercises with communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 2: Practice with more advanced communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 3: Pronunciation exercises with Oxford Advanced Learners Dictionary of Current English or any other standard Dictionary

Lab session # 4: Making an oral presentation in English. Learning Material: Professional Presentations VCD (Cambridge University Press)

Lab session # 5: Listening to telephone conversations in English and completing the tasks. Learning material: Essential Telephoning in English ACD (Cambridge University Press)

Lab session # 6: Giving an exposure to and practice with model group discussion and interviews. Learning material: How to Prepare for Group Discussion and Interview Audio Cassette (McGraw-Hill)

Lab session # 7: Giving insights into the format and the task types in the IELTS (International English Language Testing System). Learning Material: Objective IELTS, Intermediate Level (CUP)

Lab session # 8: Understanding the format and the task types in the TOEFL (Test of English as a Foreign Language). Learning Material: Understanding the TOEFL (Educational Testing Services, Princeton)

Lab session # 9: Administering the BEC (Business English Certificate) Diagnostic Test. Learning Material: BEC Practice Materials (British Council, Chennai)

Lab session # 10: Completing the steps involved in Career, Life Planning and Change Management. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 11: Setting goals and objectives exercises. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 12: Prioritizing and time planning exercises. Learning Material: Managing Time Multimedia Program CD

Lab session # 13: Taking a Personality Typing/ Psychometric Test Learning Material: 200 Psychometric Test prepared by the CUIC, Anna University Chennai

Lab session # 14: Critical and creative thinking exercises.

Lab session # 15: Improving body language and cross-cultural communication with pictures. Learning material: Body Language (S. Chand and Co.)

For a detailed plan, refer to the topics given below;

UNIT I LISTENING AND SPEAKING PRACTICE IN COMMUNICATIVE FUNCTIONS

Introductions and meetings – Talking about studies and or job – Expressing likes and dislikes – Describing daily routines and current activities – Talking about past states and events – Talking about future plans and intentions – Expressing preferences – Giving reasons – Expressing opinions, agreement and disagreement – Seeking and giving advice – Making suggestions.

UNIT II SPEAKING APPLICATIONS

Making an oral presentation – Preparing the presentation – Performing the presentation – Beginning – Language – Visual aids and body language – Voice – Ending – Questions – Telephone conversations – Group discussion and interview.

UNIT III UNDERSTANDING AND PREPARING FOR INTERNATIONAL ENGLISH LANGUAGE EXAMINATIONS

International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Business English Certificate (BEC)

UNIT IV SOFT SKILLS (1)

Preparing for and dealing with change – Motivation, goal-setting and self-esteem – Managing time and stress – Career and life planning – Team work – Leadership traits.

UNIT V SOFT SKILLS (2)

Multiple intelligences – Learning styles and personality typing – Critical and creative thinking – People, cultures and self – Intercultural communication.

RESOURCES

1. Kamalesh Sadanand and Susheela Punitha, “Spoken English: A Foundation Course” for Speakers of Indian Languages, Part 2 Audio CD, Hyderabad: Orient Longman, 2008.
2. Malcome Goodale, “Professional Presentations”, (VCD) New Delhi: Cambridge University Press, 2005.
3. Barbara Garside and Tony Garside, Essential Telephoning in English (Audio CD), Cambridge: Cambridge University Press, 2002.
4. Hari Mohan Prasad and Rajnish Mohan, “How to Prepare for Group Discussion and Interview (Audio Cassette)”, Tata McGraw-Hill Publishing.
5. International English Language Testing System Practice Tests, CUP.
6. Business English Certificate Materials, Cambridge University Press.
7. Understanding the TOEFL. Educational Testing Services, Princeton, US.
8. Interactive Multimedia Programs on Managing Time and Stress.
9. Robert M. Sherfield and et al “Developing Soft Skills”, 4th Edition, Pearson Education, 2009.

L: 15 P: 45 Total: 60

SEMESTER VII
MG1352 – TOTAL QUALITY MANAGEMENT

L T P
3 0 0

UNIT I INTRODUCTION 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 – Customer retention – Employee involvement – Motivation – Empowerment – Teams – Recognition and reward – Performance appraisal – Benefits – Continuous process improvement – Juran trilogy – PDSA 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, TS 16949 – ISO 14000 – Concept – Requirements and benefits.

Total : 45

TEXT BOOK

1. Dale H. Besterfield, et al., "Total Quality Management", Pearson Education, Inc. 2003, Indian reprint 2004. ISBN 81-297-0260-6.

REFERENCES

1. James R. Evans and William M. Lidsay, "The Management and Control of Quality", 5th Edition, South Western (Thomson Learning), 2002, ISBN 0-324-06680-5.
2. Feigenbaum .A. V., "Total Quality Management", Tata McGraw Hill, 1991.
3. Oakland.J.S., "Total Quality Management" Butterworth – Heinemann Ltd., 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.

CS1408 – PATTERN RECOGNITION AND NEURAL NETWORKS

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UNIT I FUNDAMENTALS AND DECISION MAKING 9

Basics – Examples – Statistical decision theory.

UNIT II DISCRIMINATION ANALYSIS 9

Linear discriminant analysis – Flexible discriminants.

UNIT III NEURAL NETWORKS 9

Feed-forward neural networks – Non-parametric methods – Tree-structured classifiers – Belief networks.

UNIT IV UNSUPERVISED ANALYSIS 9

Unsupervised methods finding good pattern features.

UNIT V APPLICATIONS 9

Application of pattern recognition in medicine – Application of neural networks in medicine – Case studies.

Total : 45

TEXT BOOKS

1. Ripley B.D., “Pattern Recognition and Neural Networks”, Cambridge University Press, 2001
2. Earl Gose, Richard Johnsonbaugh and Steve Jost, “Pattern Recognition and Image Analysis”, Prentice Hall of India Pvt. Ltd., 1999.

REFERENCES

1. Jang J.S.R., Sun C.T. and Mizutani, E., “Neuro-Fuzzy and Soft Computing”, PHI, Pearson Education, 2004.
2. Bishop C.M., “Pattern Recognition and Machine Learning”, Springer, 2006.

CS1409INTERNET PROGRAMMING

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UNIT I BASIC INTERNET CONCEPTS 8

Connecting to the internet – Domain name system – Exchanging e-mail – Sending and receiving files – Fighting spam – Sorting mail and avoiding e-mail viruses – Chatting and conferencing on the internet – Online chatting – Messaging – Usenet newsgroup – Internet Relay Chat (IRC) – Instant messaging – Voice and video conferencing.

UNIT II WORLD WIDE WEB 8

Overview – Web security – Privacy and site blocking – Audio and video on the web – Creating and maintaining the web – Web site creation – Web page editors – Optimizing web graphics – Web audio files – Forms – Interactivity and database driven web sites – File transfer and downloading – FTP – Peer to peer – Downloading and installing software.

UNIT III ADVANCED JAVA PROGRAMMING 12

Java fundamentals overview – AWT package – Layouts – Containers – Event package – Event model – Painting – Garbage collection – Multithreading – Language packages – Utility packages – Input output packages – Inner classes – Java database connectivity – Servlets – RMI – Java beans.

UNIT IV HTML 9

HTML – Concepts of tags – Layout – Comments – Paragraphs – Aligning – Line break – Style tags – Address – Links – Formatting – Relative and absolute path – Images – Graphical link to images – CGI – Introduction to java script and perl – Web browsers.

UNIT V XML 8

XML – DHTML – Overview of e-commerce and internet security – JSP – ASP.

L: 45 P: 15 Total: 60

TEXT BOOKS

1. Margaret Levine Young, “Internet and www”, 2nd Edition, Tata McGraw Hill, 2002.
2. Herbert Schildt, “The complete reference, java 2”, 4th Edition, Tata McGraw Hill, 2001.

REFERENCES

1. Keyur Shah, “Gateway to Java Programmer Sun Certification”, Tata McGraw Hill, 2002.
2. Deitel and Deitel, “Java How to Program”, Prentice Hall, 1999.
3. Comer D and Stevans D., “Internetworking with TCP/IP Vol 1”, 3rd Edition, PHI, 1998.
4. John R. Habbard, “Programming with Java, Schaum’s Outline Series”, McGraw Hill, 1999.

BM1402 – DIAGNOSTIC AND THERAPEUTIC EQUIPMENTS II

L	T	P
3	0	0

UNIT I ULTRASONIC TECHNIQUES FOR DIAGNOSIS 10

Basic principles of echo technique – Display techniques – A, B, M modes – Echo cardiograms – Echo encephalogram – Ultrasonic applied as diagnostic tool in ophthalmology – Obstetrics and gynaecology.

UNIT II PATIENT MONITORING AND BIOTELEMETRY 9

Patient monitoring system – ICU – Post operative – ICCU – Single channel telemetry – Multichannel telemetry – Frequency allotment – Radiopill – Transmission of biosignals over telephone lines.

UNIT III DIATHERMY 9

Clinical applications of electrotherapy – Short wave diathermy – Ultrasonic diathermy – Microwave diathermy – Surgical diathermy unit – IR lamps – UV lamps.

UNIT IV SPECIAL DIAGNOSTIC TECHNIQUES 9

Principles of cryogenic technique and application – Endoscopy – Laproscopy – Thermography.

UNIT V PATIENT SAFETY 8

Sources of leakage current – Micro and macro shock – Monitoring circuits – Earthing schemes.

Total: 45

TEXT BOOKS

1. Khandpur, R.S., “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, 1997.
2. John G. Webster, “Medical Instrumentation Application and Design”, 4th Edition, Wiley (February 3, 2009)

REFERENCES

1. John G. Webster, “Medical Instrumentation Application and Design”, John Wiley and Sons, 1998.
2. Joseph J. Carr and John M. Brown, “Introduction to Biomedical Equipment Technology”, John Wiley and Sons, 1997.

BM1403 – DIAGNOSTIC AND THERAPEUTIC EQUIPMENT LABORATORY

L	T	P
0	0	3

1. Study of ultrasonic transducers and displays.
2. Study of pacemaker.
3. Multichannel biotelemetry.
4. Shortwave and ultrasonic diathermy.
5. Multichannel data acquisition system.
6. Simulation of biosignals.
7. Analysis of ECG signals.
8. Analysis of EEG signals.
9. Leakage current and electrical safety measurements.
10. Mini project.

Total : 45

CS1410 – INTERNET PROGRAMMING LABORATORY

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1. Programs using utility packages.
2. Programs using event orientation handling mechanism.
3. Implement the file operations.
4. Programs using TCP and UDP connections
5. Program using applets.
6. Program using JDBC.
7. Program using JNI concepts.
8. Program to Illustrate the use of remote method invocation.
9. Program using servlets.
10. Program using HTML
11. Schema design using XML
12. Web page Creation using XML

Total : 45

ELECTIVES SEVENTH SEMESTER

EC1023 – ANALOG AND DIGITAL COMMUNICATION

L T P
3 0 0

UNIT I MODULATION SYSTEMS

9

AM – Single sideband and double sideband modulation – Vestigial sideband modulation – FM phase and frequency modulation – FM spectral analysis – FM bandwidth – AM modulators and FM modulators – AM transmitters and FM transmitters.

UNIT II RECEIVERS

9

Sensitivity – Selectivity – AM receivers – FM receivers – Noise in AM and FM systems, SNR in AM receivers – Signal to Noise power in FM – Pre-emphasis and De-emphasis.

UNIT III ANALOG TO DIGITAL CONVERSION

9

Sampling theorem – Pulse Amplitude Modulation (PAM) – Pulse Width Modulation (PWM) – Pulse Position Modulation (PPM) – Pulse Code Modulation (PCM) – Digital modulation and demodulation system – ASK – FSK – PSK.

UNIT IV INFORMATION THEORY

9

Average information – Information rate – Shannon's theorem – Channel capacity – Bandwidth – S/N trade off.

UNIT V SATELLITE ACCESS

9

Modulation and multiplexing voice – Data – Video – Analog-Digital transmission system – Digital video broadcast – Multiple access – FDMA – TDMA – CDMA – Assignment methods – Spread spectrum communication – Compression – Encryption.

Total: 45

TEXT BOOK

1. Wayne Tomasi, "Electronic Communication Systems, Fundamentals Through Advanced", 4th Reprint, LPE, Pearson Education, 2001.

REFERENCE

1. Taub and Schilling, "Principles of Communication Systems", McGraw-Hill, 1986.

GE1001 – INTELLECTUAL PROPERTY RIGHTS (IPR)

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UNIT I **5**

Introduction – Invention and creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property – Movable property – Immovable property and – Intellectual property.

UNIT II **10**

IP – Patents – Copyrights and related rights – Trade marks and rights arising from trademark registration – Definitions – Industrial designs and integrated circuits – Protection of geographical indications at national and international levels – Application procedures.

UNIT III **10**

International convention relating to intellectual property – Establishment of WIPO – Mission and activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV **10**

Indian position Vs WTO and strategies – Indian IPR legislations – Commitments to WTO – Patent ordinance and the bill – Draft of a national intellectual property policy – Present against unfair competition.

UNIT V **10**

Case studies on – Patents (Basumati rice, Turmeric, Neem, etc.) – Copyright and related rights – Trade marks – Industrial design and integrated circuits – Geographic indications – Protection against unfair competition.

Total: 45

TEXT BOOK

1. Subbaram, N.R., “Handbook of Indian Patent Law and Practice”, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.

REFERENCES

1. Eli Whitney, United States Patent Number : 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000, www.ipmatters.net/features/000707_gibbs.html.

GE1002 – INDIAN CONSTITUTION AND SOCIETY

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UNIT I 9

Historical background – Constituent assembly of India – Philosophical foundations of the Indian constitution – Preamble – Fundamental rights – Directive principles of state policy – Fundamental duties – Citizenship – Constitutional remedies for citizens.

UNIT II 9

Union government – Structures of the union government and functions – President – Vice president – Prime minister – Cabinet – Parliament – Supreme court of India – Judicial review.

UNIT III 9

State government – Structure and functions – Governor – Chief minister – Cabinet – State legislature – Judicial system in states – High courts and other subordinate courts.

UNIT IV 9

Indian federal system – Center – State relations – President's rule – Constitutional amendments – Constitutional functionaries – Assessment of working of the parliamentary system in India.

UNIT V 9

Society – Nature, meaning and definition – Indian social structure – Caste – Religion, language in India – Constitutional remedies for citizens – Political parties and pressure groups – Rights of women – Children and scheduled castes and scheduled tribes and other weaker sections.

Total: 45

TEXT BOOKS

1. Durga Das Basu, "Introduction to the Constitution of India", 19th Edition, Prentice Hall of India, 2008.
2. Agarwal, R.C., "Indian Political System", S.Chand and Company, 1997.
3. Maciver and Page, "Society: An Introduction Analysis", Mac Milan India Ltd., New Delhi
4. Sharma K.L., "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, 1997.

REFERENCES

1. Sharma and Brij Kishore, "Introduction to the Constitution of India", Prentice Hall of India, 2007.
2. Gahai, U.R., "Indian Political System", New Academic Publishing House, 1998.
3. Sharma, R.N., "Indian Social Problems", Media Promoters and Publishers Pvt. Ltd, 1999.
4. Yogendra Singh, "Social Stratification and Change in India", Manohar, 1977.

CS1021 – SOFT COMPUTING

L T P

3 0 0

UNIT I FUZZY SET THEORY 10

Introduction to neuro, fuzzy and soft computing – Fuzzy sets – Basic definition and terminology – Set-theoretic operations – Member function formulation and parameterization – Fuzzy rules and fuzzy reasoning – Extension principle and fuzzy relations – Fuzzy If-Then rules – Fuzzy reasoning – Fuzzy inference systems – Mamdani fuzzy models – Sugeno fuzzy models – Tsukamoto fuzzy models – Input space partitioning and fuzzy modeling.

UNIT II OPTIMIZATION 8

Derivative-based optimization – Descent methods – The method of steepest descent – Classical newton's method – Step size determination – Derivative-free optimization – Genetic algorithms – Simulated annealing – Random search – Downhill simplex search.

UNIT III NEURAL NETWORKS 10

Supervised learning neural networks – Perceptrons – Adaline – Backpropagation multilayer perceptrons – Radial basis function networks – Unsupervised learning neural networks – Competitive learning networks – Kohonen self-organizing networks – Learning vector quantization – Hebbian learning.

UNIT IV NEURO FUZZY MODELING 9

Adaptive neuro-fuzzy inference systems – Architecture – Hybrid learning algorithm – Learning methods that cross-fertilize ANFIS and RBFN – Coactive neuro fuzzy modeling – Framework neuron functions for adaptive networks – Neuro fuzzy spectrum.

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE 8

Printed character recognition – Inverse kinematics problems – Automobile fuel efficiency prediction – Soft computing for color recipe prediction.

Total: 45

TEXT BOOKS

1. Jang J S.R., Sun, C.T and Mizutani E., "Neuro-Fuzzy and Soft Computing", PHI, Pearson Education 2004.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.

REFERENCES

1. Davis E. Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, 1989.
2. Rajasekaran, S. and Pai, G.A.V., "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
3. Eberhart, R., Simpson, P. and Dobbins R., "Computational Intelligence – PC Tools", AP Professional, 1996.

BM1001 – PHYSIOLOGICAL MODELLING

L T P
3 0 0

UNIT I INTRODUCTION 9

System concept – System properties – Piece-wise linear approximation – Electrical analog for compliance – Thermal storage – Pulse response of first order systems – Response of resistant and compliance system.

UNIT II TRANSFER FUNCTIONS 9

Transfer functions and its use – Engineering concept in coupled system – Example of transformed signals.

UNIT III IMPEDANCE CONCEPT 9

Circuits for the transfer function with impedance concept – Prediction of performance – Periodic signals.

UNIT IV FEEDBACK SYSTEMS 9

Characteristics of physiological feedback systems – Uses and testing of system stability.

UNIT V SIMULATION OF BIOLOGICAL SYSTEMS 9

Simulation of thermal regulation – Pressure and flow control in circulation – Occulo motor system – Endocrinal system – Functioning of receptors.

Total: 45

TEXT BOOKS

1. William B. Blesser, “A System Approach to Bio–medicine”, McGraw–Hill book co., 1969.
2. Michael C. K. Khoo , “Physiological Control Systems: Analysis, Simulation, and Estimation (IEEE Press Series on Biomedical Engineering)”, Wiley-IEEE Press ,1999.

REFERENCES

1. Manfreo Clynes and John H. Milsum, “Bio–medical Engineering System”, McGraw–Hill Book co., 1970.
2. Douglas S. Regs, “Control Theory and Physiological Feedback Mechanism”, The William and Williams co., 1970.

BM1002 – BIOINFORMATICS

L T P
3 0 0

UNIT I BASICS 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 on transmission of genetic information – Genomes of prokaryotes – Genomes of eukaryotes – Human genome – Snips – Genetic diversity – Evolution of genomes.

UNIT III ARCHIVES AND INFORMATION RETRIEVAL 9

Introduction – Data base indexing – analysis of retrieved data – The archives – Nucleic acid sequence – genome data bases – protein sequence data bases – Gateways to archives Sequence Retrieval system(SRS) – Protein Identification Resources (PIR) – Expert protein Analysis system(ExPASy) .

UNIT IV ALIGNMENTS AND PHYLOGENETIC TREES 9

Introduction to sequence alignment – The Dot-plot – Dot-plots 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

TEXT BOOKS

1. Arthur M. Lesk, “Introduction to Bioinformatics”, Oxford University Press, 2004.
2. N. Gautham , “Bioinformatics: Databases and Algorithms (Hardcover)”, Alpha Science International Ltd ,2005.

REFERENCE

1. Attwood T.K and Parry-Smith D.J., “Introduction to Bioinformatics”, Pearson Education Asia, 2001.

IC1007 – REFRIGERATION AND AIR CONDITIONING

L T P
3 0 0

UNIT I REFRIGERATION CYCLES & REFRIGERANTS 9

Vapour compression refrigeration cycle – Simple saturated vapour compression refrigeration cycle – Thermodynamic analysis – Refrigerant classification – Designation – Alternate refrigerants – Global warming, potential and ozone depleting potential aspects.

UNIT II SYSTEM COMPONENTS 9

Refrigerant compressors – Reciprocating open and hermetic type – Screw compressors and scroll compressors – Construction and operation characteristics – Evaporators – DX coil – Flooded type chillers expansion devices – Automatic expansion valves – Capillary tube and thermostatic expansion valves – Condensing units and cooling towers.

UNIT III CYCLING CONTROLS AND SYSTEM BALANCING 9

Pressure and temperature controls – Range and differential settings – Selection and balancing of system components – Graphical method.

UNIT IV PSYCHROMETRY 9

Moist air behaviour – Psychrometric chart – Different psychrometric process analysis.

UNIT V AIR CONDITIONING 9

Summer and winter air-conditioning – Cooling load calculations – Air distribution patterns – Dynamic and frictional losses in air ducts – Equal friction method – Fan characteristics in duct systems.

Total: 45

TEXT BOOKS

1. Stocker W.F and Jones J.W., “Refrigeration and Air Conditioning” McGraw Hill Book Company, 1985.
2. Althouse A.D., Turnquist C.H. and Bracianno A.F., “Modern Refrigeration and Air Conditioning - Study Guide”, 18th Edition, Goodheart-Willcox Co Inc. 2003.

REFERENCES

1. Dossat R.J., “Principles of Refrigeration”, John Wiley and Sons Inc., 1989.
2. Manohar Prasad, “Refrigeration and Air Conditioning”, Wiley Eastern Ltd., 1995.

ELECTIVES FOR EIGHTH SEMESTER

BM1003 – BIO FLUIDS AND DYNAMICS

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UNIT I INTRODUCTORY CONCEPTS 9

Fluids and non-fluids – Continuum coordinate systems – Force and moments – Stress at a point – Rate of strain – Properties of fluids – Classification of fluids.

UNIT II FLUID FLOW 9

Different types of fluid flows – Laminar and turbulent flow – Transition from laminar to turbulent flow – Laminar flow – Annulus – Laminar flow between parallel plates – Measurement of viscosity.

UNIT III BOUNDARY LAYER FLOW 9

Development of boundary layer – Estimates of boundary layer thickness – Boundary layer equation – Nature of turbulence – Smooth and rough surface – Boundary layer separation.

UNIT IV PRESSURE AND FLOW IN BLOOD VESSELS 9

Friction loss in flow in a tube – Velocity distribution of Aortic system – Waveform of pressure and velocity in Aorta – Wave reflections and impedance in Arterial segments – Blood flow in Veins and blood flow in capillaries.

UNIT V ANALYSIS OF CARDIO VASCULAR DYNAMICS 9

Control theory and system analysis – Mechanical analysis of circulatory systems – Basic concept of myocardial mechanics – Index of contractibility – Fluid dynamics of Aortic and Mitral valves.

Total: 45

TEXT BOOK

1. Kumar K. L., “Engineering Fluid Mechanics”, Eurasia Publishing House Pvt.Ltd., 1998.
2. Bergel D. H., “Cardiovascular Fluid Dynamics” Vol. I, Academic press, London and New York, 1972.

REFERENCES

1. Clayton T. Crowe, Donald F. Elger, and John A. Roberson, “Engineering Fluid Mechanics”, 7th Edition, John Wiley & Sons 2000
2. Michael J. Moran, “Fundamentals of Engineering Thermodynamics: AND Brief Fluid Mechanics”, 6th Revised Edition, John Wiley & Sons, 2008.

BM1004 – TELE-HEALTH TECHNOLOGY

L T P
3 0 0

UNIT I CONCEPTS 9

Tele-medicine – Tele-healthcare and E-medicine – Use of computers in distance mode of healthcare delivery.

UNIT II COMMUNICATION SYSTEMS AND NETWORKS IN TELE-HEALTH TECHNOLOGY 9

Web technology – Satellite communication systems – Hypertext, voice and image transfer protocols – Medical image scanning – Data compression and transfer – Capturing of medical signals – Analog to digital conversion – Video conferencing – Remote sensing – Rural primary setups – Referral and super specialty centers – Societal medico legal aspects – Networking (Local, National and Global) – Information security and confidentiality modelling and functions of PACS and HIS.

UNIT III APPLICATIONS 9

Introduction – Archives – CABRI (Common Access to Biological Resources and Information) – Database indexing and search terms – Nucleic and genome databases – Molecular data base and servers – Array express – Gateway to archives- Sequential retrieval system- Protein Identification Resource(PIR)

UNIT IV ADVANCED APPLICATIONS 9

Telecardiology – Teledermatology – Teleneurology – Teleophthalmology – Telepathology – Telepediatrics – Telepharmacy – Telepsychiatry and mental health – Teleradiology – Telesurgery – Veterinary – Other specialties

UNIT V CASE STUDIES 9

Tele- health technology and Health care delivery for rural population – use of tele -health technology for clinical diagnostic study – conceptual frame work on home tele- health care.

Total: 45

TEXT BOOK

1. Marilyn J. Field, “A Guide to Assessing Telecommunications in Health Care”, NATIONAL ACADEMY PRESS,1996.
2. Bashshur , R. L. , Sanders, J. H and Shannon, G. W.,“Telemedicine: Theory and Practice”, Volume 27, Number 2, Springer Netherlands,1999,

REFERENCES

1. <http://tie.telemed.org/links/specialties.asp>
2. Refer Telemedicine Journal and E-Health for further reference

EC1024 – VLSI DESIGN

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UNIT I MOS TECHNOLOGY AND CIRCUITS 9

MOS technology and VLSI – Process parameters and considerations for BJT, MOS and CMOS – Electrical properties of MOS circuits and device modelling.

UNIT II MOS CIRCUIT DESIGN PROCESS 9

MOS layers – Stick diagram – Layout diagram – Propagation delays – Examples of combinational logic design – Scaling MOS circuits.

UNIT III DIGITAL CIRCUITS AND SYSTEMS 9

Programmable Logic Array (PLA) and finite state machines – Design of ALU's memories and registers.

UNIT IV ANALOG VLSI AND HIGH SPEED VLSI 9

Introduction to analog VLSI – Models for analog switches – Active resistors – Current sources / sinks – Current references – BJT and CMOS operational amplifiers for simulation – Layout of typical circuits like common source amplifier – Current source and differential amplifier – Sub-micron technology and GaAs VLSI technology.

UNIT V HARDWARE DESCRIPTION LANGUAGES 9

VHDL background and basic concepts – Structural specification of hardware and design organisation and parameterization.

Total: 45

TEXT BOOKS

1. Douglas A. Pucknell and Kamran Eshrafhian, "Basic VLSI Design Systems and Circuits", Prentice Hall of India Pvt., Ltd.
2. Randall L. Geiger and Allen P. E., "VLSI Design Techniques for Analog and Digital Circuits", McGraw-Hill Int., Co., 1990.
3. Peter J. Ashenden, "The Designer's guide to VHDL", Harcourt Asia Pvt., Ltd., 1995.

REFERENCES

1. Amar Murkherjee, "Introduction to NMOS and CMOS VLSI System Design", Prentice Hall, 1986.
2. Fabious, E., "Introduction to VLSI design", McGraw-Hill, 1990.
3. Navabi, Z., "VHDL Analysis and Modeling of Digital Systems", McGraw-Hill, 1983.
4. Mohammed Ismail and Terri Fiez, "Analog VLSI, Signal and Information Processing", McGraw-Hill, 1994.
5. Neil, H.E. Weste, Kamarin Eshraghian, Principles of CMOS VLSI Design", Addison Wesley, 1998.

CS1030 – COMPUTER NETWORKS

L T P
3 0 0

UNIT I DATA COMMUNICATION CONCEPTS 8

ISO – OSI layered architecture – Transmission media – Data encoding – Interface and modems – Multiplexing – Error detection and correction – Digital subscriber line – Circuit switching – Packet switching – Message switching.

UNIT II WIDE AREA NETWORKS 10

Data link protocols – HDLC – LAPB – LAPD – Inter networking devices – Repeaters – Bridges – Routers – Routing algorithms – Distance vector routing – Link state routing – X.25 protocol – Congestion control.

UNIT III LOCAL AREA NETWORK 10

LAN topology – Ethernet – Token bus – Token ring – FDDI – Wireless LAN – LAN – IEEE 802 Medium access control layer standard – Random access protocols – ALOHA – Slotted ALOHA.

UNIT IV FRAME RELAY AND ATM NETWORKS 9

Frame relay operation – Layers and traffic control – ATM networks – Architecture switching – Layers service classes.

UNIT V UPPER OSI LAYERS 8

Transport layer issues – Session layer – Synchronization – Presentation layer – Encryption – Decryption – Application layer – Message handling system – File transfer – Virtual terminal – E-mail.

Total : 45

TEXT BOOKS

1. William Stallings, “Data and Computer Communication”, 6th Edition, Pearson education Asia, 2000.
2. Behrouz A. Forouzan, “Data Communication and Networking”, 2nd Edition, Tata McGraw-Hill, 2000.

REFERENCES

1. Fred Halsall, “Data Communication, Computer Networks and Open Systems”, 4th Edition, Addison Wesley, 1995.
2. Andrew S. Tanenbaum, “Computer Networks”, 3rd Edition, PHI, 1996.

BM1006 – RAPID PROTOTYPING

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3 0 0

UNIT I INTRODUCTION 7

Need for time compression in product development – Product development – Conceptual design – Development – Detail design – Prototype – Tooling.

UNIT II CLASSIFICATION OF RP SYSTEMS 9

Stereo lithography systems – Principle – Process parameters – Process details – Machine details – Applications – Direct Metal Laser Sintering (DMLS) system – Principle – Process parameters – Process details – Machine details – Applications.

UNIT III MODELING 9

Fusion deposition modeling – Principle – Process parameters – Process details – Machine details, applications – Laminated object manufacturing – Principle – Process parameters – Process details – Machine details – Applications.

UNIT IV SOLID GROUND CURING 10

Principle – Process parameters – Process details – Machine details and applications – 3-dimensional printers – Principle – Process parameters – Process details – Machine details, applications – Other concept modelers like thermo jet printers – Sander’s model maker – JP system 5 – Object quadra system.

UNIT V RAPID TOOLING 10

Laser Engineering Net Shaping (LENS) – Ballistic Particle Manufacturing (BPM) – Principle – Introduction to rapid tooling – Direct and indirect method – Software for RP – STL files – Magics – Mimics – Application of rapid prototyping in medical field.

Total: 45

TEXT BOOKS

1. Pham D.T and Dimov S.S., “Rapid Manufacturing”, Springer–Verlag, 2001.
2. Neil Hopkinson, Richard Hague and Philip Dickens , “Rapid Manufacturing: An Industrial Revolution for the Digital Age”, Wiley,2006.

REFERENCE

1. Terry Wohlers, “Wohlers Report 2000”, Wohlers Associates, 2000.

GE1351 – PROFESSIONAL ETHICS AND HUMAN VALUES

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3 0 0

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, etc.

Total: 45

TEXT BOOKS

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

REFERENCES

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

BM1007 – NANO ELECTRONICS

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3 0 0

UNIT I FUNDAMENTALS AND TECHNOLOGY 9

Dielectrics – Ferroelectrics – Electronic properties and quantum effects – Magnetoelectronics – Magnetism and magnetotransport in layered structures – Organic molecules – Electronic structures – Properties, and reactions – Neurons – The molecular basis of their electrical excitability – Circuit and system design– Film deposition methods – Lithography – Material removing techniques – Etching and chemical mechanical polishing – Analysis by diffraction and fluorescence methods – Scanning probe techniques.

UNIT II LOGIC DEVICES 9

Silicon MOSFETs – Novel materials and alternative concepts – Ferroelectric field effect transistors – Quantum transport devices based on resonant tunneling – Single-electron devices for logic applications – Superconductor digital electronics – Quantum computing using superconductors – Carbon nanotubes for data processing – Molecular electronics.

UNIT III RANDOM ACCESS MEMORIES AND MASS STORAGE DEVICES 9

High-permittivity materials for DRAMs – Ferroelectric random access memories – magnetoresistive RAM – Hard disk drives – Magneto-optical discs – Rewriteable DVDs based on phase change materials – Holographic data storage – AFM-based mass storage – The millipede concept.

UNIT IV DATA TRANSMISSION AND INTERFACES 9

Transmission on chip and board level – Photonic networks – Microwave Communication systems – Novel approaches for passive devices – Neuro electronic interfacing – Semiconductor chips with ion channels – Nerve cells and brain.

UNIT V SENSOR ARRAYS, IMAGING SYSTEMS AND DISPLAYS 9

Optical 3-D time-of-flight imaging system – Pyroelectric detector arrays for IR imaging – Electronic noses – 2-D tactile sensors and tactile sensor arrays – Liquid crystal displays – Organic light emitting devices – Field-emission and plasma displays.

Total: 45

TEXTBOOKS

1. Rainer Waser, “Nanoelectronics and Information Technology (Advanced Electronic Materials and Novel Devices)”, Wiley–VCH, 2003.
2. Ando, T., Arakawa, Y., Furuya, K., Komiyama, S. and Nakashima H., “Mesophysics and Electronics”, Springer, 1998.

REFERENCES

1. Jr. Poole C.P. and Owens, F.J., “Introduction to Nanotechnology”, Wiley, 2003.
2. Drexler K. E., “Nanosystems”, Wiley, 1992.
3. Petty, M.C, Bryce, M.R and Bloor, D., “Introduction to Molecular Electronics”, Edward Arnold, 1995.
4. Awschalom, D.D., Loss, D. and Samarth N., “Semiconductor Spintronics and Quantum Computation”, Springer, 2002.
6. Mitin, V., Kochelap, V. and Stroscio M., “Quantum Heterostructures” Cambridge, 1999.
7. Scherge, M. and Gorb, S., “Micro-Biological and Nano-Tribology”, Springer, 2001.
8. Ferry, D.K, and Grondin, R.O., “Physics of Submicron Devices”, Plenum Press, 1991.
9. Nielsen, M.A and Chung, I.L., “Quantum Computation and Quantum Information”, Cambridge, 2000.
10. Calude, C.S. and Paun, F., “Computing with Cells and Atoms”, Taylor and Francis, 2001.
11. Sze, S.M., “VLSI Technology”, McGraw–Hill, 1998.
12. Sung-Mo Kang and Yusuf Leblebici, “CMOS: Digital Integrated Circuits”, McGraw–Hill, 1999.

