

AFFILIATED INSTITUTIONS
ANNA UNIVERSITY, CHENNAI

R-2008

B.E. MEDICAL ELECTRONICS ENGINEERING
II - VIII SEMESTERS CURRICULA AND SYLLABI
SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS2161	<u>Technical English – II*</u>	3	1	0	4
2.	MA2161	<u>Mathematics – II*</u>	3	1	0	4
3.	PH2161	<u>Engineering Physics – II*</u>	3	0	0	3
4.	CY2161	<u>Engineering Chemistry – II*</u>	3	0	0	3
5. a	ME2151	<u>Engineering Mechanics</u> (For non-circuit branches)	3	1	0	4
5. b	EE2151	<u>Circuit Theory</u> (For branches under Electrical Faculty)	3	1	0	4
5. c	EC2151	<u>Electric Circuits and Electron Devices</u> (For branches under I & C Faculty)	3	1	0	4
6. a	GE2151	<u>Basic Electrical & Electronics Engineering</u> (For non-circuit branches)	4	0	0	4
6. b	GE2152	<u>Basic Civil & Mechanical Engineering</u> (For circuit branches)	4	0	0	4
PRACTICALS						
7.	GE2155	<u>Computer Practice Laboratory-II*</u>	0	1	2	2
8.	GS2165	<u>Physics & Chemistry Laboratory - II*</u>	0	0	3	2

9. a	ME2155	<u>Computer Aided Drafting and Modeling Laboratory</u> (For non-circuits branches)	0	1	2	2
9. b	EE2155	<u>Electrical Circuits Laboratory</u> (For branches under Electrical Faculty)	0	0	3	2
9. c	EC2155	<u>Circuits and Devices Laboratory</u> (For branches under I & C Faculty)	0	0	3	2
TOTAL : 28 CREDITS						
10.	-	<u>English Language Laboratory</u> ⁺	0	0	2	-

* Common to all B.E. / B.Tech. Programmes

+ Offering English Language Laboratory as an additional subject (with no marks) during 2nd semester may be decided by the respective Colleges affiliated to Anna University Chennai.

A. CIRCUIT BRANCHES

I Faculty of Electrical Engineering

1. B.E. Electrical and Electronics Engineering
2. B.E. Electronics and Instrumentation Engineering
3. B.E. Instrumentation and Control Engineering

II Faculty of Information and Communication Engineering

1. B.E. Computer Science and Engineering
2. B.E. Electronics and Communication Engineering
3. B.E. Bio Medical Engineering
4. B.Tech. Information Technology

B. NON – CIRCUIT BRANCHES

I Faculty of Civil Engineering

1. B.E. Civil Engineering

II Faculty of Mechanical Engineering

1. B.E. Aeronautical Engineering
2. B.E. Automobile Engineering
3. B.E. Marine Engineering
4. B.E. Mechanical Engineering
5. B.E. Production Engineering

III Faculty of Technology

1. B.Tech. Chemical Engineering
2. B.Tech. Biotechnology
3. B.Tech. Polymer Technology
4. B.Tech. Textile Technology
5. B.Tech. Textile Technology (Fashion Technology)
6. B.Tech. Petroleum Engineering
7. B.Tech. Plastics Technology

SEMESTER III

Code No.	Course Title	L	T	P	C
THEORY					
MA3203	<u>Engineering Mathematics-III</u>	3	1	0	4
MD3202	<u>Human Physiology</u>	3	0	0	3
MD3203	<u>Instrumentation Principles</u>	3	0	0	3
MD3204	<u>Measuring Techniques</u>	3	0	0	3
MD3205	<u>Digital Electronics</u>	3	1	0	4
BM3206	<u>Electronics Circuits – I</u>	3	1	0	4
PRACTICALS					
MD3208	<u>Instrumentation Laboratory</u>	0	0	3	2
MD3209	<u>Digital Electronics Laboratory</u>	0	0	3	2
BM3210	<u>Electronics circuits - I Laboratory</u>	0	0	3	2
TOTAL		18	3	9	27

SEMESTER IV

Code No.	Course Title	L	T	P	C
THEORY					
MD3211	<u>MicroProcessor and Applications</u>	3	1	0	4
BM3212	<u>Linear Integrated Circuits</u>	3	0	0	3
MD3213	<u>Signals and Systems</u>	3	1	0	4
MD3214	<u>Object Oriented Programming</u>	3	0	0	3
BM3215	<u>Bio Medical Instrumentation</u>	3	0	0	3
MD3216	<u>Control Systems</u>	3	1	0	4
PRACTICALS					
MD3218	<u>MicroProcessor and Applications Laboratory</u>	0	0	3	2
BM3219	<u>Linear Integrated Circuits Laboratory</u>	0	0	3	2
MD3220	<u>Object Oriented Programming Laboratory</u>	0	0	3	2
TOTAL		18	3	9	27

SEMESTER V

(Applicable to the students admitted from the Academic year 2008-2009)

CODE NO.	Course Title	L	T	P	C
THEORY					
MG3301	<u>Principles of Management</u>	3	0	0	3
BM3302	<u>Digital Signal Processing</u>	3	1	0	4
BM3303	<u>Bio-Mechanics</u>	3	1	0	4
CS3304	<u>Internet and Java</u>	3	0	0	3
BM3305	<u>Medical Informatics</u>	3	0	0	3
MD3306	<u>Micro Controllers and RISC Architecture</u>	3	1	0	4
PRACTICALS					
GE3309	<u>Communication Skills and Personality Development-I</u>	0	0	3	2
BM3309	<u>Digital Signal Processing Laboratory</u>	0	0	3	2
BM3310	<u>Bio Medical Instrumentation Laboratory</u>	0	0	3	2
TOTAL		19	5	9	27

SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
GE3008	<u>Professional Ethics And Human Values</u>	3	1	0	4
MD3312	<u>Bio-Signal Processing</u>	3	1	0	4
MD3313	<u>Bio materials And Artificial organs</u>	3	0	0	3
BM3314	<u>Digital Image Processing</u>	3	1	0	4
MD3315	<u>Neural Networks and Applications</u>	3	1	0	4
E1**	Elective I	3	0	0	3
PRACTICALS					
MD3317	<u>Bio Signal Processing Laboratory</u>	0	0	3	2
BM3318	<u>Digital Image Processing Laboratory</u>	0	0	3	2
GE3320	<u>Communication Skills and Personality Development- II</u>	0	0	3	2
TOTAL		18	3	9	28

SEMESTER VII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
ET3401	<u>Embedded Systems</u>	3	0	0	3
MD3402	<u>Principles of Medical Imaging</u>	3	1	0	4
MD3403	<u>Medical Expert Systems</u>	3	0	0	3
MD3404	<u>Therapeutic Equipments</u>	3	0	0	3
E2**	Elective II	3	0	0	3
E3***	Elective III	3	0	0	3
PRACTICALS					
MD3407	<u>Medical Software Laboratory</u>	0	0	3	2
MD3408	<u>Expert System Laboratory</u>	0	0	3	2
MD3409	<u>Mini Project</u>	0	0	3	2
TOTAL		18	1	9	25

SEMESTER VIII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
MD3410	<u>Principles of Tele Medicine</u>	3	1	0	4
MD3411	<u>Disaster Management</u>	3	0	0	3
	Elective IV	3	0	0	3
	Elective V	3	0	0	3
PRACTICALS					
MD3412	<u>Project Work</u>	0	0	12	6
MD3413	<u>Simulation Software Laboratory</u>	0	0	3	2
TOTAL		12	1	15	21

LIST OF ELECTIVES FOR SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
MD3001	<u>Pattern Recognition and AI Techniques</u>	3	0	0	3
MD3002	<u>Patient Monitoring Systems</u>	3	0	0	3
MD3003	<u>Fiber Optics and Lasers in Medicine</u>	3	0	0	3
MA3021	<u>Numerical Methods</u>	3	0	0	3
MD3005	<u>Speech Processing</u>	3	0	0	3
MD3006	<u>Genetic Algorithm</u>	3	0	0	3
MD3007	<u>Data Structures</u>	3	0	0	3

SEMESTER VII

CODE NO.	COURSE TITLE	L	T	P	C
MD3008	<u>Bio Tech Prosthetic Equipments</u>	3	0	0	3
MD3009	<u>Computer Vision</u>	3	0	0	3
MD3010	<u>Health Care systems</u>	3	0	0	3
MD3011	<u>Nanotechnology in Medicine</u>	3	0	0	3
MD3012	<u>Medical Physics</u>	3	0	0	3
MD3013	<u>Data Mining for Medical Electronics</u>	3	0	0	3
CS3014	<u>Soft Computing</u>	3	0	0	3
MD3015	<u>Advanced Microprocessors</u>	3	0	0	3
MD3016	<u>Opto Electronic Devices</u>	3	1	0	4
MD3017	<u>Operating Systems</u>	3	0	0	3

SEMESTER VIII

CODE NO.	COURSE TITLE	L	T	P	C
MD3018	<u>Engineering Acoustics</u>	3	0	0	3
MD3019	<u>Robotics</u>	3	0	0	3
MD3020	<u>Hospital Management</u>	3	1	0	4
MD3021	<u>Clinical Engineering</u>	3	1	0	4
MD3022	<u>Bio Medical Diagnostic Equipments</u>	3	1	0	4
EC3023	<u>VLSI Design</u>	3	0	0	3
GE3024	<u>Intellectual Property Rights</u>	3	0	0	3
BM3025	<u>Advanced Digital Signal processing</u>	3	0	0	3
CS3026	<u>Computer Hardware and Interfacing</u>	3	0	0	3
EC3027	<u>Computer Networks</u>	3	0	0	3
GE3403	<u>Total Quality Management</u>	3	0	0	3

AIM:

To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

OBJECTIVES:

1. To help students develop listening skills for academic and professional purposes.
2. To help students acquire the ability to speak effectively in English in real-life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To help students improve their active and passive vocabulary.
5. To familiarize students with different rhetorical functions of scientific English.
6. To enable students write letters and reports effectively in formal and business situations.

UNIT I**12**

Technical Vocabulary - meanings in context, sequencing words, Articles- Prepositions, intensive reading& predicting content, Reading and interpretation, extended definitions, Process description

Suggested activities:

1. Exercises on word formation using the prefix 'self' - Gap filling with preposition.
2. Exercises - Using sequence words.
3. Reading comprehension exercise with questions based on inference – Reading headings
4. and predicting the content – Reading advertisements and interpretation.
5. Writing extended definitions – Writing descriptions of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future.

UNIT II**12**

Phrases / Structures indicating use / purpose – Adverbs-Skimming – Non-verbal communication - Listening – correlating verbal and non-verbal communication -Speaking in group discussions – Formal Letter writing – Writing analytical paragraphs.

Suggested activities:

1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) - Reading comprehension exercises with texts including graphic communication - Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categorise data in tables.
3. Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits– Writing analytical paragraphs on different debatable issues.

UNIT III**12**

Cause and effect expressions – Different grammatical forms of the same word - Speaking – stress and intonation, Group Discussions - Reading – Critical reading -

Listening, - Writing – using connectives, report writing – types, structure, data collection, content, form, recommendations .

Suggested activities:

1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word. (Eg: object –verb / object – noun)
2. Speaking exercises involving the use of stress and intonation – Group discussions– analysis of problems and offering solutions.
3. Reading comprehension exercises with critical questions, Multiple choice question.
4. Sequencing of jumbled sentences using connectives – Writing different types of reports like industrial accident report and survey report – Writing recommendations.

UNIT IV

12

Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application - content, format (CV / Bio-data) - Instructions, imperative forms - Checklists, Yes/No question form – E-mail communication.

Suggested Activities:

1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking - Role play – group discussions – Activities giving oral instructions.
5. Writing descriptions, expanding hints – Writing argumentative paragraphs – Writing formal letters – Writing letter of application with CV/Bio-data – Writing general and safety instructions – Preparing checklists – Writing e-mail messages.

UNIT V

9

Speaking - Discussion of Problems and solutions - Creative and critical thinking – Writing an essay, Writing a proposal.

Suggested Activities:

1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements.

TOTAL : 60 PERIODS

TEXT BOOK:

1. Chapters 5 – 8. Department of Humanities & Social Sciences, Anna University, 'English for Engineers and Technologists' Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 5 – 8 (Technology, Communication, Environment, Industry)

REFERENCES:

1. P. K. Dutt, G. Rajeevan and C.L.N Prakash, 'A Course in Communication Skills', Cambridge University Press, India 2007.
2. Krishna Mohan and Meera Banerjee, 'Developing Communication Skills', Macmillan India Ltd., (Reprinted 1994 – 2007).
3. Edgar Thorpe, Showick Thorpe, 'Objective English', Second Edition, Pearson Education, 2007

Extensive Reading:

1. Robin Sharma, 'The Monk Who Sold His Ferrari', Jaico Publishing House, 2007

Note:

The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

MA2161

MATHEMATICS – II

L T P C
3 1 0 4

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS 12

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT III ANALYTIC FUNCTIONS 12

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : $w = z+c$, cz , $1/z$, and bilinear transformation.

UNIT IV COMPLEX INTEGRATION 12

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

UNIT V LAPLACE TRANSFORM**12**

Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions.

Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

TOTAL : 60 PERIODS**TEXT BOOKS:**

1. Bali N. P and Manish Goyal, "Text book of Engineering Mathematics", 3rd Edition, Laxmi Publications (p) Ltd., (2008).
2. Grewal. B.S, "Higher Engineering Mathematics", 40th Edition, Khanna Publications, Delhi, (2007).

REFERENCES:

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Glyn James, "Advanced Engineering Mathematics", 3rd Edition, Pearson Education, (2007).
3. Erwin Kreyszig, "Advanced Engineering Mathematics", 7th Edition, Wiley India, (2007).
4. Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", 3rd Edition, Narosa Publishing House Pvt. Ltd., (2007).

PH2161**ENGINEERING PHYSICS – II****L T P C
3 0 0 3****UNIT I CONDUCTING MATERIALS****9**

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II SEMICONDUCTING MATERIALS**9**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration – compound semiconductors – Hall effect – Determination of Hall coefficient – Applications.

AIM

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

OBJECTIVES

- The student should be conversant with the principles electrochemistry, electrochemical cells, emf and applications of emf measurements.
- Principles of corrosion control
- Chemistry of Fuels and combustion
- Industrial importance of Phase rule and alloys
- Analytical techniques and their importance.

UNIT I ELECTROCHEMISTRY 9

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe^{2+} vs dichromate and precipitation – Ag^+ vs Cl^- titrations) and conduct metric titrations (acid-base – HCl vs, NaOH) titrations,

UNIT II CORROSION AND CORROSION CONTROL 9

Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

UNIT III FUELS AND COMBUSTION 9

Calorific value – classification – Coal – proximate and ultimate analysis metallurgical coke – manufacture by Otto-Hoffmann method – Petroleum processing and fractions – cracking – catalytic cracking and methods-knocking – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes – Gaseous fuels-water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus – theoretical air for combustion.

UNIT IV PHASE RULE AND ALLOYS 9

Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

UNIT V ANALYTICAL TECHNIQUES 9

Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (problem) (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S.Dara "A text book of Engineering Chemistry" S.Chand & Co.Ltd., New Delhi (2006).

REFERENCES:

1. B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).
2. B.K.Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2001).

**ME2151 ENGINEERING MECHANICS L T P C
3 1 0 4**

OBJECTIVE

At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

UNIT I BASICS & STATICS OF PARTICLES 12

Introduction – Units and Dimensions – Laws of Mechanics – Lame's theorem, Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments – Vector operations: additions, subtraction, dot product, cross product – Coplanar Forces – Resolution and Composition of forces – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility – Single equivalent force.

UNIT II EQUILIBRIUM OF RIGID BODIES 12

Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions – Examples

EC2151 ELECTRIC CIRCUITS AND ELECTRON DEVICES L T P C
(For ECE, CSE, IT and Biomedical Engg. Branches) **3 1 0 4**

UNIT I CIRCUIT ANALYSIS TECHNIQUES 12

Kirchoff's current and voltage laws – series and parallel connection of independent sources – R, L and C – Network Theorems – Thevenin, Superposition, Norton, Maximum power transfer and duality – Star-delta conversion.

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS 12

Basic RL, RC and RLC circuits and their responses to pulse and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor – single tuned and double tuned circuits.

UNIT III SEMICONDUCTOR DIODES 12

Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics.

UNIT IV TRANSISTORS 12

Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES 12
(Qualitative Treatment only)

Tunnel diodes – PIN diode, varactor diode – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Laser, CCD, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

TOTAL : 60 PERIODS

TEXT BOOKS:

1. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Shaum series, Tata McGraw Hill, (2001)
2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2nd Edition, (2008).
3. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, (2008).

REFERENCES:

1. Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, 7th Edition, (2006).
2. William H. Hayt, J.V. Jack, E. Kemmely and Steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 6th Edition, 2002.
3. J. Millman & Halkins, Satyabranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, 2nd Edition, 2008.

GE2152 BASIC CIVIL & MECHANICAL ENGINEERING L T P C
(Common to branches under Electrical and I & C Faculty) **4 0 0 4**

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 15

Surveying: Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections.

UNIT II BUILDING COMPONENTS AND STRUCTURES 15

Foundations: Types, Bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

TOTAL : 30 PERIODS

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING 10

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

UNIT IV I C ENGINES 10

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM 10

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

TOTAL: 30 PERIODS

REFERENCES:

1. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co., New Delhi, (1996).
2. Ramamrutham. S, “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd. (1999).
3. Seetharaman S. “Basic Civil Engineering”, Anuradha Agencies, (2005).
4. Venugopal K and Prahu Raja V, “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, (2000).
5. Shantha Kumar S R J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, (2000).

GE2155	COMPUTER PRACTICE LABORATORY – II	L T P C
		0 1 2 2

LIST OF EXPERIMENTS

- | | |
|---|-----------|
| 1. UNIX COMMANDS | 15 |
| Study of Unix OS - Basic Shell Commands - Unix Editor | |
| 2. SHELL PROGRAMMING | 15 |
| Simple Shell program - Conditional Statements - Testing and Loops | |
| 3. C PROGRAMMING ON UNIX | 15 |
| Dynamic Storage Allocation-Pointers-Functions-File Handling | |

TOTAL : 45 PERIODS

HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS

Hardware

- 1 UNIX Clone Server
- 33 Nodes (thin client or PCs)
- Printer – 3 Nos.

Software

- OS – UNIX Clone (33 user license or License free Linux)
- Compiler - C

GS2165	PHYSICS LABORATORY – II	L T P C
		0 0 3 2

LIST OF EXPERIMENTS

1. Determination of Young's modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
4. Determination of viscosity of liquid – Poiseuille's method.
5. Spectrometer dispersive power of a prism.
6. Determination of Young's modulus of the material – uniform bending.
7. Torsional pendulum – Determination of rigidity modulus.

- **A minimum of FIVE experiments shall be offered.**
- **Laboratory classes on alternate weeks for Physics and Chemistry.**
- **The lab examinations will be held only in the second semester.**

GS2165

CHEMISTRY LABORATORY – II

L T P C

0 0 3 2

LIST OF EXPERIMENTS

1. Conduct metric titration (Simple acid base)
2. Conduct metric titration (Mixture of weak and strong acids)
3. Conduct metric titration using BaCl_2 vs Na_2SO_4
4. Potentiometric Titration (Fe^{2+} / KMnO_4 or $\text{K}_2\text{Cr}_2\text{O}_7$)
5. PH titration (acid & base)
6. Determination of water of crystallization of a crystalline salt (Copper sulphate)
7. Estimation of Ferric iron by spectrophotometry.

- A minimum of FIVE experiments shall be offered.
- Laboratory classes on alternate weeks for Physics and Chemistry.
- The lab examinations will be held only in the second semester.

ME2155

COMPUTER AIDED DRAFTING AND
MODELING LABORATORY

L T P C

0 1 2 2

List of Exercises using software capable of Drafting and Modeling

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
9. Drawing isometric projection of simple objects.
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

Note: Plotting of drawings must be made for each exercise and attached to the records written by students.

ENGLISH LANGUAGE LABORATORY (Optional)

L T P C
0 0 2 -

1. Listening: **5**
Listening & answering questions – gap filling – Listening and Note taking- Listening to telephone conversations

2. Speaking: **5**
Pronouncing words & sentences correctly – word stress – Conversation practice.

Classroom Session **20**

1. Speaking: Introducing oneself, Introducing others, Role play, Debate- Presentations: Body language, gestures, postures.
Group Discussions etc
2. Goal setting – interviews – stress time management – situational reasons

Evaluation

(1) Lab Session – 40 marks

- Listening – 10 marks
- Speaking – 10 marks
- Reading – 10 marks
- Writing – 10 marks

(2) Classroom Session – 60 marks

- Role play activities giving real life context – 30 marks
- Presentation – 30 marks

Note on Evaluation

1. Examples for role play situations:
 - a. Marketing engineer convincing a customer to buy his product.
 - b. Telephone conversation – Fixing an official appointment / Enquiry on availability of flight or train tickets / placing an order. etc.
2. Presentations could be just a Minute (JAM activity) or an Extempore on simple topics or visuals could be provided and students could be asked to talk about it.

REFERENCES:

1. Hartley, Peter, Group Communication, London: Routledge, (2004).
2. Doff, Adrian and Christopher Jones, Language in Use – (Intermediate level), Cambridge University Press, (1994).
3. Gammidge, Mick, Speaking Extra – A resource book of multi-level skills activities , Cambridge University Press, (2004).
4. Craven, Miles, Listening Extra - A resource book of multi-level skills activities, Cambridge, Cambridge University Press, (2004).
5. Naterop, Jean & Rod Revell, Telephoning in English, Cambridge University Press, (1987).

LAB REQUIREMENTS

1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients.

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 identify – Harmonic Analysis.

UNIT III BOUNDARY VALUE PROBLEMS 9

Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT IV FOURIER TRANSFORM 9

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT V Z TRANSFORMS 9

Z-transforms - Elementary properties – Inverse Z-transform – Convolution theorem - Formation of difference equations – Solution of difference equations using Z-transform.

TUTORIAL 15 TOTAL : 60 PERIODS**REFERENCES :**

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition , Khanna Publishers, Delhi, 2001.
2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company Ltd., New Delhi, 1996.
3. Kenneth, Hoffman and Ray.Kunz, Linear Algebra," 2nd Edition, Prentice Hall India,2000.
4. Wylie C. Ray and Barrett Louis, C., "Advanced Engineering Mathematics", Sixth Edition, McGraw-Hill, Inc., New York, 1995.
5. Andrews, L.A., and Shivamoggi B.K., "Integral Transforms for Engineers and Applied Mathematicians," Macmillen, New York, 1988.

MD3202	HUMAN PHYSIOLOGY	L	T	P	C
		3	0	0	3

UNIT I INTRODUCTION 9

Structure of cell – Function of each components of the cell – Membrane potential – Action potential – Generation and Conduction – Electrical simulation. Blood Cell – Composition – origin of RBC – Blood Groups – Estimation of RBC, WBC and Platelet

UNIT II CARDIAC AND NERVOUS SYSTEM 10

Anatomy of Human heart - Cardiac cycle – ECG – Blood pressure – Feedback control for blood pressure – Nervous control of heart. Cardiac output – Coronary and peripheral circulation – anatomy, structure and function of nervous tissue – Reflex action – Velocity of conduction of nerve impulses. Electro Encephalograph – Autonomic Nervous system.

UNIT III RESPIRATORY SYSTEM 8

Anatomy an Physiological aspects of respiration. Exchange off gases – Regulation of Respiration. Disturbance of respirating function. Pulmonary function test.

UNIT IV DIGESTIVE AND EXCRETORY SYSTEM 9

Anatomy and physiological aspects of GI system, Digestion and absorption – Movement of GI tract –anatomy of human kidney - Structure of Nephron – Mechanism of urine formation – urine reflex – skin and sweat gland – Temperature regulation.

UNIT V SPECIAL SENSES 9

Optics of Eye – Retina – Photochemistry of vision – Accommodation Neurophysiology of vision – EOG. Physiology of Internal Ear – Mechanism of Hearing – Auditory pathway, Hearing Tests.

TOTAL: 45 PERIODS

REFERENCES :

1. Sarada subramanyam, K. Madhavan Kutty and H.D. Singh – Text book of 'Human Physiology'-S.Chand & Company, 1996. (Unit 1 – 4).
2. Arthur.C.Guyton – Text book of Medical Physiology – Prism Book (P) Ltd.1996.
3. Webster J.C. and Albert M.Cook,"Clinical Engineering Principle and Practice", Printice Hall Inc.Englewood cliffs, New jersey, 1979.
4. Sujit K. Chaudhuri – Concise Medical Physilogy – New Central Book agency, 1997. (unit 5)

MD3203	INSTRUMENTATION PRINCIPLES	L	T	P	C
		3	0	0	3

UNIT I BASIC MEASUREMENT CONCEPTS 9

Measurement systems – Static and dynamic characteristics – units and standards of measurements – error analysis – moving coil, moving iron meters – multimeters – True RMS meters – Bridge measurements – Maxwell, Hay, Schering, Anderson and Wien bridge.

UNIT II BASIC ELECTRONIC MEASUREMENTS 9
 Electronic multimeters – Cathode ray oscilloscopes – block schematic – applications – special oscilloscopes – Q meters – Vector meters – RF voltage and power measurements.

UNIT III SIGNAL GENERATORS AND ANALYZERS 9
 Function generators – RF signal generators – Sweep generators – Frequency synthesizer – wave analyzer – Harmonic distortion analyzer – spectrum analyzer.

UNIT IV DIGITAL INSTRUMENTS 9
 Comparison of analog and digital techniques – digital voltmeter – multimeters – frequency counters – measurement of frequency and time interval – extension of frequency range – measurement errors.

UNIT V DATA ACQUISITION SYSTEMS AND FIBER OPTIC MEASUREMENTS 9
 Elements of a digital data acquisition system – interfacing of transducers – multiplexing – computer controlled instrumentation – IEEE 488 bus – fiber optic measurements for power and system loss – optical time domains reflectometer.

TOTAL : 45 PERIODS

REFERENCES :

1. Albert D.Helfrick and William D.Cooper – Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall of India, 2003.
2. Joseph J.Carr, Elements of Electronics Instrumentation and Measurement, Pearson education, 2003.
3. Alan. S. Morris, Principles of Measurements and Instrumentation, Prentice Hall of India, 2nd edn., 2003.
4. Ernest O. Doebelin, Measurement Systems- Application and Design-Tata McGraw-Hill-2004.

MD3204 MEASURING TECHNIQUES L T P C
3 0 0 3

UNIT I TRANSDUCERS 9
 Classifications and characteristics of transducers, transducers for measurement of pressure, flow and temperature, optical sensors, principle of operation of resistance potentiometer, LVDT, strain gauge and Piezo electric transducers, encoders.

UNIT II DIGITAL DISPLAY AND RECORDING DEVICES 9
 Digital storage oscilloscope – digital printers and plotters – CD ROMS – digital magnetic tapes, Dot matrix and LCD display CROs, color monitor, digital signal analyzer and digital data acquisition.

UNIT III SIGNAL ANALYSIS 9
 Amplifiers, filters, transmitter, receiver, wireless base, and mobile station test sets, noise figure meters, RF network analyzer and high frequency signal sources.

UNIT IV CURRENT TRENDS IN DIGITAL INSTRUMENTATION 9
 Introduction to special function add on cards – resistance card – input and output cards – counter, test and time of card and digital equipment construction with modular designing.

UNIT V ELECTRONIC LABORATORY INSTRUMENTS 9
 Strip chart and X-Y recorders, field bus instrumentation, measurement of earth resistance, transformer ratio bridges, measurement of resistance using transformer ratio bridges.

TOTAL : 45 PERIODS

REFERENCES:

1. Cooper, "Electronic Instrumentation and Measurement Techniques : Prentice Hall of India, 1998
2. Doebelin, " Measurement Systems", Mc Graw Hill, 1990
3. C.Barney, " Intelligent Instrumentation", Prentice Hall of India, 1985
4. C.S.Rangan, "Instrumentation Devices and Systems", Tata Mc Graw Hill 1998
5. John Lenk, D., "Handbook of Micro Computer Base Instrumentation and Control", Prentice Hall,1984.
6. Product Catalogue, Hewlet Packard, 1996.

MD3205	DIGITAL ELECTRONICS	L	T	P	C
		3	1	0	4

UNIT I NUMBER SYSTEMS 9
 Binary, Octal, Decimal, Hexadecimal-Number base conversions – complements – signed Binary numbers. Binary Arithmetic- Binary codes: Weighted –BCD-2421-Gray code-Excess 3 code-ASCII –Error detecting code – conversion from one code to another-Boolean postulates and laws –De-Morgan’s Theorem- Principle of Duality- Boolean expression – Boolean function- Minimization of Boolean expressions – Sum of Products (SOP) –Product of Sums (POS)-Minterm- Maxterm- Canonical forms – Conversion between canonical forms –Karnaugh map Minimization – Don’t care conditions.

UNIT II LOGIC GATES 9
 AND, OR, NOT, NAND, NOR, Exclusive – OR and Exclusive – NOR- Implementations of Logic Functions using gates, NAND –NOR implementations –Multi level gate implementations- Multi output gate implementations. TTL and CMOS Logic and their characteristics –Tristate gates.

REFERENCES:

1. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson Education / PHI, 2007.
2. David A. Bell, Electronic Devices & Circuits, 4th Edition, PHI, 2007
3. Floyd, Electronic Devices, Sixth Edition, Pearson Education, 2002.
4. I.J. Nagrath, Electronic Devices and Circuits, PHI, 2007.
5. Anwar A. Khan and Kanchan K. Dey, A First Course on Electronics, PHI, 2006.
6. B.P. Singh and Rekha Singh, Electronic Devices and Integrated Circuits, Pearson Education, 2006.
7. Rashid M, Microelectronics Circuits, Thomson Learning, 2007.

MD3208

INSTRUMENTATION LABORATORY

L	T	P	C
0	0	3	2

List of Experiments:

1. Study of displacement and pressure transducer.
2. AC bridges
3. DC bridges
4. Instrumentation amplifiers
5. A/D and D/A converters
6. Study of transients
7. calibration of single phase energy meter
8. Measurement of three phase power and power factor
9. Measurement of Iron loss

TOTAL : 45 PERIODS

MD3209

DIGITAL ELECTRONICS LABORATORY

L	T	P	C
0	0	3	2

List of Experiments:

1. Design and implementation of Adders and Subtractors using logic gates.
2. Design and implementation of code converters using logic gates
 - (i) BCD to excess-3 code and vice versa
 - (ii) Binary to gray and vice-versa
3. Design and implementation of 4 bit binary Adder/ subtractor and BCD adder using IC 7483
4. Design and implementation of 2Bit Magnitude Comparator using logic gates 8 Bit Magnitude Comparator using IC 7485
5. Design and implementation of 16 bit odd/even parity checker generator using IC74180.
6. Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154
7. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147
8. Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters
9. Design and implementation of 3-bit synchronous up/down counter
10. Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip- flops
11. Study of Opto Counter

TOTAL : 45 PERIODS

- Expt No.1** Fixed Bias amplifier circuit using BJT
1. Waveforms at input and output without bias.
 2. Determination of bias resistance to locate Q-point at center of load line.
 3. Measurement of gain.
 4. Plot the frequency response & Determination of Gain Bandwidth Product
- Expt No.2** Design and construct BJT Common Emitter Amplifier using voltage divider bias
- (self-bias) with and without bypassed emitter resistor.
1. Measurement of gain.
 2. Plot the frequency response & Determination of Gain Bandwidth Product
- Expt No.3** Design and construct BJT Common Collector Amplifier using voltage divider bias
- (self-bias).
1. Measurement of gain.
 2. Plot the frequency response & Determination of Gain Bandwidth Product
- Expt No.4** Darlington Amplifier using BJT.
1. Measurement of gain and input resistance.
 2. Comparison with calculated values.
 3. Plot the frequency response & Determination of Gain Bandwidth Product
- Expt No.5** Source follower with Bootstrapped gate resistance
1. Measurement of gain, input resistance and output resistance with and without Bootstrapping.
 2. Comparison with calculated values.
- Expt No.6** Differential amplifier using BJT
1. Measurement of CMRR.
- Expt No.7** Class A Power Amplifier
1. Observation of output waveform.
 2. Measurement of maximum power output.
 3. Determination of efficiency.
 4. Comparison with calculated values.
- Expt No.8** Class B Complementary symmetry power amplifier
1. Observation of the output waveform with crossover Distortion.
 2. Modification of the circuit to avoid crossover distortion.
 3. Measurement of maximum power output.
 4. Determination of efficiency.
 5. Comparison with calculated values.

4. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000
5. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.
6. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.

BM3212	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

UNIT I CHARACTERISTICS OF OPERATIONAL AMPLIFIER 9
 Analysis of difference amplifiers with active loads, current sources -- Characteristics of OP AMP –Open Loop OP AMP–Frequency response of OP AMP – Slew Rate - Monolithic IC operational amplifier.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS 9
 Inverting and Non inverting Amplifiers- Differentiator- Integrator- Voltage to current converter- Instrumentation amplifier-Sine wave Oscillator- Low-pass and band-pass filters- Comparator- Multivibrators and Schmitt trigger- Triangular wave generator- Precision rectifier- Log and Antilog amplifiers.

UNIT III ANALOG MULTIPLIER AND PLL 9
 Analysis of four quadrant (Gilbert cell) and variable transconductance multipliers- Voltage controlled Oscillator- Closed loop analysis of PLL, AM, PM and FSK modulators and demodulators-Frequency synthesizers- Compander ICs.

UNIT IV ANALOG TO DIGITAL & DIGITAL TO ANALOG CONVERTERS 9
 Analog switches-High speed sample and hold circuits -sample and hold ICs-Types of D/A converter- Current driven DAC- Switches for DAC- A/D converter-Flash- Single slope- Dual slope-Successive approximation- Delta Sigma Modulation- Voltage to Time converters.

UNIT V SPECIAL FUNCTION ICS 9
 Astable and Monostable Multivibrators using 555 Timer-Voltage regulators-linear and switched mode types- Switched capacitor filter- Frequency to Voltage converters- Tuned amplifiers- Power amplifiers and Isolation Amplifiers- Video amplifiers.

TOTAL: 45 PERIODS

REFERENCES

1. Ramakant A.Gayakwad, 'OP-AMP and Linear IC's', Prentice Hall / Pearson Education, 1994
2. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2000.
3. Sergio Franco, 'Design with operational amplifiers and analog integrated circuits', McGraw-Hill, 1997.

4. David L. Terrell, "Op Amps-Design, Application, and Troubleshooting", II edition, Elsevier publications.
5. Taub and Schilling, Digital Integrated Electronics, McGraw-Hill, 1997.
6. Gray and Meyer, 'Analysis and Design of Analog Integrated Circuits', Wiley International, 1995.
7. J. Michael Jacob, 'Applications and Design with Analog Integrated Circuits', Prentice Hall of India, 1996.
8. William D. Stanely, 'Operational Amplifiers with Linear Integrated Circuits'. Pearson Education, 2004.

MD3213	SIGNALS AND SYSTEMS	L	T	P	C
		3	1	0	4
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 exponential unit impulse – 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 – Explanation of 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 of the Continuous time Fourier Transform and Laplace Transform basic properties, Parseval's relation, and 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 - 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 & 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.

3. Webster J.G., "Medical Instrumentation application and design", Third Edition, John Wiley and sons, New York, 1999
4. Richard A. Normann, "Principle of Bio- Instrumentation", John Wiley and sons, New York, 1988.

MD3216	CONTROL SYSTEMS	L	T	P	C
		3	1	0	4
UNIT I	CONTROL SYSTEM MODELLING				9
System concept, differential equations and transfer functions. Modelling of electric systems, translational and rotational mechanical systems, Simple electromechanical systems. Block diagram representation of systems – Block diagram reduction methods – Closed loop transfer function, determination of signal flow graph. Mason's gain formula – Examples.					
UNIT II	TIME DOMAIN ANALYSIS				9
Test signals – time response of first order and second order systems – time domain specifications – types and order of systems – generalised error co-efficients – steady state errors – concepts of stability – Routh-Hurwitz stability – root locus.					
UNIT III	FREQUENCY DOMAIN ANALYSIS				9
Introduction – correlation between time and frequency response – stability analysis using Bode plots, Polar plots, Nichols chart and Nyquist stability criterion – Gain margin – phase margin.					
UNIT IV	COMPENSATORS				9
Realization of basic compensators – cascade compensation in time domain and frequency domain and feedback compensation – design of lag, lead, lag-lead compensator using Bode plot and Root locus. Introduction to P, PI and PID controllers.					
UNIT V	CONTROL SYSTEM COMPONENTS AND APPLICATION OF CONTROL SYSTEMS				9
Stepper motors – AC servo motor – DC servo motor – Synchros – sensors and encoders – DC tacho generator – AC tacho generator – Hydraulic controller – Pneumatic controller – Typical application of control system in industry.					

TUTORIAL :15 TOTAL : 60 PERIODS

REFERENCES :

1. Ogata.K, Modern Control Engineering, Prentice Hall of India, 4th Edition, 2003 (UNIT I – IV)
2. Nagrath & Gopal, Control System Engineering, 3rd Edition, New Age International Edition, 2002. (UNIT V)
3. Benjamin.C.Kuo, Automatic Control Systems, 7th Edition – Prentice Hall of India, 2002.
4. M.Gopal, Control Systems, Tata McGraw-Hill, 1997

MD3218	MICROPROCESSOR AND APPLICATIONS LABORATORY	L	T	P	C
		0	0	3	2

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 MP Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between two MP 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 8051 microcontroller.
11. Programming and verifying Timer, Interrupts and UART operations in 8031 microcontroller.
12. Communication between 8051 Microcontroller kit and PC.

TOTAL : 45 PERIODS

BM3219	LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

1. Linear Op-Amp circuits – Inverting and Non inverting Amplifiers, Voltage Follower, Differentiator, Integrator, Subtractor, summer.
2. Comparator circuits – zero crossing detector, Window detector and Schmitt trigger.
3. Sample and hold circuits.
4. Multivibrators using Op-Amp.
5. Multivibrators using IC 555.
6. DAC Circuits –R – 2R, ladder type.
7. Successive approximation type ADC.
8. Active filters using Op-Amps – 2nd order LPF, HPF, BPF and BSF.
9. Multiplier as Analog divider, squarer and square rooter.
10. Oscillators using Op-Amps
11. Study of Voltage Regulator using IC 723

TOTAL : 45 PERIODS

List of Experiments:**C++:**

1. program using functions
 - functions with default arguments
 - implementation of call by value, address, reference
2. simple classes for understanding objects, member functions & constructors
 - classes with primitive data members,
 - classes with arrays as data members
 - classes with pointers as data members
 - classes with constant data members
 - classes with static member functions
3. compile time polymorphism
 - operator overloading
 - function overloading
4. run time polymorphism
 - inheritance
 - virtual functions
 - virtual base classes
 - templates
5. file handling
 - sequential access
 - random access

JAVA:

6. simple java applications
 - for understanding references to an instant of a class
 - handling strings in JAVA
7. simple package creation
 - developing user defined packages in java
8. interfaces
 - developing user defined interfaces
 - use predefined interfaces
9. threading
 - creation of threading in java applications
 - multi threading
10. exception handling mechanism in java
 - handling predefined exceptions
 - handling user defined exceptions

TOTAL : 45 PERIODS

UNIT I	FOUNDATIONS	9
Historical developments –approaches to management– Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization-		
UNIT II	MANAGERS & ENVIRONMENT	9
Social responsibility–Planning – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies- Policies & Planning Premises- Forecasting – Decision-making-		
UNIT III	FUNCTIONAL AREA OF ORGANISATION	9
Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process - Techniques – HRD – Managerial Effectiveness-		
UNIT IV	MOTIVATION & DIRECTIONS	9
Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication		
UNIT V	CONTROLLING STRATEGIES	9
System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology– Computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management		

TOTAL : 45 PERIODS

REFERENCES:

1. Harold Koontz & Heinz Weihrich “Essentials of Management”- Tata McGraw-Hill-7th Edition-2007.
2. Joseph L Massie “Essentials of Management”- Prentice Hall of India- (Pearson) 4th Edition- 2003.
3. Tripathy PC And Reddy PN- “ Principles of Management”- Tata McGraw-Hill- 1999.
4. Decenzo David- Robbin Stephen A- ”Personnel and Human Resources Management”- Prentice Hall of India- 1996 .
5. Robbins-“ Principles of Management” Pearson education -2005.

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 – fast convolution- overlap save method.

UNIT II FINITE IMPULSE RESPONSE DIGITAL FILTERS 9

Amplitude and phase responses of FIR filters – Linear phase filters – Windowing techniques for design of linear phase FIR filters: Rectangular- Hamming- Hanning- Blackman and Kaiser Windows. Gibbs phenomenon –principle of frequency sampling technique- principle of optimum equiripple approximation. Realization - FIR filters.

UNIT III INFINITE IMPULSE RESPONSE DIGITAL FILTERS 9

Review of design of analogue Butterworth and Chebychev Filters- Frequency transformation in analog domain – Design of IIR digital filters using impulse invariance technique – Design of IIR digital filters using bilinear transformation – pre warping – Frequency transformation in digital domain – Realization - Direct form I, Direct form II, cascade and parallel.

UNIT IV FINITE WORD LENGTH EFFECTS 9

Quantization noise – derivation for quantization noise power – Binary fixed point and floating point number representations – Comparison – truncation and rounding error – input quantization error-coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

UNIT V DIGITAL SIGNAL PROCESSORS 9

Architectural Features – DSP Building Blocks – Multiplier- Shifter- MAC Unit- ALU –Bus Architecture and Memory – Addressing Modes – Address Generation Unit -Hardware architecture – pipelining- Overview of instruction set of TMS320C50.

TUTORIAL: 15 TOTAL: 60 PERIODS

REFERENCES:

1. John G Proakis- Dimtris G Manolakis- Digital Signal Processing Principles- Algorithms and Application- Pearson/PHI- 4th Edition- 2007-
2. S.K.Mitra- “Digital Signal Processing- A Computer based approach”- Tata McGraw-Hill- 1998- New Delhi
3. Allan V.Openheim, Ronald W.Shafer & John R.Buck-“Discrete Time Signal Processing”,second edition-Pearson/Prentice Hall.
4. B.Venkataramani & M-Bhaskar- Digital Signal Processor Architecture- Programming and Application- TMH 2002-
5. Johny R-Johnson: Introduction to Digital Signal Processing- Prentice Hall- 1984
6. Emmanuel Ifeachor “Digital Signal Processing: A Practical Approach”, 2/E -Prentice Hall-2002
7. Li Tan “ Digital Signal Processing” Elsevier-2008

BM3303

BIO – MECHANICS

L T P C

3 0 0 3

UNIT I INTRODUCTION 9

Material Science and Classes of Materials used in Medicine: Polymers, Metals and Plastics, Ceramics. Treated Natural Materials, Tissue Reaction. Sterilization of Biomaterials. Steam Sterilization. Ethylene Oxide Treatment, Gamma Irradiation, Formaldehyde Treatment.

UNIT II BIO MATERIALS 9

Mechanical Properties of Materials - Experimental Stress Analysis and Material Testing. Tissue Reactions and Blood Compatibility. Practical Aspects of Biomaterials Cardio Vascular Implants. Implants and Device Failure. Product Development and Regulations

UNIT III SCOPE OF MECHANICS IN MEDICINE 9

Orthopaedics, Cardiology, Exercise Physiology, Surgery, Biomechanics in Orthopaedics - Principles, Joints, Fracture, Internal and External Fixation, Prosthetic Design.

UNIT IV BIO FLUID MECHANICS 9

Biomechanics of Degenerative Disorders, Gait Analysis, Biofluid Mechanics, Mathematical Models. Biomechanics and Accident Investigation.

UNIT V INTRODUCTION TO REHABILITATION ENGINEERING 9

Introduction to Rehabilitation Engineering: Artificial Limb, Myoelectric hand, Finite Element Analysis and its Application to Problems in Biomechanics.

TUTORIAL : 15 TOTAL : 60 PERIODS

REFERENCES:

1. Sahay and Saxena, "Biomechanics", Tata McGraw Hill, New Delhi, Edition -1998.
2. Y.C Fung, "Biomechanics, Mechanical properties of Living Tissues", Springer Verlag, Edition 2- 1993
3. J.B.Park, "Bio-materials - Science and Engineering" Plenum Press, Edition 1984.
4. Hench and Etheridge. "Bio-materials" Vol. 1,2,3,4, Plenum Press, Edition 1998.
5. D.N. Ghista and Roaf, "Orthopedic Mechanics" Academic Press, Edition 1999

CS3304

INTERNET AND JAVA

L T P C

3 0 0 3

UNIT I 9

Internet connection concepts – Dialup Internet access – High speed connections – Connecting LANs to Internet – Email Concepts – Email Commands – Sending and receiving files by email - Security in Email-

UNIT II 9

Online chatting and conferencing concepts – Mailing lists – Usenet Newsgroups – Internet Relay Chat (IRC) – Voice and video conferencing – WWW concepts – Searching on the Web-

UNIT III **9**
 Website creation concepts – Creating web pages by hand and Web page editors – Web Graphics – Web audio files – Advanced web options – File Transfer concepts – FTP programs – Downloading and installing software-

UNIT IV **9**
 The Java programming language – Basics – Classes – Packages – Interfaces – Inheritance - Exception handling – Multithreading – String and String buffer – Applets-

UNIT V **9**
 I/O streams – the utility package – Abstract Window Toolkit (AWT) – the net package – Advanced concepts: RMI and Servlets-

TOTAL: 45 PERIODS

REFERENCES:

1. Margaret Levine Young et al- "Internet – The Complete Reference"- Millennium edition- Tata McGraw Hill publishing company- New Delhi- 2002.
2. Patrick Schilt- "JAVA 2- The Complete Reference"- Tata McGraw Hill Publishing Company- New Delhi- 2003 .
3. Deitel & Deitel- "Java – How to Program"- 6th Edition PHI- New Delhi- 2005
4. R. Krishnamoorthy, Internet and Java Programming, New Age International (P) Ltd. (2004)

BM3305	MEDICAL INFORMATICS	L	T	P	C
		3	0	0	3

UNIT I **9** **BIO MEDICAL INFORMATION TECHNOLOGY**
 Historical highlights of healthcare, information systems – bio medical information systems – problems and pitfalls – history and evolution of electronic resources – internet and interactive multimedia components

UNIT II **9** **OVERVIEW OF DATA STRUCTURES**
 Introduction to Data Structures: Elements, Arrays, Records, sets, Tables singly and doubly Linked Data, Stacks, Queues, Trees Etc.

UNIT III **9** **DATA BASE MANAGEMENT**
 Need for a Database, Architecture of a DBMS, Representation of Data, Physical Record Interface, Data Models, Relational, Hierarchical and network Approach. Data Modeling Techniques: Relational, Hierarchical and network Normalization techniques for Data handling, Relational, Distributed and other types of Databases.

UNIT IV **9** **HOSPITAL INFORMATION SYSTEMS**
 Structuring Medical Records to carry out Functions like Admissions, Discharges, Treatment History, etc.Computerization in Pharmacy and Billing, Automated Clinical lab System and Radiology Information system. Detailed Study of picture Archival and communication System (PACS)

UNIT V CASE STUDY 9
 Case Study of any one of Application areas like Pharmacology System Or Biochemistry Lab Analysis System. (Students to take up one Development Assignment and Demonstrate the Utility of the Software).

TOTAL: 45 PERIODS

REFERENCES:

1. Mary Beth Fecko, "Electronic Resources: Access and Issues", Bowker – Saur, London, Edition -1997.
2. Edward Shortliffe, "Computer Based Medical Consultation" Elsevier Scientific, 1997.
3. John Zimmerman, "Computer for the Physicians Office" Research Studies Press, 1989.
4. Ellitz.& Howrohwithz sahani, "An Introduction to Data structures " Prentice hall of India, 2004
5. J.D.Ullman, "Principles of Database systems" Galgotia Publications, 2006

MD3306	MICRO CONTROLLERS AND RISC ARCHITECTURE	L	T	P	C
		3	1	0	4

UNIT I THE 8051 ARCHITECTURE 9
 8051 Microcontroller Hardware-Input/Output pins- ports and circuits-External memory-Counters and Timers-Serial Data Input/Output-Interrupts

UNIT II THE 8051 INSTRUCTION SET AND PROGRAMMING 9
 8051 Addressing Modes-Arithmetic Instructions-Logical Instructions-Single bit Instructions-Timer/Counter-Serial Communication-Interrupts Programming-Assembly Language programming

UNIT III THE 8051-REAL WORLD INTERFACING 9
 Interfacing LCD-ADC and sensors to 8051-8051 interfacing to a stepper motor-keyboard and DAC-8051 interfacing to external memory-8051 interfacing to the 8255

UNIT IV THE ARM RISC ARCHITECTURE 9
 The RISC revolution-The reduced instruction set computer –Design for low power consumption-The ARM architecture basics-Architectural inheritance-The ARM programmers model-ARM organization and implementation-3 stage and 5 stage pipeline ARM organization-ARM instruction execution-ARM implementation-ARM processor cores-ARM7 TDMI-ARM8 TDMI-ARM9 TDMI-ARM development tools-Architectural support for system development

UNIT V ARM INSTRUCTION AND ASSEMBLY LANGUAGE PROGRAMMING 9
 Exceptions-Conditional execution-Branch and branch with link and exchange-Software interrupt-Data processing instructions-Single word and unsigned byte data transfer and

half word and signed byte data transfer instructions-Multiple register transfer instructions-Swap instructions-Architectural support for high level languages-The thumb instruction set-Thumb implementation-Thumb applications-Writing simple assembly language programs.

TUTORIAL: 15 TOTAL : 60 PERIODS

REFERENCES:

1. "Muhammad Ali Mazidi-Jamice Gillispit Mazidi-"The 8051 micro controller and Embedded System" Pearson Education,2002.
2. Ajay.V.Deshmukh, Mircro controllers Theory and applications, TMH,2004.
3. Kenneth J-Ayala-"The Microcontroller Architecture-Programming & Applications"Pearson International,2003.
4. Krishnakant "Microprocessors and Microcontrollers Architecture- programming and system design 8085- 8086- 8051- 8096"- PHI 2007- New Delhi
5. Steve Furber "ARM System-on-chip-architecture "2nd edition Addison Wesley 2000
6. Alan Clements "The Principles of Computer Hardware" 3rd edition Oxford University Press 2000

GE3309

**COMMUNICATION SKILLS AND PERSONALITY
DEVELOPMENT- I**

**L T P C
0 0 3 2**

1. LANGUAGE DEVELOPMENT THROUGH READING

TOFEL based reading comprehension –Cur rent affairs –Vocabulary building – Idioms and phrases –Basic phonetics.

2. SPEAKING PRACTICE

Dialogue / Conversation – Types of conversations – Public Speaking -Debate

3. LISTENING SKILLS

4. TELEPHONE ETIQUETTE

5. SELF ASSESSMENT

Identifying strength and weakness

6. PERSONALITY DEVELOPMENT

Body Language-Non Verbal Skills-Leadership qualities-Emotional Quotient- Effective Time Management-Surviving Stress-Overcoming failure.

7. VERBAL COMMUNICATION

Social Exchanges-Planned Speech-Extempore-Basics of attending and organizing meetings-Informal Discussions.

TOTAL : 45 PERIODS

LIST OF EXPERIMENTS**USING TMS320C5X**

- 1- Generation of Signals
- 2- Linear Convolution
- 3- Implementation of a FIR filter
- 4- Implementation of an IIR filter
- 5- Calculation of FFT

USING MATLAB

- 1- Generation of Discrete time Signals
- 2- Verification of Sampling Theorem
3. FFT and IFFT
4. Time & Frequency response of LTI systems
- 5- Linear and Circular Convolution through FFT
- 6- Design of FIR filters (window design)
- 7-Design of IIR filters (Butterworth &Chebychev)

TOTAL : 45 PERIODS**List of Experiments:**

1. Study of biological pre amplifiers
2. Recording of ECG signal and analysis
3. Recording of Audio gram
4. Recording of EMG-Signal
5. Recording of EEG-Signal
6. Recording of EOG-Signal
7. Recording of various physiological parameters using patient monitoring system and telemetry units.
8. Measurement of pH, pO₂ and conductivity.
9. Measurement and recording of peripheral blood flow
10. Measurement of visually evoked potential.

TOTAL : 45 PERIODS

UNIT I HUMAN VALUES 8

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 –industrial standards- a balanced outlook on law - the challenger case study

UNIT IV SAFETY- RESPONSIBILITIES AND RIGHTS 10

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 9

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- I-E-E-E- Institution of Engineers (IEI) India- Institution of Electronics and Telecommunication engineers(IETE) India- etc

TUTORIAL : 15 TOTAL: 60 PERIODS

REFERENCES :

1. Mike Martin and Roland Schinzinger- "Ethics in Engineering"- Tata McGraw-Hill- - 1996-3 e.
2. Govindarajan M- Natarajan S- Senthil Kumar V- S- "Engineering Ethics"- Prentice Hall of India- New Delhi- 2004.
3. R-S Nagarazan -"A textbook on Professional Ethics and Human Values" New Age International Publishers- New Delhi 2006.
4. Charles D- Fleddermann- "Engineering Ethics"- Pearson Education / Prentice Hall- New Jersey- 2004 (Indian Reprint).
5. Charles E Harris- Michael S- Protchard and Michael J Rabins- "Engineering Ethics – Concepts and Cases"- Wadsworth Thompson Learning- United States- 2000 (Indian Reprint now available).
6. John R Boatright- "Ethics and the Conduct of Business"- Pearson Education- New Delhi- 2003.

UNIT III IMAGE ENHANCEMENT AND RESTORATION 9

Spatial domain enhancement: gray level transformations - histogram modification and specification techniques- Image averaging- Directional Smoothing- Median- Geometric mean- Harmonic mean- Contra harmonic and Yp mean filters- Homomorphic filtering- Color image enhancement. 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

UNIT IV IMAGE SEGMENTATION AND REPRESENTATION 9

Point- line and edge detection- Edge linking- Region based segmentation: Region splitting and merging.
Image representation: chain codes – polygonal approximations – signatures – boundary segments – skeletons

UNIT V IMAGE COMPRESSION 9

Need for data compression-Error free compression: variable length coding, bit plane coding, LZW coding. Lossy compression: Transform coding, wavelet coding.

Compression standards: binary image compression standard, still image compression standards, video compression standards.

TUTORIAL : 15 TOTAL: 60 PERIODS

REFERENCES:

1. Rafael C- Gonzalez- Richard E-Woods- 'Digital Image Processing'- Pearson Education- Inc-- Second Edition- 2004
2. Anil K- Jain- 'Fundamentals of Digital Image Processing'- Pearson/Prentice Hall of India- 2002-
3. David Salomon : Data Compression – The Complete Reference- Springer Verlag New York Inc-- 2nd Edition- 2001
4. William K-Pratt- 'Digital Image Processing'- John Wiley- NewYork- 2002
5. Kenneth R.Castleman-"Digital Image Processing"-Pearson-2003

**MD3315 NEURAL NETWORKS AND APPLICATIONS L T P C
3 1 0 4**

UNIT I NEURON MODEL NETWORK ARCHITECTURE 9

Neuron model – single input neuron –activation function – multiple input neuron neural networks viewed as directed graphs -feedback - network architectures – knowledge representation – linear and non- linear separable problem(XOR)

UNIT II LEARNING PROCESS 9

Error – correction learning – memory based learning - hebbian learning-competitive learning-Boltzmann learning-credit assignment problem-supervised and unsupervised learning-adaptation-statistical learning theory.

UNIT III PERCEPTIONS 9

Single layer perception-Adaptive filtering-unconstrained optimization-Least-mean square algorithm-Leaning curve-Annealing Technique-perception convergence theorem-Relationship between perception and Baye's classifier-Back propagation algorithm-Network pruning techniques-supervised learning viewed as an optimization problem-convolutional network. Application to Adaptive Prediction and character recognition.

UNIT IV ATTRACTOR NEURAL NETWORK AND ART 9

Hopfield model-BAM model-BAM stability-Adaptive BAM -Lyapunov function-effect of gain-Hopfield design-Application to TSP problem-ART- layer 1-layer 2-orienting subsystem-Leaning lawL1-L2-Leaning law L2-L1-ART algorithm-ARTMAP

UNIT V PRINCIPAL COMPONENT ANALYSIS AND SELF ORGANIZATION 9

Principle of self organization-Principle Component analysis-Adaptive PCA using Lateral inhibition-Two classes of PCA algorithm-Two basic feature- mapping model-self organizing map-SOM Algorithm-properties of the feature map-LVQ-Hierarchical vector Quantization. Applications of self-organizing maps: The Neural Phonetic Typewriter-Learning Ballistic Arm Movements

TUTORIAL : 15 TOTAL: 60 PERIODS

REFERENCES:

1. Simon Haykin, "Neural Networks and Learning Machines" -3/E - Pearson/ Prentice Hall 2009
2. Satish Kumar- "Neural Networks : A Classroom Approach"-TMH-2008
3. Freeman J.A., Skapura D.M."Neural networks, algorithms, applications, and programming techniques" -Addition Wesley, 2005.
4. Laurene Fausett, "Fundamentals of Neural Networks: Architectures, Algorithms, and Applications" - Pearson/ Prentice Hall
5. Robert J Schalkoff-"Artificial Neural Networks,McGraw Hill"-1997
* Common with ECE

MD3317

BIO SIGNAL PROCESSING LABORATORY

**LT P C
0 0 3 2**

List of Experiments:

1. Measurement of ECG signal using DSP
2. Measurement of EMG signal using DSP
3. Measurement of EEG signal using DSP
4. Analysis of adaptive filters for segmentation in ECG and PCG signals
5. Analysis of Bio signal acquisition
6. Non parametric analysis of EEG signals (ARMA, AR) Models

7. Measures of Diagnostic accuracy
8. Data compressions of EEG, ECG and EOG signals.
9. Parametric extraction in ECG signals using wavelet transforms (Haar, dB4, Sym4)
10. Design and test FIR filter using Windowing method (Hamming window and Kaiser Window) for the given order and cut-off frequency.

TOTAL : 45 PERIODS

BM3318	DIGITAL IMAGE PROCESSING LABORATORY	L T P C
		0 0 3 2

List of Experiments:

Simulation using MATLAB (Image processing Tool Box)

1. Image sampling and quantization
2. Transforms (Walsh, Hadamard, DCT, Haar)
3. Image Enhancement – Histogram, equalization, Spatial filtering
4. Image segmentation – Edge detection, line detection and point detection
5. Basic morphological algorithms

Mini Projects

1. Applications to Biometric and security
2. Applications to Medical Images

TOTAL : 45 PERIODS

GE3320	COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- II	L T P C
		0 0 3 2

DEXTERITY IN WRITING

Importance of Writing –Writing vs Spoken Language – Formal & Informal styles of Writing – Report writing-Resources for improving Writing – Grammar and Usage – Application Essays – Project Proposals

1. COMPOSITION ANALYSIS

Technical and non technical passages (GRE based) - Differences in American and British English – Analyzing Contemporary issues – Expanding terminology

2. PRESENTATION SKILLS

Collecting and organizing materials- audience – Content – Rehearsing – Delivering matter – Questions – Seminar Presentations (Subject Oriented/ General Topics)

3. RESUME PREPARATION

4. GROUP DISCUSSIONS / ACTIVITIES

Preparation – Participation – Group Dynamics – Intra / Inter Dept-- Group Discussion – Team Work – Negotiation Skills – Organizational Behavior

5. INTERVIEWS

Verbal and Non verbal Skills – Rehearsing – Taking the Interview – Facing the Questions – Mock Interviews -

6. PSYCHOMETRIC TESTS - APTITUDE TESTS AND PUZZLES

Logical reasoning - problem solving – verbal- sharpening the skills

TOTAL : 45 PERIODS

ET3401

EMBEDDED SYSTEMS

**LT P C
3 0 0 3**

UNIT I ARCHITECTURE OF EMBEDDED SYSTEMS 9

Categories of Embedded Systems-Specifications of Embedded systems-Recent trends in Embedded Systems-Hardware Architecture-Software Architecture-Communication software-Process of generation of executable image-development/testing tools.

UNIT II PROGRAMMING FOR EMBEDDED SYSTEMS 9

Getting the most of C-data types-manipulating bits in memory and I/O ports-accessing memory mapped I/O devices – structures-variant access-mixing C to assembly-register usage-use of addressing options-instruction sequencing –procedure call and return-parameter passing –retrieving parameters memory management-scope-automatic allocation-static allocation-dynamic allocation-shared memory-recognizing shared objects-reentrant functions-accessing shared memory device drivers- productivity tools.

UNIT III HARDWARE PLATFORM 9

PIC microcontroller- Architecture of PIC 16c6x/7x- FSR- Reset action-Oscillatory connection- Memory organization- Instructions- Addressing modes- I/O ports- Interrupts-Timers- ADC- Assembly language programming.

UNIT IV REAL-TIME OPERATING SYSTEM CONCEPTS 9

Architecture of the Kernel-task and task scheduler-Interrupt Service Routines-Semaphores-Mutex-Mailboxes-Message Queues-Event Registers-Pipes-Signals-Timers-Memory Management – Priority Inversion Problem

UNIT V REAL-TIME OPERATING SYSTEM TOOLS AND CASE STUDIES 9

Use of μ C/OS-II- Case study of coding for an Automatic Chocolate Vending Machine using MUCOS RTOS- Case study of an Embedded system for an Adaptive Cruise Control Systems in a Car- Case study of an Embedded Systems for a Smart Card.

TOTAL: 45 PERIODS

REFERENCES:

1. .K.V.K.K.Prasad "Embedded /Real-Time Systems:Concepts,Design and Programming"Dream tech,Wiley 2003.
2. Ajay V Deshmukh "Microcontroller Theory and Applications" Tata McGraw Hill 2005
3. Raj Kamal "Embedded Systems Architecture Programming and Design" 2nd Edition TMH,2008
4. David E Simon "An Embedded Software Primer " Pearson Education 2003
5. Daniel 5.W Lewis, "Fundamentals of Embedded Software" Pearson Education-2001
6. Peatman " Designing with PIC Micro Controller",Pearson 2003

MD3402

PRINCIPLES OF MEDICAL IMAGING

**LT P C
3 1 0 4**

UNIT I INTRODUCTION 9

Introduction to imaging modalities-Image quality X-rays in Diagnostic imaging-X-ray production-X-ray interactions-X-ray spectra-X-ray dosimetry-X-ray detection-radiography-mammography-fluoroscopy. Computed tomography systems- Scanner design-reconstruction techniques-image quality artifacts-multi slice imaging-scanner performance.

UNIT II MAGNETIC RESONANCE IMAGING 9

Basic principles of nuclear magnetic resonance-Image creation- Slice selection, Frequency encoding, Phase Encoding, pulse sequence, Image characteristics and artifacts, Hardware and software components.

UNIT III ULTRASOUND IMAGING 9

The wave equation-Impedance, Power and reflection-Acoustic properties of Biological tissues-Transducers, beam patterns and resolution-Diagnostic imaging modes –Doppler principles.

UNIT IV SEGMENTATION 9

Image preprocessing-Thersholding-Edge based techniques-Region based segmentation-Classification-deformable models-Image Registration-Geometrical Transformations-Point based methods-Surface based methods-Intensity based methods

UNIT V 3D VISUALIZATION 9

Pre processing-Scene-based visualization-object based visualization-Manipulation. Medical Applications and Systems– Diagnostics-Therapeutics- Interventions.

TUTORIAL 15 TOTAL: 60 PERIODS

REFERENCES:

1. Isaac Bankman, I. N. Bankman , “Handbook of Medical Imaging: Processing and Analysis (Biomedical Engineering)”, Academic Press, 2000
2. K.Krish Shung, Micheal B. Smith, Benjamin Tsui, “Principles of Medical Imaging”, Academic Press Inc; London 1992.
3. Jacob Beutel (Editor), M. Sonka (Editor), “Handbook of Medical Imaging”, Volume 2. Medical Image Processing and Analysis , SPIE Press 2000:
4. Albert Macowski, “Medical Imaging Systems”, Prentice hall New Jersey-1983.
5. Avinash C.Kak, Malcolm Shaney, “Principles of Computerized Tomographic Imaging”, IEEE Press, New York-1998.

MD3403**MEDICAL EXPERT SYSTEMS****L T P C
3 0 0 3****UNIT I INTRODUCTION TO AI 9**

Definition of AI – importance of AI – problem solving, searching, heuristic searching.

UNIT II KNOWLEDGE REPRESENTATION 9

Proposition Logic – Clause form – Predicate logic – Resolution – Inference Rules – Unification – Semantic networks – frames – conceptual dependency – Scripts – knowledge representation using rules – rule based systems.

UNIT III EXPERT SYSTEMS 9

Expert system architecture - non-production systems architecture– knowledge acquisition and validation - Knowledge system building tools

UNIT IV LEARNING & DECISION MAKING 9

Types of learning – general learning model – learning by induction – generalization & specialization – inductive bias – explanation based learning

UNIT V CASE STUDY 9

Study of medical expert systems – MYCIN, EMYCIN - development of medical expert systems – sample Case studies

TOTAL: 45 PERIODS**REFERENCES:**

1. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”, Prentice Hall of India, Delhi, 2001.
2. Watterman. “Expert Systems”, Mc-Graw Hill, New York, 1991
3. George F Luger, “Artificial Intelligence, structures and strategies for complex problem solving”, Pearson Education Delhi, 2001.
4. Elain Rich and Kevin Knight, “Artificial Intelligence”, 2nd edition, Tata McGraw Hill, 1993.
5. R.D.Lele, “Computers in Medicine,” Tata McGraw Hill, New Delhi-1989.

- UNIT I REVIEW OF RECORDING AND MONITORING INSTRUMENTS 9**
The origin of Bio electric signals ECG,EEG,EMG,PCG and EOG, lead systems and recording methods, typical waveforms and signal characteristics-Electrodes- Medical display systems- Patient monitoring systems.
- UNIT II DIAGNOSTIC TECHNIQUES 9**
pH,pO₂,pCO₂,pHCO₃ –Electrophoresis-Auto analyzers- Blood flow meters-Cardiac output measurement-Blood cell counters- pulmonary function analyzers.
- UNIT III THERAPEUTIC EQUIPMENTS 9**
Cardiac pacemakers-Cardiac defibrillators-Dialysers-Surgical Diathermy-LASER-Physiotherapy and Electrotherapy equipments-Oxygenators-Heart-Lung Machines-Hearing aids.
- UNIT IV MEDICAL IMAGING 9**
X-Ray and Computer Axial Tomography-Positron Emission Tomography-MRI and NMR-Ultrasonic Imaging systems-Medical Thermograph.
- UNIT V COMPUTER APPLICATIONS IN MEDICAL FIELD 9**
Bio medical Telemetry-Radio pill-Tele stimulation-Physiological parameter monitoring in space station-Arrhythmia monitoring system-EEG signal analysis-Role of Expert Systems(Cadiag,Mycin)-Pattern recognition techniques-E-health- Concepts of Bio technology, Bio Informatics and Genetic Engineering -Application of model sim VLSI design tool for diagnostic fuzzy processor.

TOTAL : 45 PERIODS**REFERENCES:**

1. Albert M.Cook and Webster.J.G., "Therapeutic Medical Devices", Prentice Hall Inc., New Jersey, 1982
2. Leslie Cromwell, Fred. J. Weibel, Erich.A.Pferffer, "Biomedical Instrumentation and Measurements," Prentice Hall India, NewDelhi-2001.
3. R.S.Khandpur, "Hand book of Biomedical Instrumentation,"Tata McGraw Hill, NewDelhi-1998.
4. Rangaraj.M.Rangayyan, "Biomedical Signal Analysis-A Case Study Approach,"IEEE Press- John Wiley&Sons Inc, New York-2002.
5. Joseph .J.Carr and John .M.Brown, "Introduction to Biomedical Equipment Technology," John Wiley&Sons Inc, New York-2002.

MD3407

MEDICAL SOFTWARE LABORATORY

L T P C
0 0 3 2

List of Experiments:

1. Study of Software related to Clinical instrumentation.
2. Study and simulation of Apnea Monitoring software.
3. Study and simulation of Drip Rate Control software
4. Study and simulation of Pulse Oximetric software
5. Study of Hospital Management Software.
6. Study of software in cancer monitoring

Mini Project:

1. Creation of Medical software for Medical Informatics

TOTAL : 45 PERIODS

MD3408

EXPERT SYSTEM LABORATORY

L T P C
0 0 3 2

List of Experiments:

EXPERT SYSTEMS LAB:

1. Study of Medical Expert systems.
 1. MYCIN
 2. PUFF
 3. Fuzzy diagnostic systems
 4. Neural network based Expert systems
 5. Support vector Machine – Expert systems
2. Development of Medical Expert systems
 1. Hospital Management
 2. Respiratory disorder
 3. Fetal Monitoring System
 4. Heart rater variability monitoring
 5. Monitoring in Diabetes Milletes

TOTAL : 45 PERIODS

UNIT II	APPLICATION OF TECHNOLOGY IN DISASTER RISK REDUCTION	9
Application of various technologies: Data bases – RDBMS – Management Information systems – Decision support system and other systems – Geographic information systems – Intranets and extranets – video teleconferencing. Trigger mechanism – Remote sensing-an insight – contribution of remote sensing and GIS - Case study.		
UNIT III	AWARENESS OF RISK REDUCTION	9
Trigger mechanism – constitution of trigger mechanism – risk reduction by education – disaster information network – risk reduction by public awareness		
UNIT IV	DEVELOPMENT PLANNING ON DISASTER	9
Implication of development planning – financial arrangements – areas of improvement – disaster preparedness – community based disaster management – emergency response.		
UNIT V	SEISMICITY	9
Seismic waves – Earthquakes and faults – measures of an earthquake, magnitude and intensity – ground damage – Tsunamis and earthquakes		

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Pardeep Sahni, Madhavi malalgoda and ariyabandu, “Disaster risk reduction in south asia”, PHI
2. Amita sinvhal, “Understanding earthquake disasters” TMH, 2010.

REFERENCES:

1. Pardeep sahni, Alka Dhameja and Uma medury, “Disaster mitigation: Experiences and reflections”, PHI

MD3413	SIMULATION SOFTWARE LABORTAORY	L T P C
		0 0 3 2
1.	Simulation HDP Medical Software	
2.	Simulation MYCIN Medical Software	
3.	Simulation TEIRESIAS Medical Software	
4.	Simulation ANSYS Medical Software	
5.	Simulation PUFF Medical Software.	

TOTAL: 45 PERIODS

MD3001 **PATTERN RECOGNITION AND AI TECHNIQUES** **LT P C**
3 0 0 3

UNIT I INTRODUCTION 9

Definition of AI, Intelligent agents, perception and language processing, problem solving, searching, heuristic searching, game playing, logics, logical reasoning.

UNIT II BASIC PROBLEMS SOLVING METHODS 9

Forward Vs background, knowledge representation, frame problems, heuristic functions, weak methods of matching.

UNIT III PRINCIPLES OF PATTERN RECOGNITION 9

Patterns and features, training and learning in pattern recognition approach, different types of pattern recognition.

UNIT IV DECISION MAKING 9

Baye's theorem, multiple features, decision boundaries, estimation of error rates, histogram, kernels, window estimators, nearest neighbour classification, maximum distance pattern classifiers, adaptive decision boundaries.

UNIT V CLUSTER ANALYSIS AND FEATURE EXTRACTION 9

Unsupervised learning, heirarchical clustering, graph theories approach to pattern clustering, fuzzy pattern classifiers, application of pattern recognition in medicine.

TOTAL: 45 PERIODS

REFERENCES:

1. Elain Rich and Kevin Knight, "Artificial Intelligence" Tata McGraw-Hill, 2nd Edition, Edition- 1993.
2. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Prentice Hall of India, Delhi, Edition- 2001.
3. Earl Gose, Richard Johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall of India Pvt. Ltd., New Delhi, Edition- 1999.
4. G.F. Luger & W.A Stubble Field, "Artificial intelligence structures and Strategies f or complex problem solving," 3rd Edition, Pearson Education, Edition- 1998.
5. Efrain Turban and Jay E Aranson: "Decision support systems and Intelligent Systems," 5th Edition, Pearson Education, 1998.

MD3002 **PATIENT MONITORING SYSTEMS** **LT P C**
3 0 0 3

UNIT I INTRODUCTION 9

Computers in data – computer evolution – structure of medical informatics – hospital information system – security of computer records – sources of data for decision making

UNIT II COMPUTERIZED SYSTEM DESIGN 9

Computerized database management system – dialogue of computer method of history taken by computer – computerized medical records evolution –

UNIT III COMPUTERS IN PATIENT MONITORING 9

Computers in clinical laboratory – automated hematology laboratory – information flow in A CLINICAL LAB - physiological monitoring – automated ICU – computerized arrhythmia monitoring – interfacing to hospital information system (HIS)

UNIT IV COMPUTERS IN MEDICAL IMAGING & DECISION MAKING 9

Computer assistant medical imaging – nuclear medicine computer systems – data acquisition modes – X-ray, CT scan, – medical decision making: - Computer assisted decision making – general model, algorithms – fuzzy set theory

UNIT V RECENT TRENDS 9

Computer aids for handicapped: – computer for deaf – computers for the blind – speech generation and recognition -Computer assisted instructions:-
Introduction - telemedicine, INDONET in medicine – role of Expert systems

TOTAL: 45 PERIODS

REFERENCES:

1. R D Lee, "Computers in Medicine", Tata McGraw Hill, 1999
2. Harold sack man , " Biomedical Information Technology", Academic Press, New York, Edition -1997.
3. R.S.Khandpur "Handbook of Biomedical Instrumentation", 2nd Edition, Tata McGraw Hill, Edition -2003
4. Tatsuo Togawa "Biomedical Transducers and Instruments", Toshiyo Tamura And P. Ake Oberg, CRC Press, Edition-1997.
5. Leslie Cromwell, Fred J. Weibell and Erich A. Pfeiffer,"Biomedical Instrumentation and Measurement", Prentice-Hall India Pvt. Ltd, 1996.

**MD3003 FIBER OPTICS AND LASERS IN MEDICINE L T P C
3 0 0 3**

UNIT I OPTICAL PROPERTIES OF THE TISSUES 9

Refraction, scattering, absorption, light transport inside the tissue, tissue properties, Light interaction with tissues, optothermal interaction, fluorescence, speckles.

UNIT II INSTRUMENTATION IN PHOTONICS 9

Instrumentation for absorption, scattering and emission measurements, excitation light sources – high pressure arc lamp, solid state LEDs, optical filters, polarisers, time resolved and phase resolved detectors.

UNIT III APPLICATIONS OF LASERS 9

Laser in tissue welding, lasers in dermatology, lasers in ophthalmology, otolaryngology, urology.

UNIT IV OPTICAL HOLOGRAPHY 9

Wave fronts, interference patterns, principle of hologram, optical hologram, applications.

UNIT V SPECIAL TECHNIQUES**9**

Near field imaging of biological structures, in-vitro clinical diagnostic, fluorescent spectroscopy, photodynamic therapy.

TOTAL: 45 PERIODS**REFERENCES:**

1. Tuan Vo Dirh, "Biomedical photonics – Handbook", CRC Press, Boca Raton, 2003 (Unit I – III, V)
2. Leon Goldman, M.D., & R. James Rockwell, Jr., "Lasers in Medicine", Gordon and Breach, Science Publishers Inc., New York, 1975.
3. Glasser, O., "Medical Physics -- Vol 1, 2, 3" Adam Hilgar Bristol Inc, 1987.
4. Abraham Katzir, "Lasers and Optical Fibers in Medicine", Academic Press, Edition-1998.
5. G. David Baxter "Therapeutic Lasers – Theory and practice", Churchill Livingstone Publications Edition- 2001

MA3021**NUMERICAL METHODS****L T P C
3 1 0 4****UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS (10 + 3)**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton-Raphson method- Solution of linear system of equations - Gauss Elimination method – Pivoting - Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss-Jordan method - Eigenvalues of a matrix by Power method and by Jacobi's method.

UNIT II INTERPOLATION AND APPROXIMATION (8 + 3)

Interpolation with unequal intervals - Lagrange interpolation – Newton's divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton's forward and backward difference formulae.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION (9 + 3)

Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method – Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS (9 + 3)

Single step-methods - Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first and second order equations – Multistep methods - Milne's and Adams-Bashforth predictor-corrector methods for solving first order equations.

UNIT IV SPEECH CODING 9
 Introduction- Statistical Models- Scalar Quantization- Vector Quantization (VQ)-
 Frequency-Domain Coding- Model-Based Coding- LPC Residual Coding

UNIT V SPEECH TECHNOLOGY IN SELECTED AREAS 9
 Speech Recognition – Introduction- Mathematical formulation- Acoustic Pre-processor-
 Use of HMMs in Acoustic Modelling- Use of higher order statistical models in acoustic
 modelling- case study – speech recognition using a Hidden Markov Model - Robustness
 of Acoustic Modelling and Recognizer Design- Speed synthesis – Introduction- Basic
 approaches- Synthesis Methods- Databases- Case Study – Automatic unit selection for
 waveform speech synthesis

TOTAL: 45 PERIODS

REFERENCES:

1. Li Deng Douglas O’Shaughnessy- “Speech Processing: A Dynamic and Optimization oriented Approach”- Signal Processing and Communication Series- Printed in USA- 2003
2. Thomas F-Quatieri- “Discrete Time Speech Signal Processing: Principles and Practice”- Pearson Education- New Delhi- 2006
3. Rabiner and Schaffer Pearson
4. John R., Jr. Deller , Discrete-Time Processing of Speech Signals , Wiley-IEEE Press-1999
5. Quatieri, Discrete-Time Speech Signal Processing: Principles and Practice, PHI-2006

MD3006 GENETIC ALGORITHM L T P C
3 0 0 3

UNIT I 9
 Fundamentals of genetic algorithm: A brief history of evolutionary computation-biological terminology-search space -encoding- reproduction-elements of genetic algorithm-genetic modeling-comparison of GA and traditional search methods-

UNIT II 9
 Genetic technology: steady state algorithm - fitness scaling - inversion- Genetic programming - Genetic Algorithm in problem solving

UNIT III 9
 Genetic Algorithm in engineering and optimization-natural evolution –Simulated annealing and Tabu search -Genetic Algorithm in scientific models and theoretical foundations-

UNIT IV 9
 Implementing a Genetic Algorithm – computer implementation - low level operator and knowledge based techniques in Genetic Algorithm-

UNIT V 9
 Applications of Genetic based machine learning-Genetic Algorithm and parallel processors- composite laminates- constraint optimization- multilevel optimization- real life problem

TOTAL: 45 PERIODS

REFERENCES:

1. Melanie Mitchell- 'An introduction to Genetic Algorithm'- Prentice-Hall of India- New Delhi- Edition: 2004
2. David-E-Golberg- 'Genetic algorithms in search- optimization and machine learning'- Addison-Wesley-1999
3. S-Rajasekaran and G-A Vijayalakshmi Pai-'Neural Networks- Fuzzy logic and Genetic Algorithms- Synthesis and Applications'- Prentice Hall of India- New Delhi- 2003
4. Nils-J-Nilsson- "Artificial Intelligence- A new synthesis'- Morgan Kauffmann Publishers Inc- San Francisco-California-1998

MD3007

DATA STRUCTURE

L T P C

3 0 0 3

UNIT I PROBLEM SOLVING 9

Top-down Design – Implementation – Verification – Efficiency – Analysis – Algorithms – Brute force – Recursive – Divide & Conquer.

UNIT II LISTS, STACKS AND QUEUES 9

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

UNIT III TREES 9

Terminology – Binary Trees – The Search Tree ADT – Binary Search Trees – Tree Traversals – Hashing – Binary Heap.

UNIT IV SORTING 9

General background of sorting - Bubble sort - selection sort- 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 – Depth-First Search – Breadth first search – Undirected Graphs

TOTAL :45 PERIODS

REFERENCES:

1. R. G. Dromey, "How to Solve it by Computer" Prentice-Hall of India, 2002.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education Asia, 2002.
3. E. Horowitz & S.Sahni, "Fundamentals Of computer Algorithms", Galgotia , 2005
4. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
5. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.
6. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.
7. Robert Kruse / C. L. Tondo "Data Structures & Program design in C" Prentice Hall of India 2007.

- UNIT I HEART LUNG MACHINE AND ARTIFICIAL HEART 9**
Condition to be satisfied by the H/L system. Different types of oxygenators, pumps, pulse and continuous types, monitoring process, shunting, the indication for cardiac transplant, driving mechanism, blood handling system, functioning and different types of Artificial heart, mock test setup for assessing its functions.
- UNIT II CARDIAC ASSIST DEVICES 9**
Synchronous counter pulsation, assisted through respiration right ventricular by-pass pump, left ventricular bypass pump, open chest and closed chest type, Principle and problems --Intra Aortic balloon pumping, Veno Arterial Pumping, Prosthetic Cardio Valves, Biomaterials for purposes, its characteristics and testing.
- UNIT III ARTIFICIAL KIDNEY 9**
Indication and principle of Heamodialysis, Membrane, Dialasate, different types of Heamodialisers, monitoring systems, wearable artificial kidney, implanting type.
- UNIT IV PROSTHETIC AND ORTHODIC DEVICES 9**
Hand and Arm replacement – Different Types of Models Externally Powered Limb Prosthesis Feedback in Orthodic System, functional Electrical Stimulation, Sensory Assist Devices, Materials for Prosthetic and Orthodic devices.
- UNIT V RESPIRATORY AND HEARING AIDS 9**
Intermittent positive pressure, breathing apparatus operating sequence, electronic IPPB unit with monitoring for all respiratory parameters, audiograms , types of deafness, conductive and nervous, hearing aids, constructional and functional characteristics.

TOTAL: 45 PERIODS

REFERENCES:

1. Levine S.N.(Ed.), "Advances in Biomedical Engineering and Medical Physics," Vol:1,2 & 4, Inter University Publications, New York, Edition- 1968
2. Kolff W.J." Artificial Organs", John Wiley and Sons, New York, Edition- 1979
3. Andreas.F. Von racum, "Hand book of Bio material Evaluation," Mc.Millan Publishers, Edition- 1980
4. Albert M.Cook and WebsterJ.G., "Therapeutic Medical Devices", Prentice Hall Inc., New Jersey, Edition- 1992
5. R.S.Khandpur ,"Handbook of Biomedical Instrumentation", Tata McGraw Hill, 2 nd Edition, Edition- 2003

UNIT I	DIGITAL IMAGE PROCESSING FUNDAMENTALS	9
Digital image representation – an image model – digital image processing transforms – overview of L-transforms – transforms and Fourier Transforms		
UNIT II	IMAGE PROCESSING & SEGMENTATION	9
Image enhancement and image restoration – histogram modification techniques – image smoothing – image sharpening – algebraic approach to restoration – constrained and unconstrained restoration – image encoding – image segmentation and description – point and region dependent techniques.		
UNIT III	BOUNDARY DETECTION	9
Edge finding – surface orientation – optical flow – design – growing		
UNIT IV	IMAGE REPRESENTATION	9
Texture – texture as pattern recognition problem – two and three dimensional geometric structures – boundary representation- regions representation – shape properties- knowledge representation and use		
UNIT V	MATCHING AND INFERENCE	9
Semantic nets – matching – inference – computer reasoning – production systems – active knowledge – goal achievement		

TOTAL : 45PERIODS

REFERENCES:

1. Forsyth and Ponce, "Computer Vision,- Modern Approach ", Pearson Education, Edition- 2003.
2. Rosenfeld .A and Kak A.C., "Digital Picture Processing", Academic Press, Edition- 1982
3. Ballard B and Brown B, "Computer Vision", Prentice Hall of India, Edition- 1982
4. Mallot, "Computational Vision: Information Processing in Perception and Visual Behavior",. Cambridge, MA: MIT Press, Edition- 2000.
5. Gonzalez.R and Wintz.P," Digital Image Processing", Addison Wesley Publishing Co. USA, Edition- 1987.

- UNIT I PLANNING AND DEVELOPMENT AND ITS STRATEGY 9**
Introduction-Mission of IT in Health Care: Creating a system – Managing the IT Strategic Planning – Process-Strategies in consulting for the 21st Century-Baylor Health Care-Clarian Health care.
- UNIT II PREPARING FOR ORGANIZATIONAL CHANGE 9**
Informatics in Health Care: Managing Organizational change-the Role of ethics in IT decisions-memorial Hermann health care system; redesign and implementation of a multi facility clinical information system.
- UNIT III IT TRANSFORMATION 9**
IT: transition fundamentals in Health care Transformation -- home and hospital life care system.
- UNIT IV PATIENT – CENTERED TECHNOLOGIES 9**
Patient outcomes of health care-six sigma excellence – electronic health record-interviewing patient with a computer-nursing administration: a growing role in systems development – computer-enhanced radiology – information technology and the New culture of patient Safety- A Component Based Clinical Information and Electronic Health Record.
- UNIT V OUTLOOK ON FUTURE TECHNOLOGIES 9**
Technologies in progress – Evidence –Based Medicine – Aligning Process and Technology-Clinical Decision Support Systems-Quality Information and care-Role for Health Information Systems-Clinical Practice-Connecting the Community for Better Health.

TOTAL: 45 PERIODS**REFERENCES:**

1. Ball, Marion; Weaver, Charlotte A.; Kiel, Joan M. (Eds), "Healthcare Information Management Systems Cases, Strategies and Solutions Sries: Health Informatics", 3rd Editon., Springer Berlin Heidelberg New York, 2004
2. Webster.J.G. and Albert M.Cook, "Clinical Engineering Principles and Practices" Prentice Hall Inc., Englewood Cliffs, New Jersey, 1979.
3. Hans Pfeiff, Vera Dammann (Ed), "Hospital Engineering in Developing Countries, Z Report", Eschborn, 1986.
4. Jacob Kline, "Handbook of Bio Medical Engineering", Academic Press Inc., San Diego 1988.
5. Tatsuo Togawa, Toshiyo Tamura and P. Ake Oberg," Biomedical Transducers and Instruments", CRC Press, 1997.

UNIT I	INTRODUCTION	9
What Is Nanotechnology, Nanotechnology Products and Applications, Future Applications of Nanotechnology, Fields of Study That Influence Nanotechnology, Risks of Nanotechnology, Science of Nanotechnology, Matter, Properties of Matter, Atom and Molecules, Polymers and Nanotechnology,		
UNIT II	CARBON NANOTUBES, NANOWIRES, AND NANOCRYSTALS	9
The Element Carbon, Fullerenes and Nanotechnology, Buckyballs, Carbon Nanotubes, Manufacturing of Carbon Nanotubes, Applications of Carbon Nanotubes AFM Probe Tips, Nanowires, Nanocrystals, and Quantum Dots, Nanoshells		
UNIT III	NANOTECHNOLOGY IN MEDICINE AND HEALTH	9
Cardiovascular Diseases, Cancer Detection and Diagnosis, Diabetes and Nanotechnology, Implants and Prosthetics Nanotechnology and Burn Victims, Diagnosis and Therapy, Drug Delivery Using Nanoparticles, Nanotechnology Fights Infections, Pharmaceutical Nanotechnology Research.		
UNIT IV	NANOMATERIALS AND NANOSYSTEMS FOR BIOMEDICAL APPLICATIONS	9
Micro and Nano Systems in Biomedicine and Drug Delivery, Artificial Implants – New Developments and Associated Problems, Niosomes as Nanocarrier Systems, Alternative Applications for Drug Delivery: Nasal and Pulmonary Routes.		
UNIT V	RISKS, ETHICS AND LAWS	9
Microsystems and Nanoscience for Biomedical Applications, Nanotechnoscience and Complex Systems, From Biotechnology to Nanotechnology, Risk Management and Regulation in an Emerging Technology, Nanotechnology and Nanoparticle Toxicity, The Global Ethics of Nanotechnology, Risk, Trust and Public Understanding of Nanotechnologies, Nanotechnologies and the Law of Patents, Nanotechnologies and Civil Liability, Nanotechnologies and the Ethical Conduct of Research Involving Human Subjects		
		TOTAL:45 PERIODS

REFERENCES:

1. John Mongillo, "Nanotechnology", Greenwood Press, United States of America, Edition – 2007.
2. M. Reza Mozafari , "Nanomaterials and Nanosystems for Biomedical Applications", Springer, Edition – 2007
3. Geoffrey Hunt and Michael D. Mehta, "Nanotechnology - Risks, Ethics and Laws" James and James- Earthscan Edition – 2005
4. Jones, Richard A.L., "Soft Machines: Nanotechnology and Life", Oxford University Press, Edition- 2004.
5. Charles P.Poole and Frank J Owens. "Introduction to Nanotechnology",. Wiley Interscience, Edition- 2033.

MD3012

MEDICAL PHYSICS

L T P C

3 0 0 3

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; Radiionuclides 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 V ADVANCES IN MEDICAL PHYSICS

10

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 PERIODS

REFERENCES:

1. Glasser,O., "Medical Physics -- Vol 1,2,3 " Adam Hilgar Brustol Inc, Edition- 1987.
2. Moselly, " Non ionizing Radiation ",Adam Hilgar Brustol Inc, Edition- 1988.
3. Leon Goldman, M.D, & R.James Rockwell,Jr. , "Lasers in Medicine ", Gordon & Breach , Science Publishers Inc; New York, Edition- 1975
4. Tuan Vo Dirh, "bio medical photonics – hand book ", CRC Press,bocaraton, Edition- 2003.
5. Branski .S, & Cherski, P "Biological effects of Microwave "Hutchson & Ross Inc., Edition- 1980.

MD3013

DATAMINING FOR MEDICAL ELECTRONICS

L T P C

3 0 0 3

UNIT I INTRODUCTION

9

Data mining – introduction – information and production factor – Data mining Vs Query tools-Data mining in marketing-self learning in computer systems-concept learning-data learning- data mining and data ware house.

UNIT II KNOWLEDGE DISCOVERY PROCESS

9

Knowledge discovery process- data selection –cleaning- enrichment-coding- preliminary analysis of the data set using traditional query tools – Visualization techniques – OLAP tools – Decision trees – Association rules – Neutral networks – Genetics algorithms – KDD(knowledge Discover in Database) environment.

UNIT III DATA MINING 9
Analysis of descriptive mining of complex data objects, text database, time series and sequence data, applications to medical data

UNIT IV DATA MINING IN BIOMEDICAL ENGINEERING 9
Conceptual models for Biological and medical data – Biomedical Data in integration analysis and interoperability – Biomedical Query processing, query optimization and information retrieval – ontology – driver Biomedical systems – Biomedical data privacy and security.

UNIT V RECENT TRENDS 9
Data mining application in Bio – informatics, Bio medicine, healthcare and other Biomedical domain areas.

TOTAL : 45 PERIODS

REFERENCES:

1. J.Han, M.Kambe, "Data mining: concepts and techniques", Harcourt India / Morgan Kauffman, Edition- 2001.
2. Margaret H.Dunham, "Data mining: Introductory and Advanced Topics", Pearson Education Edition- 2004.
3. "Annual review of Bio-medical Knowledge discovery and data mining: data integration for Bio informatics", Springer, Edition- 2006 2nd ed.
4. Berson,"Data warehousing, data mining and OLAP". Edition- 2000
5. Bronzino, Joseph D, "The Biomedical Engineering Hand book", 2nd ed, Tata McGraw Hill. Edition-2003

**CS3014 SOFT COMPUTING L T P C
3 0 0 3**

UNIT I ARTIFICIAL NEURAL NETWORKS 9
Basic-concepts-single layer perception-Multi layer perception-Supervised and unsupervised learning back propagation networks- Application

UNIT II FUZZY SYSTEMS 9
Fuzzy sets and Fuzzy reasoning-Fuzzy Matrices-Fuzzy functions-decomposition-Fuzzy automata and languages-Fuzzy control methods-Fuzzy decision making- Applications

UNIT III NEURO-FUZZY MODELLING 9
Adaptive networks based Fuzzy interfaces-Classification and Representation trees-Data clustering algorithm-Rule base structure identification-Neuro-Fuzzy Controls

UNIT IV GENETIC ALGORITHM 9
Survival of the fittest-pictures computations-cross over mutation-reproduction-rank method-rank space method- Application

UNIT V APPLICATIONS 9
 ANFIS Applications - Introduction- Printed Character Recognition- Nonlinear System Identification- Channel Equalization- Adaptive Noise Cancellation - Fuzzy sets and GA in Game playing-Introduction- Variants of GA- using GA in game playing- simulation results of the Basic Models- using Fuzzy characterized features-

TOTAL: 45 PERIODS

REFERENCES:

1. Jang J-S-R-- Sun C-T and Mizutani E- "Neuro Fuzzy and Soft Computing"- Pearson/Prentice Hall India P Ltd-- New Delhi- 2006
2. Timothy J-Ross –"Fuzzy Logic Engineering Applications"-Tata McGraw Hill- 1997-
3. S- Rajasekaran and G A Vijayalakshmi Pai- "Neural Networks- Fuzzy Logic and Genetic Algorithms Synthesis and Applications"- Prentice Hall India P Ltd- New Delhi- 2007
4. David E-Goldberg- "The Design of Innovation (Genetic Algorithm and Evolutionary Computation) "- Kluwer Academic publisher- 2002

**MD3015 ADVANCED MICROPROCESSORS L T P C
 3 0 0 3**

UNIT I THE 8086 MICROPROCESSOR 9
 Introduction - architecture, addressing modes, Instruction Format, Data transfer, Arithmetic, Bit and Logical manipulation, string, program transfer and processor control instructions, dependent instructions, Pseudo instructions - Use of assembler and assembler directives, simple math programme, moving block of data , arrange a block of data in ascending / descending order.

UNIT II SYSTEM DESIGN USING 8086 9
 Pins and signals, Basic system concepts, interfacing with memories, I/O ports - Programmed I/O - Input / Output processor - Interrupts - DMA - 8086 based microcomputer - Math co processor 8087.

UNIT III MOTOROLA 68000 9
 Introduction - Registers - Memory addressing - Instruction format – addressing modes - Instruction set - Pins and signals - Memory interface - System diagram. Programmed I/O - Interrupt system - DMA - 68000 based microcomputer.

UNIT IV OTHER MICROPROCESSOR 9
 Intel 80386, 80486, Pentium microprocessor - SUN's SPARC microprocessor – AMD microprocessor - MOTOROLA 68040, MC88100.

UNIT V PERIPHERAL INTERFACING AND BUS STANDARDS 9
 Parallel versus serial transmission, USART, Interfacing of hexadecimal keyboard and Display unit to a microprocessor - CRT, Printer interface - DMA Controllers. ISA bus, PCI bus, USB - RS232C, RS423A, RS-449, IDE, ATA, SCSI, IEEE-488 bus.

TOTAL 45 PERIODS

REFERENCES

1. M. Rafiquzzaman, "Microprocessors - Theory and applications", Prentice Hall of India private Limited, 2005.
2. Barry B.Brey, "The Intel Microprocessor", Prentice Hall International Inc., 2000.
3. Badri Ram, "Advance Microprocessors and Interfacing", Tata McGraw Hill Publishing Company limited, 2007.
4. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Community College Div. Publishing, 1991

MD3016

OPTO ELECTRONIC DEVICES

L T P C

3 1 0 4

UNIT I ELEMENTS OF LIGHT AND SOLID STATE PHYSICS 9

Wave nature of light- Polarization- Interference- Diffraction- Light Source- review of Quantum Mechanical concept- Review of Solid State Physics- Review of Semiconductor Physics and Semiconductor Junction Device-

UNIT II DISPLAY DEVICES AND LASERS 9

Introduction- Photo Luminescence- Cathode Luminescence- Electro Luminescence- Injection Luminescence- LED- Plasma Display- Liquid Crystal Displays- Numeric Displays- Laser Emission- Absorption- Radiation- Population Inversion- Optical Feedback- Threshold condition- Laser Modes- Classes of Lasers- Mode Locking- laser applications-

UNIT III OPTICAL DETECTION DEVICES 9

Photo detector- Thermal detector- Photo Devices- Photo Conductors- Photo diodes- Detector Performance-

UNIT IV OPTOELECTRONIC MODULATOR 9

Introduction- Analog and Digital Modulation- Electro-optic modulators- Magneto Optic Devices- Acoustoptic devices- Optical- Switching and Logic Devices-

UNIT V OPTOELECTRONIC INTEGRATED CIRCUITS 9

Introduction- hybrid and Monolithic Integration- Application of Opto Electronic Integrated Circuits- Integrated transmitters and Receivers- Guided wave devices-

TUTORIAL : 15 TOTAL:45 PERIODS

REFERENCES:

1. J- Wilson and J-Haukes- "Opto Electronics – An Introduction"- Pearson/Prentice Hall of India Pvt- Ltd-- New Delhi- 2007-
2. Bhattacharya "Semiconductor Opto Electronic Devices"- Pearson/Prentice Hall of India Pvt-Ltd-New Delhi- 2006-
3. India Pvt-Ltd-New Delhi- 2006-
4. Jasprit Singh- "Opto Electronics – As Introduction to materials and devices"- McGraw-Hill International Edition- 1998
5. Joachim Piprek, Semiconductor Optoelectronic Devices, Elsevier-2003
6. S. O. Kasap, Safa Kasap, Optoelectronics and Photonics: Principles and Practices, PHI-2001

UNIT I INTRODUCTION AND TYPES OF OPERATING SYSTEMS 9

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication-

UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION 9

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors-

UNIT III DEADLOCK 9

System Model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging-

UNIT IV MEMORY MANAGEMENT 9

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V FILE MANAGEMENT 9

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management- Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management-

TOTAL: 45 PERIODS**REFERENCES:**

1. Abraham Silberschatz- Peter Baer Galvin and Greg Gagne- “Operating System Concepts”- Sixth Edition- John Wiley & Sons (ASIA) Pvt- Ltd- 2003.
2. Dhamhdere, Operating System 2nd Edition, TMH,2006.
3. Harvey M- Deitel- “Operating Systems”- Second Edition- Pearson Education Pvt- Ltd- 2002-
4. Andrew S- Tanenbaum- “Modern Operating Systems”- Pearson/Prentice Hall of India Pvt- Ltd- 2003- Davis -”operating systems “ - pearson 2005
5. William Stallings,Operating systems: Internals and design principle-5/E PHI 2004

UNIT I FUNDAMENTAL OF ACOUSTICS 9

Acoustics waves – Linear wave equation – sound in fluids – Harmonic plane waves – Energy density – Acoustics intensity – Specific acoustic impedance – spherical waves – Describer scales-Transmission from one fluid to another normal and oblique incidence – method of images-

UNIT II RADIATION AND RECEPTION 9

Radiation from a pulsating sphere – Acoustic reciprocity – continuous line source - radiation impedance - Fundamental properties of transducers- Absorption from viscosity – complex sound speed and absorption – classical absorption coefficient

UNIT III HEARING & SPEECH- PIPES RESONATORS AND FILTERS 9

Physiology of speech and hearing- fundamental properties of hearing – loudness level and loudness – pitch and frequency – voice- Noise- spectrum level and band level – combing band levels and tones – detecting signals in noise – detection threshold - Resonance in pipes - standing wave pattern absorption of sound in pipes – long wavelength limit – Helmholtz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic filters – low pass- high pass and band pass.

UNIT IV ARCHITECTURAL ENVIRONMENTAL ACOUSTICS 9

Sound in enclosure – A simple model for the growth of sound in a room – reverberation time - Sabine- sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design-Weighted sound levels speech interference – highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design of portions-

UNIT V LOUD SPEAKERS & MICROPHONES 9

Transducer network – canonical equation for the two simple transducers transmitters – moving coil loud speaker – loudspeaker cabinets – horn loud speaker- receivers – condenser – microphone – moving coil electrodynamic microphone piezoelectric microphone – calibration of receivers-

TOTAL: 45 PERIODS**REFERENCES :**

1. Lawrence E-Kinsler- Austin- R-Frey- Alan B-Coppens- James V-Sanders- Fundamentals of Acoustics- 4th edition- Wiley- 2000-
2. L-Berarek - "Acoustics" - McGraw-Hill 2000-
3. Frank J. Fahy ,Foundations of engineering Acoustics
4. Michael Möser, Engineering Acoustics, Springer; 1 edition (March 19, 2004)

UNIT I INTRODUCTION TO ROBOTICS 9

Motion - Potential Function, Road maps, Cell decomposition and Sensor and sensor planning. Kinematics. Forward and Inverse Kinematics - Transformation matrix and DH transformation. Inverse Kinematics - Geometric methods and Algebraic methods. Non-Holonomic constraints.

UNIT II COMPUTER VISION 9

Projection - Optics, Projection on the Image Plane and Radiometry. Image Processing - Connectivity, Images-Gray Scale and Binary Images, Blob Filling, Thresholding, Histogram. Convolution - Digital Convolution and Filtering and Masking Techniques. Edge Detection - Mono and Stereo Vision.

UNIT III SENSORS AND SENSING DEVICES 9

Introduction to various types of sensor. Resistive sensors. Range sensors - Ladar (laser distance and ranging), Sonar, Radar and Infra-red. Introduction to sensing - Light sensing, Heat sensing, Touch sensing and Position sensing.

UNIT IV ARTIFICIAL INTELLIGENCE 9

Uniform Search strategies - Breadth first, Depth first, Depth limited, Iterative and deepening depth first search and Bidirectional search. The A* algorithm . Planning - State-Space Planning , Plan-Space Planning, Graphplan/SatPlan and their Comparison, Multi-agent planning , and Multi-agent planning , Probabilistic Reasoning - Bayesian Networks, Decision Trees and Bayes net inference .

UNIT V INTEGRATION TO ROBOTICS 9

Building of 4 axis or 6 axis robot - Vision System for pattern detection - Sensors for obstacle detection - AI algorithms for path finding and decision making

TOTAL: 45 PERIODS**REFERENCES :**

1. Duda, Hart and Stork, "Pattern Recognition", Wiley-Interscience, 2000.
2. Mallot, "Computational Vision: Information Processing in Perception and Visual Behavior", Cambridge, MA: MIT Press, 2000.
3. Stuart Russell and Peter Norvig, "Artificial Intelligence-A Modern Approach" Pearson Education Series in Artificial Intelligence, 2004
4. Robert Schilling and Craig , "Fundamentals of Robotics, Analysis and control",
5. Prentice Hall of India Private Limited, New Delhi, 2003.
6. Forsyth and Ponce, "Computer Vision-- A modern Approach", Person Education, 2003.

UNIT IV BIO TELEMETRY 9
Principle, frequency selection for telemetry, radio pills, multiplexing and tracking techniques, telestimulation.

UNIT V RECENT TRENDS AND ELECTRICAL SAFETY 9
Principles of thermography, detecting circuits, it's application in medicine, principles of cryogenic techniques, it's application in medicine, principles of fibre optic cable, endoscopy, laproscopy, ophthalmic equipments, macro and micro shock, sources of shock, monitoring and interrupting circuit from leakage current, earthing scheme.

TUTORIAL: 15 TOTAL : 60 PERIODS

REFERENCES:

1. Albert M.Cook and Webster.J.G., "Therapeutic Medical Devices", Prentice Hall Inc., New Jersey, 1982.
2. Fein Berg B.N., "Applied Clinical Engineering," Prentice Hall Inc.,New Jersey,1986.
3. Khandpur.R.S., "Handbook of Bio Medical Instrumentation," Tata McGraw Hill Publishing, New Delhi, 1999.
4. Jacobson .B. and Webster J.G., "Medicine and Clinical Engineering", Prentice Hall of India, New Delhi, 1999.
5. Leslie Cromwell, et al, "Bio Medical Instrumentation and Measurements", Prentice Hall of India, New Delhi, 2000.

EC3023 VLSI DESIGN L T P C
3 0 0 3

UNIT I MOS TECHNOLOGY 9
Chip Design Hierarchy- IC Layers –Photolithography and Pattern Transfers- Basic MOS Transistors-CMOS Fabrication – Submicron CMOS Process –Masks and Layout –CMOS Design Rules: Lambda based layout- Types of rules- SCMOS Design Rule set II.

UNIT II MOSFET TRANSISTOR 9
MOSFET operation - MOSFET switch model and square law model – MOSFET parasitic-- MOSFET SPICE Modeling-CMOS Inverter: Voltage Transfer curve- Layout- Body Effect-Latch up problem in CMOS circuits-Latch up prevention-

UNIT III CMOS LOGIC GATES DESIGN AND LAYOUT 9
NAND and NOR Gates – Complex Logic Gates –Tri state circuits – Large FETs- Transmission Gate and Pass Transistor Logic-Standard Cell design: Cell hierarchy-Cell libraries.

UNIT IV STORAGE ELEMENTS AND DYNAMIC LOGIC CIRCUITS 9
SR Latch- Bit Level Register –D Type Flip Flop –Dynamic D Flip Flop –The Static RAM Cell –Dynamic Logic – Domino Logic – SR Logic –Dynamic Memories

UNIT V VHDL 9
 VHDL Program Structure- concurrent code – sequential code - Variables- signals and Constants-VHDL Operators -VHDL Description of Combinational Networks: Adders – Modeling Flip Flop using VHDL Processes – VHDL Model for Multiplexer –Modeling a sequential Machine-

TOTAL: 45 PERIODS

REFERENCES

1. John P Uyemura- “ Chip Design for Submicron VLSI:CMOS layout and simulation” Thomson India Edition- 2006(unit I to IV)
2. Charles H Roth-”Digital System Design Using VHDL”- Thomson business Information India Pvt Ltd-2006 (Unit V)
3. Kamran Eshraghian- Douglas A Pucknell Sholeh Eshraghian “Essentials of VLSI Circuits and Systems”- Prentice Hall of India Pvt Ltd- 2006
4. Volnei A Pedroni-”Circuit design with VHDL”- Prentice Hall of India Pvt Ltd- 2005
- 5 Wayne Wolf,” Modern VLSI Design – System On Chip”, PHI 2006, 3e, New Delhi

**GE3024 INTELLECTUAL PROPERTY RIGHTS L T P C
 3 0 0 3**

UNIT I IMPORTANCE OF INTELLECTUAL PROPERTY RIGHTS 5
 Introduction – Tangible and Intangible Properties- Intellectual property- an intangible wealth and a product of creative mind – IPR and its significance- Types of IPRs-

UNIT II COPYRIGHTS AND RELATED ISSUES 10
 Works protected by copyright- Reproduction rights-moral rights-translation and adaptation rights-copyright issues-Piracy- civil -criminal remedies-Infringement- Patents – Copyrights of designs 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 INTERNATIONAL AGREEMENT FOR THE PROTECTION OF IPR 10
 Berne convention-Madrid agreement-Hague agreement-Patent cooperation treaty-Paris convention-Lisbon Agreement - Establishment of WIPO – UPOV and WTO-Mission and Activities – History – General Agreement on Trade and Tariff (GATT)-

UNIT IV PATENTED INVENTION AND ADMINISTRATION 10
 Significance of Patent information-classification of invention according to technology- Novelty search and state of art search-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 APPLICATIONS**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- Patent agents-Examiner of Patents- IPR Managers-

TOTAL: 45 PERIODS**REFERENCES:**

1. Prabuddha Ganguli, "Intellectual Property Rights,"TMH, 2001.
2. Subbaram N-R- " Handbook of Indian Patent Law and Practice "- S- Viswanathan (Printers and Publishers) Pvt- Ltd—1998.
3. Richard Stim, "Intellectual Property Copyrights, trademarks, and Patents," Cengage Learning India Private Ltd, 2004.
4. Deborah E. Bouchoux, "Intellectual Property Rights," Cengage Learning India Private Ltd, 2005.
5. Dr.Radhakrishnan & Balasubramani" IPR
6. Eli Whitney- United States Patent Number : 72X- Cotton Gin- March 14- 1794-
7. Intellectual Property Today : Volume 8- No- 5- May 2001- [www-iptoday-com]-

BM3025**ADVANCED DIGITAL SIGNAL PROCESSING****L T P C
3 0 0 3****UNIT I DISCRETE RANDOM PROCESS****9**

Discrete Random Processes- Expectation- Variance- Co -Variance- Uniform- Gaussian and Exponentially distributed noise - Hilbert space and inner product for discrete signals -Energy of Discrete Signals- Parseval's Theorem- Wiener Khintchine Relation- Power Spectral Density- Sum Decomposition Theorem- Spectral Factorization Theorem - Discrete Random Signal Processing by Linear Systems - Simulation of White Noise - Low Pass Filtering of White Noise-

UNIT II POWER SPECTRUM ESTIMATION**9**

Sample auto correlation–Periodogram- Use of DFT in power spectrum estimation- Non–parametric methods:-Bartlett- Welch and Blackman-Tukey method- Parametric methods:- Model based Approach - AR- MA- ARMA Signal Modeling-Parameter Estimation using Yule-Walker Method- Solutions using Durbin's algorithm

UNIT III ADAPTIVE & MULTIRATE SIGNAL PROCESSING**9**

FIR adaptive filters – steepest descent adaptive filter – LMS algorithm – convergence of LMS algorithms – Application: noise cancellation – channel equalization – adaptive recursive filters – recursive least squares-
Decimation by a factor D – Interpolation by a factor I – Filter Design and implementation for sampling rate conversion: Direct form FIR filter structures – Polyphase filter structure-

UNIT IV SPEECH SIGNAL PROCESSING 9

Digital models for speech signal : Mechanism of speech production – model for vocal tract- radiation and excitation – complete model – time domain processing of speech signal:- Pitch period estimation – using autocorrelation function – Linear predictive Coding: Basic Principles – autocorrelation method – Durbin recursive solution-

UNIT V ADVANCED TRANSFORMS 9

Fourier Transform : Its power and Limitations – Short Time Fourier Transform – The Gabor Transform - Discrete Time Fourier Transform and filter banks – Continuous Wavelet Transform – Wavelet Transform Ideal Case – Perfect Reconstruction Filter Banks and wavelets – Recursive multi-resolution decomposition – Haar Wavelet – Daubechies Wavelet-

TOTAL: 45 PERIODS

REFERENCES

1. Monson H-Hayes – Statistical Digital Signal Processing and Modeling- Wiley- 2002
2. John G-Proakis- Dimitris G-Manobakis- Digital Signal Processing- Principles- Algorithms and Applications- Third edition- (2000) Pearson/PHI-
3. L-R-Rabiner and R-W-Schaber- Digital Processing of Speech Signals- Pearson Education (1979)-
4. Roberto Crist- Modern Digital Signal Processing- Thomson Brooks/Cole (2004)
5. Raghuvveer- M- Rao- Ajit S-Bopardikar- Wavelet Transforms- Introduction to Theory and applications- Pearson Education- Asia- 2000-

**CS3026 COMPUTER HARDWARE AND INTERFACING L T P C
3 0 0 3**

UNIT I CPU AND MEMORY 9

CPU essentials- processor modes- modern CPU concepts- Architectural performance features- CPU over clocking- Over clocking the system- Over clocking the Intel processors- Essential memory concepts- memory organizations- memory packages- modules- Logical memory organizations- memory types- memory techniques- selecting and installing memory-

UNIT II I/O AND VIDEO PERIPHERALS 9

Input- Output devices - Keyboard and mouse interfaces- Display - Video and LCD displays - CRT controller - Graphics controller- Audio / Video cards- printers- Interface standards

UNIT III STORAGE DEVICES 9

Storage Devices - Floppy Disks - Controllers and Standards - Hard disks - Formats- Controllers and Interface Standards- Optical disks - CDROM disks and drive formats- High capacity Magnetic storage techniques - RAID- Magnetic Tapes – Standards

UNIT IV PC ARCHITECTURE 9

Operating systems and boot process-BIOS–personal computer architecture-Motherboard-Chipsets-Interfacing peripheral devices-Device drivers-Introduction to other personal computers/work stations/Network computers-

UNIT V SYSTEM BUS 9

Standards in PC Architecture - BUS standards- System Bus- I/O bus- communication Interface- Plug and play Systems- Current topics in PC architecture / standards-

TOTAL: 45 PERIODS

REFERENCES:

1. Stephen J-Bigelow-"Troubleshooting-Maintaining & repairing of PCs"- TMH, 2007.
2. Craig Zacker & John Rourke- "The complete reference: PC hardware"- Tata McGraw-Hill- New Delhi- 2007-
3. Mike Meyers- "Introduction to PC Hardware and Trouble shooting"- Tata McGraw-Hill- New Delhi- 2005-
4. B-Govindarajulu- "IBM PC and Clones hardware trouble shooting and maintenance"- Tata McGraw-Hill- New Delhi- 2007-
5. Mueller-S- Upgrading and repairing PCS- 4th Edition- Prentice Hall- 1995
6. D-V-Hall- Microprocessors and Interfacing Programming and Hardware- Mc Graw Hill-2006

**EC3027 COMPUTER NETWORKS L T P C
3 0 0 3**

UNIT I APPLICATION LAYER 9

The Network Edge- The Network Core- Delay- Loss- and Throughput in Packet-Switched Networks-Protocol Layers and Their Service Models- Networks Under Attack-Principles of Network Applications-The Web and HTTP-File Transfer: FTP-Electronic Mail in the Internet- DNS—The Internet’s Directory Service-Peer-to-Peer Applications

UNIT II TRANSPORT LAYER 9

Introduction and Transport-Layer Services-Multiplexing and Demultiplexing-Connectionless Transport: UDP-Principles of Reliable Data Transfer-Connection-Oriented Transport: TCP-Principles of Congestion Control-TCP Congestion Control

UNIT III THE NETWORK LAYER 9

Introduction-Virtual Circuit and Datagram Networks- Inside a Router- The Internet Protocol (IP): Forwarding and Addressing in the Internet-Routing Algorithms Routing in the Internet-Broadcast and Multicast Routing- Mobile IP

UNIT IV THE LINK LAYER AND LOCAL AREA NETWORKS 9

Link Layer: Introduction and Services-Error-Detection and -Correction Techniques-Multiple Access Protocols-Link-Layer Addressing-Ethernet-Link-Layers Switches- The Point-to-Point Protocol-Link Virtualization: A Network as a Link Layer- WiFi: 802-11 Wireless LANs

UNIT V NETWORK SECURITY AND MANAGEMENT 9

Principles of Cryptography- Message Integrity- End-Point Authentication- Securing E-mail- Securing TCP Connections: SSL-Network-Layer Security: IPsec- Securing Wireless LANs- Operational Security: Firewalls and Intrusion Detection Systems-elements of QOS

TOTAL: 45 PERIODS

REFERENCES:

1. James .F.Kurose & W.Ross "Computer Networking: A Top down approach "- Pearson education-4 /E 2007
2. Behrouz A.Forouzan- "Data communication and Networking"- Tata McGraw-Hill-4/E-2007.
3. Alberto Leon Garcia, Communication Networks, 2nd Edition TMH, 2004.
4. Larry L-Peterson & Peter s-Davie-"Computer Networks "-Harcourt Asia Pvt-Ltd-2/E.
5. Andrew S.Tannenbaum-"Computer Networks"- PHI/Pearson – 4/E 2003.
6. Douglas Comer 'Computer networks with Internet applications" Pearson edition 2005.

**GE3403 TOTAL QUALITY MANAGEMENT LT P C
3 0 0 3**

AIM:

To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES:

- To under the various principles, practices of TQM to achieve quality
- To learn the various statistical approaches for quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems.

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II TQM PRINCIPLES 9

Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I 9

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

