

B. TECH
CURRICULUM
&
SYLLABUS

Semester I

Code	Subject	L	T	P	C
HSS101	English for technical communication I	2	0	0	2
MAT101	Mathematics I	3	0	0	3
PHY101	Physics I	3	0	0	3
CHY105	Chemistry	3	0	0	3
MEC101	Engineering Drawing	1	0	3	2
CIV101	Basic Civil and Mechanical Engineering	4	0	0	4
MEC181	Work Shop	0	0	3	1
CHY181	Chemistry Laboratory	0	0	3	1
	Total	–	–	–	19

Semester II

Code	Subject	L	T	P	C
HSS102	English for technical communication II	2	0	0	2
MAT102	Mathematics II	3	0	0	3
PHY104	Physics II	3	0	0	3
EEE101	Basic Electrical and Electronics Engineering	4	0	0	4
CHY101	Environmental Sciences	2	0	0	2
CSE102	Programming Languages	2	0	0	2

MEC103	Engineering Mechanics	3	0	0	3
PHY181	Physics Laboratory	0	0	3	1
CSE181	Programming Languages Laboratory	0	0	3	1
	Total	–	–	–	21

Semester III

Code	Subject	L	T	P	C
MAT201	Mathematics III	3	0	0	3
HSSXXX	Humanities Elective I	3	0	0	3
EEE201	Electromagnetic theory	3	1	0	4
EEE202	DC Machines and Transformers	3	1	0	4
EEE203	Electric Circuit Analysis	3	1	0	4
ECE256	Electronic Devices and circuits	3	1	0	4
EEE281	Machines Laboratory I	0	0	3	2
ECE296	Electronic devices and Circuits Laboratory	0	0	3	2
	Total	–	–	–	26

Semester IV

Code	Subject	L	T	P	C
MAT211	Numerical Methods	3	0	0	3
EEE204	Control Systems	3	1	0	4
EEE205	AC Machines	3	1	0	4

EEE206	Measurements and Instrumentation	4	0	0	4
ECE266	Digital electronics	3	1	0	4
CSE206	Object Oriented Programming	3	1	0	4
EEE282	Machines Laboratory II	0	0	3	2
CSE285	Object Oriented Programming Laboratory	0	0	3	2
	Total	–	–	–	27

Semester V

Code	Subject	L	T	P	C
EEEXXX	Major Elective I	3	0	0	3
EEEXXX	Minor Elective I	3	0	0	3
EEE301	Power Electronics	3	1	0	4
EEE302	Transmission and Distribution	3	1	0	4
EEE303	Linear Integrated Circuits	3	1	0	4
EEE304	Design of Electrical Apparatus	3	1	0	4
EEE381	Power Electronics Laboratory	0	0	3	2
EEE382	Instrumentation and control Laboratory	0	0	3	2
	Total	–	–	–	26

Semester VI

Code	Subject	L	T	P	C
HSSXXX	Humanities Elective II	3	0	0	3
EEEXXX	Major Elective II	3	0	0	3
EEEXXX	Free Elective I	3	0	0	3
EEEXXX	Minor Elective II	3	0	0	3
EEE305	Power System Analysis	3	1	0	4
EEE306	Microprocessor and Microcontroller	3	1	0	4
EEE383	Digital Circuits and Integrated Circuits Laboratory	0	0	3	2
EEE384	Microprocessor and Microcontroller Laboratory	0	0	3	2
	Total				24

Semester VII

Code	Subject	L	T	P	C
HSSXXX	Humanities Elective III	3	0	0	3
EEEXXX	Free Elective II	3	0	0	3
EEEXXX	Major Elective III	3	0	0	3
EEEXXX	Major Elective IV	3	0	0	3
EEE401	Protection and Switch gear	3	0	0	3
EEE402	Electrical Drives	3	1	0	4

EEE403	Power System Operation and Control	3	1	0	4
EEE481	Power System Simulation Laboratory	0	0	3	2
	Total	–	–	–	25

Semester VIII

Code	Subject	L	T	P	C
EEEXXX	Self study Elective	3	0	0	3
EEE499	Project work	0	0	24	8
	Total	3	0	24	11

MAJOR ELECTIVES

Code	Subject	L	T	P	C
EEE306	Special electrical machines	3	0	0	3
EEE307	High voltage engineering	3	1	0	4
EEE308	Solid state drives	3	0	0	3
EEE309	Control system design	3	0	0	3
EEE310	Non-conventional energy sources	3	0	0	3
EEE311	Network analysis and synthesis	3	0	0	3
EEE404	HVDC and FACTS	3	0	0	3
EEE405	Power system dynamics	3	1	0	4

EEE406	Power system optimization	3	1	0	4
EEE407	Electric energy generation, utilisation and conservation	3	0	0	3
EEE408	Modern control theory	3	0	0	3
EEE409	Industrial automation	3	1	0	4
EEE410	Neural network and fuzzy logic	3	0	0	3

MINOR ELECTIVES

Code	Subject	L	T	P	C
ECE301	Digital signal processing	3	1	0	4
CSE301	Computer architecture and organization	3	0	0	3
ECE356	Communication engineering	3	0	0	3
CSE366	Visual languages and applications	3	1	0	4
CSE306	Data communication and networks	3	1	0	4
CSE207	Operating systems	3	0	0	3
EIE314	VLSI Design	3	0	0	3
MEC308	Mechatronics	3	0	0	3
EIE409	Bio-medical instrumentation	3	0	0	3
ECE431	Wireless communication	3	0	0	3

EIE412	Optimal and adaptive control	3	0	0	3
ECE366	Embedded systems	3	0	0	3
EIE415	Micro controller based system design	3	0	0	3

Total number of Credits =179

HUMANITIES ELECTIVES

Code	Subject	L	T	P	C
HSS001	Total Quality Management	3	0	0	3
HSS002	Engineering Management	3	0	0	3
HSS004	Industrial Psychology	3	0	0	3
HSS006	Professional Ethics	3	0	0	3
HSS014	Marketing Management	3	0	0	3
HSS015	Management Concepts and Techniques	3	0	0	3
HSS016	Organizational Psychology	3	0	0	3
HSS017	International Economics	3	0	0	3
HSS018	Communication Skills	3	0	0	3
HSS019	Operations research	3	0	0	3
HSS020	Human Resource Management	3	0	0	3
HSS023	Entrepreneurship Development	3	0	0	3

SEMESTER I

HSS101	ENGLISH FOR TECHNICAL COMMUNICATION I (Common to all branches)	L	T	P	C
		2	0	0	2

FOCUS ON LANGUAGE

Parts of speech – nominal compounds, noun phrases – relative pronoun – adjective – numerical, comparison and contrast, collocation and word combinations – verb – preposition and relative – conjunction– connectives, expressions of purpose and function, cause and effect – articles – adjectives – sentence pattern – tenses – voice – rewriting the sentences in impersonal/abbreviated passive grammatical structures – concord – sentence level verb noun agreement – gerund – rewriting infinitive into gerund – imperative – rewriting imperative into recommendation using should – word formation – varied grammatical function of the same word – affixes – prefix and suffix, number prefix, negative prefix – reported speech – editing strategies – conditional structures – real, unreal, no possibility, zero condition – writing formal definition – abbreviation and acronym – idioms and phrases – varieties of english – british versus american

LISTENING SKILLS

Comprehension practice – vocabulary development – familiarity to varied types of spoken english and accents – developing ability to understand audio and video media – aiming at overcoming barriers to listening – listening to documentaries, radio news broadcasts, TV news telecasts – active listening in discussions and to lectures – taking notes while listening – extracting information from listening

SPEAKING SKILLS

Oral practice – role play – interplay – seminar – transcoding visual into oral – participating in short and longer conversation – voice record, replay, correction of intonation, pronunciation and flow of

speech – phonemes – vowels, consonants, stress, rhythm, intonation
– group discussion – participative learning – acquiring proficiency,
fluency, accuracy in oral communication – speaking practice –
developing confidence – extempore speech – learning
professional/conversational etiquette

READING SKILLS

Vocabulary extension – improving vocabulary – intensive reading –
reading strategies – identifying topic sentence – guessing meaning
from content – picking out specific information – professional
reading – reading practice – predicting the content, critical and
analytical reading – reading articles in english newspapers, sports
magazines, encyclopedias – reading aloud, use of stress and
intonation – reading and comprehending technical materials – cloze
reading

WRITING SKILLS

Discourse cohesion – improving writing skills, avoiding common
grammatical errors in academic writing – extending the hints –
writing shorter sentences – punctuation – dialogue writing –
paragraph writing, problems and solutions, achieving coherence,
transition words, sequence words – essays of descriptive and
argumentative – writing instructions, use of imperatives – jumbled
sentences into sequential paragraph using linguistic clues – report
writing – technical reports, industry visit reports, events reports –
writing recommendations – letter writing – formal and informal
letters – job application and resume, permission for in–plant training,
business correspondence letters, calling for quotation, placing order,
lodging complaint, persuasive letters – assignment writing – mini–
project – transcoding – transferring of information from text to
pictorial/graphical representation and vice versa

TEXT BOOK

1. Rizvi .M ,Ashraf., Effective Technical Communication, Tata
McGraw–Hill, 2005

REFERENCES

1. Daniel Jones., English Pronouncing Dictionary, Universal Book Stall, New Delhi, 17th Edition, 2000
2. Geoffrey Leech, Fan Svartvik, A Communicative Grammar of English, Pearson Education Asia, 1994
3. Hornby, AS., Oxford Advanced Learner's Dictionary of Current English, OUP, 7th Edition, 2005
4. Manivannan, G., English for Engineers – A Book on Scientific and Technical Writing”, Govi Publications, 2005
5. Martin Cutts, Plain English Guide – How to Write Clearly and Communicate Better, Oxford University Press, 1999

MAT101	MATHEMATICS I (Common to all branches)	L	T	P	C
		3	0	0	3

MATRICES

Review of linear algebra–matrix operations – addition, scalar multiplication, multiplication, transpose, adjoint and their properties– special types of matrices – null, identity, diagonal, triangular, symmetric, skew–symmetric, Hermitian, skew–Hermitian, orthogonal, unitary, normal– rank– consistency of a system of linear equations– solution of the matrix equation $ax = b$ – row–reduced echelon form

EIGEN VALUE PROBLEMS

Eigen value and eigen vector of real matrix – properties of eigen values and eigen vectors – Cayley– Hamilton theorem – orthogonal transformation of a real symmetric matrix to diagonal form – reduction of quadratic form to canonical form by orthogonal transformation – index, signature and nature of quadratic form

DIFFERENTIAL CALCULUS

Review of limits – continuity and differentiability – curvature – cartesian and parametric co–ordinates – centre and radius of

curvature – circle of curvature–evolutes – involutes – envelopes – partial differentiation –Euler’s theorem for homogeneous functions– total differential – Taylor’s expansion (two variables) – maxima / minima for functions of two variables – method of Lagrangian multiplier – Jacobians

THREE DIMENSIONAL ANALYTICAL GEOMETRY

Direction cosines and ratios – angle between two lines – equations of a plane – equations of straight line – coplanar lines – shortest distance between two skew lines – sphere – tangent plane – plane section of a sphere – orthogonal spheres

ORDINARY DIFFERENTIAL EQUATIONS

Solutions of second and higher order linear ODE with constant coefficients – Cauchy’s and Legendre’s linear equations – simultaneous first order linear equations with constant coefficients – method of variation of parameters

TEXT BOOKS

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8th Edn., 2001
2. Arumugam, S., ea.tl., Engineering Mathematics, Volume I, Scitech Publications (India) Pvt. Ltd., Chennai, 2nd Edn., Reprint 2000, 1999

REFERENCES

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37th Edn., 5th Reprint 2004.
2. Venkataraman, M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2nd Edn., Reprint 2001.

PHY 101	PHYSICS I (Common to all branches)	L	T	P	C
		3	0	0	3

ACOUSTICS AND STRUCTURE OF SOLIDS

Classification of sound– reverberation, Sabine’s formula, common acoustical defects and remedies. classification of solids– crystal structures, x–ray diffraction, crystal growth, crystal defects

LASER AND FIBRE OPTICS

Interaction of radiation with matter –quantum mechanical view, three and four level laser system, engineering and medical applications –introduction of fibre optics– classification of fibre–engineering and medical applications

QUANTUM PHYSICS

Inadequacy of classical mechanics –black body radiation, Plancks law, photoelectric effect, compton effect ,Einstein’s photoelectric equation, Schrodinger wave equation, Particle in one, three dimensional box

NDT, NEW ENGINEERING MATERIALS

Ultrasonics– ultrasonics flaw detectors– x–ray photography– fluoroscopy– thermography– gamma ray spectroscopy – characterization technique nano phase materials– biomaterials–non linear materials– polymer materials

DIGITAL ELECTRONICS

Introduction, analog to digital circuits– conversion of numbers one’s complement– 2’s complement– logic gates– Boolean algebra– Demorgan’s theorem– Karnaugh’s maps

TEXT BOOK

1. Gaur R. K., Gupta ,S.L., Engineering Physics, Dhanpat Rai Publishers, New Delhi, 2001

REFERENCES

1. Murthy V.S.R., et.al., Structures and Properties of Engineering Materials, Tata McGraw Hill Publishing company Limited, New Delhi, 2003.
2. Ali Omar. M., Elementary Solid State Physics, Pearson Education (Singapore), Indian Branch, New Delhi, 1st Edition, 2006.
3. William F. Smith., Foundations of materials science and Engineering, McGraw–Hill, New York, 3rd Edition , 2003.
4. Mathews. P.M., Venkatesan. K., Text Book of Quantum Mechanics, Tata McGraw Hill company, Delhi, 2003.
5. Gupta S.L., Kumar.V., Hand book of Electronics, Pragati Prakashan, Meerut, 28th Edition, 2001

CHY105	CHEMISTRY (Common to ECE, EIE & EEE)	L	T	P	C
		3	0	0	3

WATER

Water quality parameter (industry and drinking water) – hardness, definition, classifications, expressions, units of hardness of water with respect to CaCO_3 , problems – estimation of hardness by edta method (theory only) – definition of alkalinity (theory only) – boiler feed water – requirements, disadvantages of using hard water in boilers, removal of boiler scales and sludges – water softening – zeolite process, demineralization (ion – exchange process), desalination

CORROSION SCIENCE AND CONTROL ENGINEERING

Corrosion, definitions – electrode potential – principles of dry and wet corrosion, factors influencing rate of corrosion, types of corrosion – corrosion control – impressed current cathodic protection and sacrificial anodic protection method – corrosion inhibitors – protective coatings, surface conversion coatings, organic coatings (paints)

POLYMERS

Introduction, classification, difference between thermoplastic and thermosetting plastics – properties of plastic – degree of polymerization – types of polymerization (mechanism) – phenol formaldehyde resin, epoxy resin, polyurethanes, teflon – amino resins (urea formaldehyde, nylon.11, nylon.66 & nylon 6), pet, pvc – composites – definition, characteristics, constituent. types– fibre reinforced plastics (frp), metal matrix composites (mmc), ceramic matrix composites (cmmc), properties and applications

INSTRUMENTAL METHODS OF ANALYSIS

Electro magnetic radiation – absorption of radiation , beer – lambert's law – uv–vis. spectroscopy – ir spectroscopy – principle and instrumentation (block diagram only) estimation of iron by colorimetry – flame photometry, principle and instrumentation (block diagram only), estimation of na by flame photometry – atomic absorption spectroscopy, principle and instrumentation (block diagram only), quantitative estimation of nickel by atomic absorption spectroscopy

ENERGY STORAGE DEVICES AND NANOTECHNOLOGY

Batteries – introduction, primary and secondary batteries – dry cell – alkaline batteries, lead acid storage cell, nicad battery, lithium batteries – fuel cell (hydrogen – oxygen fuel cell) – photo galvanic cell – chemical structure and electronic behavior of conduction polymer, semi conducting properties of organic polymers containing metal group such as polyferrocenes – optical fibre principle and structure, characteristic of optical fibre, photoresist optical fibre, advantages of optical fibres – nanotechnology – introduction, preparation, characterization and application

TEXT BOOKS

1. Jain,P.C ., Monika Jain., Engineering Chemistry, Dhanpat Rai Publishing company (P) Ltd., New Delhi, 14th Edition 2002.

- Sharma, B.K., Industrial Chemistry, Goel Publishing House, Meerut, 12th edition 2001.

REFERENCES

- Puri B.R., Sharma L.R., Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., Jalandhar, 40th edition 2003.
- Vogel A.I., A text book of Quantitative Inorganic Analysis, ELBS, London, 3rd edition 2000.
- Mick Wilson., Kamali Kannangara., Nanotechnology: Basic science and emerging technology, Overseas India Pvt. Ltd. Press, New Delhi, 1st edition 2005.
- Bandyopadhyay, A.K., Nano Materials, New Age International Publishers, New Delhi, 1st edition 2007.

MEC101	ENGINEERING DRAWING (Common to all branches)	L	T	P	C
		1	0	3	2

INTRODUCTION

Importance of graphics – use of drafting instruments – BIS conventions and specifications – size, layout and folding of drawing sheets – lettering dimensioning and scales - Orthographic principles - free hand sketching in first angle projection from pictorial views

PROJECTION OF POINTS, STRAIGHT LINES AND PLANES

Projection of points, located in all quadrants - projection of straight lines located in the first quadrant, determination of true lengths and true inclinations, location of traces - projection of polygonal surface and circular lamina located in first quadrant inclined to one or both reference planes

PROJECTION AND SECTION OF SOLIDS

Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method. Section of above solids in simple vertical position by cutting

planes inclined to any one of the reference planes, obtaining true shape of section

DEVELOPMENT OF SURFACES

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones - development of lateral surfaces of combined solids – prism and cylinder, cylinder and cylinder with axes at right angles with no offset.

ISOMETRIC AND PERSPECTIVE PROJECTION

Principles of isometric projection – isometric view and projections of simple solids, truncated prisms, pyramids, cylinders and cones
Perspective projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

TEXT BOOK

1. Bhatt, N.D., Engineering Drawing, Charotar publishing House, New Delhi, 46th Edition, 2003

REFERENCES

1. Natarajan, K.V., A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2006.
2. Shah, M.B., and Rana, B.C., Engineering Drawing, Pearson Education, New Delhi, 2005.
3. Gopalakrishnana, K.R., Engineering Drawing (Vol. I and II), Subhas Publications, 1998.
4. Luzadder and Duff, Fundamentals of Engineering Drawing, Prentice Hall of India Pvt Ltd, New Delhi, XI Edition, 2001.
5. Venugopal, K., Engineering Graphics, New Age International (P) Limited, 2002.

CIV101	BASIC CIVIL AND MECHANICAL ENGINEERING (Common to all branches)	L	T	P	C
		4	0	0	4

CIVIL ENGINEERING**BUILDINGS**

Characteristics of good building materials such as stones, bricks, plywood and ceramic tiles, timber, cement, aggregates and concrete - Basic functions of buildings – Major components of buildings – Foundations - Purpose of a foundation – Bearing capacity of soils – types of foundations. Proper methods of construction of Brick masonry – Stone masonry – Hollow Block masonry. Beams – Lintels – Columns – Flooring – Damp proof course – surface finishes – Doors and windows – Roofing

TRANSPORTATION ENGINEERING

Principles and Classification of surveying, Chain surveying, Compass surveying and leveling - Importance of roads – Classification of Highways –water bound macadam, bituminous and cement concrete roads –. Railways - Importance of railways – Gauges – Components of a permanent way. Bridges - Components of Culverts – Causeways, Slab Bridge, T-beam and slab bridge, Suspension bridge

MECHANICAL ENGINEERING**BOILERS AND TURBINES**

Boilers - boiler mountings and accessories – Cochran boiler, Locomotive boiler, Babcock and Wilcox boiler, fire and water tube boilers - Steam turbine - single stage impulse turbine, Parson's reaction turbine, difference between impulse and reaction turbines

POWER PLANTS AND INTERNAL COMBUSTION (IC) ENGINE

Classification of power plants – steam, nuclear, diesel and hydro power plants - Alternate sources of energy - solar, wind, tidal, geothermal, ocean thermal energy conversion. – IC engine - components, working of four and two stroke petrol and diesel engines

PRODUCTION TECHNOLOGY

Metal casting and forming process –patterns, moulding, melting of cast iron, casting – forging – rolling – extrusion – drawing - Metal joining process - welding – arc welding, gas welding, brazing and soldering - Metal machining – lathe, drilling machine, milling machine, shaping machine, planing machine, introduction to Computer Numerical Control machining

TEXT BOOK

1. Shanmugam, G., and Palanichamy, M.S., Basic Civil and Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 1996.

REFERENCES

1. Khanna, K., Justo C E G, Highway Engineering, Khanna Publishers, Roorkee, 2001
2. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, New Delhi, 1997.
3. Venugopal K., Basic Mechanical Engineering, Anuradha Publications, Kumbakonam, 2000.
4. Shanmugam G., Basic Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 2001.

MEC181	WORK SHOP (Common to all branches)	L	T	P	C
		0	0	3	1

CARPENTRY

Carpentry tools - practice in marking, sawing, planing and chiseling – making simple joints: lap joint, T-joint, dovetail joint, mortise and tenon joint

FITTING

Fitting tools - practice in marking, filing, punching, hacksawing - fitting to size and drilling - making of simple mating profiles: V, square, dovetail, half round joints

SHEET METAL

Study of press, die and tools - sheet metal layout - development of lateral surfaces -simple exercises: blanking, forming, bending and flanging

DRILLING

Drilling and tapping in drilling machines

Demonstration on:

- i) Welding operations like butt joint and lap joints in Arc welding
- ii) Foundry operations like mould preparation for split pattern
- iii) Smithy operations like the production of hexagonal bolt
- iv) Preparation of plumbing line sketches – basic pipe connections involving the fittings like valves, taps, couplings, unions, reducers, elbows and other components used in household fittings.

CHY181	CHEMISTRY LABORATORY (Common to all branches)	L	T	P	C
		0	0	3	1

1. Preparation of standard and buffer solutions.
2. Estimation of hardness of water sample by EDTA method
3. Determination of dissolved oxygen in a sample of water.
4. Estimation of chloride and fluoride ion in water sample.
5. Determination of alkalinity of water sample.
6. Estimation of hydrochloric acid by pH titration
7. Estimation of ferrous ion by potentiometric titration
8. Estimation of mixture of acid by conductometric titration
9. Estimation of iron by spectrophotometric method.
10. Flame photometry – Determination of Na & K

SEMESTER II

HSS102	ENGLISH FOR TECHNICAL COMMUNICATION II (Common to all branches)	L	T	P	C
		2	0	0	2

GRAMMAR AND VOCABULARY

Grammar and Vocabulary – introduction to grammatical models – proper use of tenses, concord, voice, articles, punctuation, and modal auxiliaries

RECEPTION SKILLS

Listening and language development – improving listening skills – comprehension practice – comprehend classroom lectures, simple technically oriented passages – listening to news bulletins, pre-recorded talks, different speech styles, comprehending the essential meaning – physical and psychological barriers to listening – steps to overcome the barriers – practice in note-taking while listening

SPEAKING TECHNIQUES

Speaking practice – improving conversing skills – improving self-expression – developing confidence and fluency in oral communication – physical and psychological barriers to speaking – steps to overcome the barriers – Formal and public speaking practice – extemporaneous talk practice – speech process – fluency and accuracy in speech – developing persuasive speaking skills – conversation in a given milieu, social and cultural surroundings – practice in giving small talks on local topics for a minute or two – goal oriented group discussion – participating in seminars – independent and effective communication

READING STRATEGIES

Reading comprehension – vocabulary extension methods – speed reading practice – technical and non-technical materials – practice in various reading techniques – skimming, scanning, eye reading –

looking for specific information – comprehending the given passages, technical information

WRITTEN COMMUNICATION

Basic grammatical structures – Alphabet of other languages – Paragraph writing – Expressing the idea in writing – Avoiding and correcting common errors – Effective writing techniques – brevity, clarity, objectivity and simplicity – Discourse writing – definition, description, instruction – Note-making – Proof reading – Mechanics of writing – Writing formal, informal letters, Technical reports – Reference skills – using dictionary better

TEXT BOOKS

1. Rizvi M Ashraf., Effective Technical Communication, Tata McGraw–Hill, 2005.
2. Rutherford Andrea, J., Basic Communication Skills for Technology, Pearson Education, 2002.

REFERENCES

1. Deborah C Andrews., Margaret D Bickle., Technical Writing – Principles and Forms, Macmillan, 1978.
2. Manivannan ,G., English for Engineers – A Book on Scientific and Technical Writing, Govi Publications, 2005.
3. Sarah Freeman., Written Communication in English, Orient Longman, 2000.
4. Thomson ,A J., AV Martinet., A Practical English Grammar, OUP, 4th Edition, 1986.
5. Tom Hutchinson., Alan Waters., English for Specific Purpose, Cambridge University Press, 1987.

MAT102	MATHEMATICS II (Common to all branches)	L	T	P	C
		3	0	0	3

SEQUENCES AND SERIES

Convergence and divergence of infinite series – series of positive terms – comparison, D’Alembert’s ratio, Raabe’s and Cauchy’s root tests – convergence of alternating series – Leibnitz’s test (proof of theorems and tests not included) – elementary notions of absolute and conditional convergence – power series – Taylor’s theorem(one variable)

ANALYTIC FUNCTION AND CONFORMAL MAPPING

Function of a complex variable – analytic function – necessary conditions – cauchy – riemann equations – sufficient conditions (excluding proof) – properties of analytic function – harmonic conjugate – construction of analytic functions – conformal mapping – $w = z+a$, az , $1/z$, e^z , $\sin z$, $\cos z$ and bilinear transformation – fixed points – cross ratio

COMPLEX INTEGRATION

Statement and application of Cauchy’s integral theorem and integral formula – Taylor and Laurent expansions – isolated singularities – residues – Cauchy’s residue theorem – contour integration over unit circle and semicircular contours (excluding poles on boundaries)– evaluation of real integrals using contour integration

MULTIPLE INTEGRALS

Review of Riemann integrals – double integration – cartesian and polar coordinates – change of order of integration – change of variable between cartesian and polar – area as double integral – triple integration in cartesian, cylindrical and spherical polar coordinates – volume as triple integral

VECTOR CALCULUS

Gradient, divergence and curl – directional derivative – irrotational and solenoidal vector fields – vector integration – green's theorem in a plane, gauss divergence theorem and stoke's theorem (excluding proof) – simple applications

TEXT BOOKS

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8th Edn., 2001
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Engineering Mathematics Volume II, Scitech Publications (India) Pvt. Ltd., Chennai, 1st Edn., Reprint 2000, 1999

REFERENCES

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematic, Khanna Publishers, New Delhi, 37th Edn., 5th Reprint 2004.
2. Venkataraman, M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2nd Edn., Reprint 2001.
3. Venkataraman, M. K., Engineering Mathematics –III A, The National Publishing Company, Chennai, 11th Edn., Reprint 2002.

PHY 104	PHYSICS II (Common to ECE,EEE,EIE)	L	T	P	C
		3	0	0	3

CONDUCTING MATERIALS

Electron theory of solids –classical free electron theory, quantum free electron theory, Band theory of solids

SEMI CONDUCTING AND SUPER CONDUCTING MATERIALS

Semi conducting materials – Introduction, Types of semi conducting materials, carrier concentration – Hall effect –determination of hall coefficient – superconducting phenomena properties of

superconductors –type I and type II superconductors, high T_c – superconductors, application of super conductors

MAGNETIC MATERIALS

Classical theory of magnetism quantum theory of paramagnetism, ferromagnetism , ferrites , applications of magnetic materials

DIELECTRIC MATERIALS AND OPTICAL MATERIALS

Electronic, ionic, orientational and space charge polarization, internal field and deduction of clausius –mosotti relation ,properties of dielectric materials ,classification of insulating materials–optical properties of semiconductor– imperfection of crystals, luminescence, fluorescence and phosphorescence ,light emitting diode, liquid crystal displays

NEW ENGINEERING MATERIALS

Metallic glasses as transformer core material, nanophase materials, shape memory alloys, biomaterials (metals & alloys, ceramics) –non linear materials – second harmonic generation, optical mixing, optical phase conjugation, solitons, IC packaging materials

TEXT BOOK

1. Arumugam.M., Materials Science, Anuradha Agencies, Kumbakonam, 3rd Edition,2003.

REFERENCES

1. Aswani K.G., A Text book of Material Science, S.Chand & Co., Ltd.,New Delhi, 2nd Edition, 2001
2. William F.Smith, Foundations of Materials Science and Engineering, McGraw–Hill, New York, 3rd Edition,2003
3. Wahab M.A., Solid State Physics, Narosa Publishing House, New Delhi, 1999
4. Pillai S.O., Solid State Physics, New Age International Publication, New Delhi, 5th edition, 2003

5. Ali Omar.M., Elementary Solid State Physics, Pearson Education (Singapore) Pvt. Ltd., Indian Branch, New Delhi, 2002
6. Murthy V.S.R., Jena A.K, Gupta K.P. and Murthy G.S., Structure and Properties of Engineering Materials, Tata McGraw–Hill Publishing Company Ltd, New Delhi, 2003

EEE101	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common to all branches)	L	T	P	C
		4	0	0	4

ELECTRICAL CIRCUITS

Introduction to electric circuits – laws of electric circuits– Ohm’s Law, Kirchoff’s Laws– analysis of DC circuits–mesh, nodal – introduction to AC circuits– average Value, RMS value, power and power factor–analysis of 3 phase AC circuits – balanced and unbalanced circuits

ELECTRICAL MACHINES

DC Machines –principle of operation–DC generators–emf equation, characteristics, types– DC motors–shunt, series, compound– single phase transformer – principle of operation, emf equation, phasor diagram –induction motors–single phase, three phase–alternators–principle of operation, emf equation , characteristics

ELECTRICAL MEASUREMENTS

Moving coil –ammeter, voltmeter – moving iron instruments – ammeter, voltmeter – dynamometer – wattmeter, energy meter

BASIC ELECTRONICS

Semiconductor devices – introduction, construction, types – pn junction diode –working principle, characteristics– zener diode–working principle, characteristics uni–junction transistor– operation, characteristics –field effect transistor– operation, characteristics–

bipolar junction transistor– operation, characteristics–applications– half wave and full wave rectifiers

DIGITAL ELECTRONICS

Introduction to binary number system–logic gates –AND, OR, NOT, NAND, NOR, exclusive OR–boolean algebra– combinational circuits – half adder, full adder, half subtractor, full subtractor

INTEGRATED CIRCUITS

Operational amplifier–introduction, DC characteristics, AC characteristics–types of operational amplifier–inverting, non–inverting– applications– scalar, adder, Subtractor, differentiator, and integrator

TEXT BOOKS

1. Edward Hughes., Electrical &Electronics Technology, Pearson Education ltd, 9th edition, 2005.
2. Kothari.D.P.,and.Nagrath.I.J.,Basic Electrical Engineering, Tata McGraw Hill,2nd Edition.

REFERENCES

1. Malvino,A.P., Electronic Principles, TataMcGraw Hill International, 1998.
2. Vincent Del tora.,Electrical Engineering fundamentals, Prentice hall of India , 2nd edition 2003.
3. Muraleedharan.K.A., Muthusubramanian .R., and Salivahanan .S., Basic Electrical and Electronics and Computer Engineering, Tata McGraw Hill, 1997.

CHY101	ENVIRONMENTAL SCIENCES (Common to all branches)	L	T	P	C
		2	0	0	2

NATURAL RESOURCES

Definitions –scope of environmental sciences – forest resource – food resource – land resource – water – mineral resources –

utilization of natural resource, impact on environment – conservation of natural resources.

ECOSYSTEM AND BIODIVERSITY

Concept – structure and function – energy flow in ecosystem – ecological succession – food chain – food web, ecological pyramids – biodiversity, definition, values, threats to biodiversity, conservation of biodiversity.

ENVIRONMENTAL POLLUTION

Definition, causes, effects and control measures of air, water and soil pollution – thermal and nuclear pollution

MANAGEMENT OF ENVIRONMENTAL POLLUTION

Solid waste management – treatment methods adopted for municipal sewage and industrial effluent – hazardous and biomedical waste management.

TOOLS FOR ENVIRONMENTAL MANAGEMENT

Environment impact assessment – precautionary and polluter pay principle – constitutional provision – (air, water and forest) – waste minimization techniques, cleaner technology options, bioremediation.

TEXT BOOK

1. Dhameja, S.K., Environmental engineering and Management, S. K. Kataria and sons, New Delhi, 1st edition 2004.

REFERENCES

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad, 1st edition 2001
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. USA, 2nd edition 2004.

3. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media., New Delhi, 2nd edition 2004
4. Masters, G. M., Introduction to Environmental Engineering & Science, Prentice Hall, New Delhi, 2nd edition 1997
5. Henry, J. G., Heike, G. W., Environmental Science & Engineering, Prentice Hall International Inc., New Jersey, 1st edition 2005

CSE102	PROGRAMMING LANGUAGES	L	T	P	C
	(Common to all branches)	2	0	0	2

BASIC ELEMENTS OF C AND CONTROL STATEMENTS

Introduction to C- Structure of C language – Lexical elements of C- Operators and Expressions-Operator precedence and associativity of operators -Input and Output Functions-Library Functions –Header Files-Simple Computational problems. Decision Making: if statement - if-else statement - else-if ladder - switch statement – Looping Control Structure - the break statement - ? : operator - Continue statement - goto statement – Problems using Control Structures

FUNCTIONS, PROGRAM STRUCTURES AND ARRAYS

Prototypes and Functions – Declaring, defining and accessing Functions- Parameter passing methods-Recursion - Storage Classes - Automatic Variables -External Variables – Static and Register Variables – Programs using functions. Defining and Processing an Array - Passing Arrays to Functions - Multidimensional Arrays - Arrays and Strings - Enumerated data types-Programs using sorting, searching and merging of arrays

POINTERS, STRUCTURES AND UNIONS

Pointer Fundamentals - Pointer Declarations - Passing Pointers to Functions - Arrays and Pointers - Pointers and One-Dimensional

Arrays - Pointers and Multidimensional Arrays - Operations on Pointers - Pointers and Structures - Dynamic Memory Allocation – Command Line Arguments – Programs using Pointers with Functions, Arrays and Structures. Defining a Structure - Processing a Structure - User-Defined Data Types – Union – Nested structure - Structures and Pointers - Passing Structures to Functions - Self Referential Structures

DATA FILES AND DATA STRUCTURES

Opening and Closing a Data File - Creating a Data File - High Level File Operations - Processing and Updation of Data Files - Unformatted Data Files - Low Level Programming – File Handling Programs. Linked List – Creation, Insertion and Deletion of elements - Stack and Queue implementation using Linked List

UNIX BASICS AND SHELL PROGRAMMING

Shell Fundamentals - Shell Commands - Shell Decisions and Repetitions - Command line usage - Wildcard expansion - Redirection of I/O, pipes and filters. Shell Programming - Simple scripts - Specifying the interpreter - Shell variables - The Environment - Control flow; test, if, for, while, case - Command substitution - Signal catching - Shell functions - Aliases - Reading from the Standard I/P - Startup Files - basename and dirname - Expression evaluation

TEXT BOOKS

1. Byron S. Gottfried, Theory and Problems of Programming with C, Tata McGraw Hill, Second Edition, 1996.
2. Lowell Jay Arthur and Ted Burns, UNIX Shell Programming, John Wiley & Sons Canada, Ltd, Fourth Edition, 1997.
3. Deshpande P.S, Kakde O.G, C & Data Structures , Dreamtech Press, First edition, 2004

REFERENCES

1. Brian Kernighan W, Dennis Richie M, The C Programming

- language, Pearson Education,2005.
2. Johnsonbaugh R.and Kalin M, Applications Programming in ANSI C, Pearson Education, Third Edition ,2003.
 3. Behrouz A.Forouzan and Richard Gilberg F, A Structured Programming Approach Using C, Brooks-Cole Thompson Learning Publications, Second Edition, 2001.
 4. Bruce Molay, Understanding UNIX/LINUX Programming: A Guide to Theory and Practice, Prentice Hall, First Edition, 2002.
 5. Glass, G., Ables, K. UNIX for Programmers and Users, Prentice Hall, 1999.
 6. Stephen Kochan and Patrick Wood, UNIX Shell Programming, Pearson Education, Third Edition, 2003.

MEC103	ENGINEERING MECHANICS	L	T	P	C
	(Except BT,IT &CSE)	3	0	0	3

STATICS OF PARTICLES

Fundamental principles and concepts - vector algebra, Newton's laws, gravitation, force external and internal, transmissibility - velocity and acceleration - Couple- Moment about point and about axis - Varignon's theorem - resultant of concurrent and non-concurrent coplanar forces - static equilibrium, free body diagram, reactions - Problem formulation concept in 2-D and 3-D statics

TRUSSES AND FRAMES

Trusses - assumptions, rigid and non-rigid trusses- simple trusses in plane and space- analysis by method of joints and by method of sections- compound trusses-statically determinate, rigid, and completely constrained - analysis of frames and machines

FRICITION

Frictional forces- laws of friction- simple contact friction - rolling resistance - belt friction

PROPERTIES OF SURFACES AND SOLIDS

Centroids of lines - areas, volumes, composite bodies - center of mass - area moment of Inertia - mass moment of inertia - principal moment of inertia

DYNAMICS OF PARTICLES

Displacements, velocity and acceleration, their relationship – relative motion – Curvilinear motion – Newton’s law – work Energy equation of particles – impulse and momentum – impact of elastic bodies

TEXT BOOK

1. Beer, F.P., and Johnson, E.R., Vector Mechanics for Engineers – Statics and Dynamics, Tata McGraw Hill, New York, 2004.

REFERENCES

1. Merriam, J.L., Engineering Mechanics, Volume I – Statics, and Volume – II, Dynamics 2/e, Wiley International,1998.
2. Irving , H., Shames, Engineering Mechanics, Statics and Dynamics, Third Edition, Prentice Hall of India Pvt. Ltd., 1993.

PHY181	PHYSICS LABORATORY (Common to all branches)	L	P	T	C
		0	0	3	1

1. To determine the acceleration due to gravity using Compound Pendulum
2. To determine the Rigidity Modulus of wire using Torsional Pendulum
3. To find thickness of the given two glass plates using single optic lever
4. To determine the thermal conductivity of a bad conductor – Lee’s disc method.
5. To determine the refractive index of the material of the prism
6. To find the prominent wave length of mercury spectrum using grating

7. To determine the particle size using Laser
8. To determine the coefficient of viscosity of the liquid by Poiseuille's method
9. To determine the young's modulus of given material using Uniform Bending
10. To Determine the thickness of a given material using Air wedge method
11. To determine the focal length of a biconvex lens using Newton's Rings method
12. To determine the velocity of ultrasonic waves in the liquid using ultrasonic Interferometer

CSE181	PROGRAMMING	L	T	P	C
	LANGUAGES LABORATORY (Common to all branches)	0	0	3	1

WORD PROCESSING, SPREADSHEET, POWERPOINT

1. To create an advertisement in Word.
2. To illustrate the concept of mail merging in word.
3. To create a spread sheet to analyze the marks of the students of a class and also to create appropriate charts.
4. To create the presentation for the department using Power Point.

C PROGRAMMING

5. To write a simple menu driven calculator program using switch statement
6. To write a program to print Pascal's triangle.
7. To write a program for electricity bill preparation.
8. To write a program to print the sine and cosine series.
9. To print Fibonacci series up to N numbers.

ARRAYS AND FUNCTIONS

10. To write a program to perform Matrix multiplication.
11. To write a program to sort a given set of numbers.

12. To write a program to perform string manipulation manipulations function like string concatenations, comparison, find the length and string copy without using library functions.
13. To write a program to arrange names in alphabetical order.
14. To write a C program to check whether a number is palindrome or not using functions.
15. To write a program to calculate the factorial of the given number using functions.

POINTERS, STRUCTURES AND FILES

16. To print the mark sheet of n students using structures.
17. To write a program using pointers to access the elements of an array and count the number of occurrences of the given number in the array.
18. To write a program for find the average of numbers using files.
19. To write a program to merge the given two files arguments using command line arguments.

UNIX PROGRAMMING

20. Study of Basic UNIX Commands.
21. Implement ls Command.
22. Write a shell script to determine the properties of a given file.
23. Implement grep function.
24. Write a shell script to find the factorial of given number.
25. Write a shell script to evaluate the given expression using switch-case.

SEMESTER III

MAT201	MATHEMATICS III (Common to Bio-Technology, Chemical Engineering, Civil Engineering, CSE, EEE, EIE and Mechanical Engineering)	L	T	P	C
			3	0	0

LAPLACE TRANSFORM

Definition of Laplace Transform - Linearity property - condition for existence of Laplace Transform - First and Second Shifting properties - Laplace Transform of derivatives and integrals - Unit step functions - Dirac delta-function - Differentiation and Integration of transforms - Convolution Theorem - Inversion - Periodic functions - Evaluation of integrals by Laplace Transform - Solution of boundary value problems

PARTIAL DIFFERENTIAL EQUATIONS

Formation of PDE - Solution of standard types of first order PDE - Lagrange's linear equation - Linear PDE of second and higher order with constant coefficients

FOURIER SERIES

Dirichlet's conditions - General Fourier series - Odd and even functions - Half range sine and cosine series - Complex form of Fourier series - Parseval's identity - Harmonic analysis

Z - TRANSFORM

Z-transform - Elementary properties - Inverse Z-transform - Convolution theorem - Formation of difference equation - Solution of difference equation using Z-transform

FOURIER TRANSFORM

Fourier Integral formula - Fourier Transform - Fourier sine and cosine transforms - Linearity, Scaling, frequency shifting and time

shifting properties - Self reciprocity of Fourier Transform - Convolution theorem - Application to boundary value problems

TEXT BOOKS

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore, 8th Edition, 2001
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Engineering Mathematics Volume II, Scitech Publications (India) Pvt. Ltd., Chennai, 1st Edition, Reprint 2000, 1999

REFERENCES

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37th Edition, 5th Reprint 2004
2. Venkataraman, M. K., Engineering Mathematics -III A, The National Publishing Company, Chennai, 11th Edition, Reprint 2002
3. Venkataraman, M. K., Engineering Mathematics - III B, The National Publishing Company, Chennai, 13th Edition, Reprint 1999

EEE201	ELECTROMAGNETIC THEORY	L	T	P	C
		3	1	0	4

VECTOR ANALYSIS

Vector fields – co-ordinate system–rectangular, cylindrical, spherical co-ordinate systems – line, surface and volume integrals–definition – Curl, Divergence and Gradient – Divergence theorem – Stroke’s theorem

ELECTROSTATICS

Experimental law of Coloumb – electric field intensity – field due to line, sheet charge – continuous volume charge distribution – electric flux density– Gauss’s law – definition, applications – divergence–vector operator, divergence theorem, line integral – potential field of

point charge , system of charges – potential gradient– energy density in electric field – current density and continuity equation – boundary conditions – Poission’s and Laplace’s equations

MAGNETOSTATICS

Law of magnetostatics – Biot–Savart law – Ampere’s circuital law – Curl–Stroke’s theorem – magnetic flux density – vector magnetic potentials, scalar, vector – force on a moving charge, differential current element, torque on a closed circuit – Inductance – nature of magnetic materials– magnetization and permeability – magnetic boundary conditions – potential energy and forces on magnetic materials

TIME VARYING FIELDS AND MAXWELL’S EQUATIONS

Faraday’s laws– induced emf – transformer and motional EMF– Maxwell’s equations (differential, integral forms) – displacement current – relation between field theory and circuit theory

PLANE ELECTROMAGNETIC WAVES

Wave propagation in free space – conductors and dielectrics– Poynting theorem – wave polarization – reflection of uniform plane waves at normal incidence – wave reflection from multiple interfaces – plane wave propagation in general directions – plane wave reflection at oblique and incidence angles

TEXT BOOK

1. William ,H.Hayt., Engineering Electromagnetics, Tata McGraw Hill,2001.

REFERENCES

1. John.D.Kraus., Electromagnetics, TataMcGraw Hill Book Co., New York, 4th Edition, 1991.
2. Joseph. A.Edminister., Theory and Problems of Electromagnetics, 2nd edition, Schaum Series, Tata McGraw Hill, 1993.

3. Sadiku., Elements of Electromagnetics, 2nd edition, Oxford University Press,1995.

EEE202	DC MACHINES AND TRANSFORMERS	L	T	P	C
		3	1	0	4

TRANSFORMERS

Transformers – working principle – construction, emf equation– elementary theory of ideal transformer – voltage transformation ratio – transformer with losses but no magnetic leakage – transformer on no load and on load – equivalent circuit –regulation – efficiency – all day efficiency – auto transformer – condition for maximum efficiency – parallel operation of single phase transformer – three phase transformer connections

BASIC CONCEPTS OF ROTATING MACHINES

Principles of electromechanical energy conversion – single and multiple excited systems – m.m.f of distributed AC windings – rotating magnetic field – generated voltage – torque in round rotor machine

DC GENERATORS

DC generator – construction, principle and operation, types, emf equations characteristics – armature windings – single, double layer windings – losses in a DC generator – condition for maximum efficiency – armature reaction – demagnetizing , cross magnetizing conductors, demagnetizing AT per pole, cross magnetizing AT per pole – commutation – parallel operation of generators – Load sharing

DC MOTORS

DC motors – working principle, characteristics, Emf equation – significance of the back emf – losses and efficiency – power stages– speed control of dc motor – necessity of starter – three point starter, four point starter

TESTING OF DC MACHINES AND TRANSFORMERS

DC machines – brake test, Swinburne’s test, Hopkinson’s test, retardation test, field test – transformer – open and short circuit tests – load test – polarity test – Sumpner’s test

TEXT BOOK

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

REFERENCES

1. Fitzgerald A.E., Charles Kingsley, Stephen.D.Umans, Electric Machinery, Tata McGraw Hill Publishing Company Ltd, 2003.
2. Gupta,J.B., Theory and Performance of Electrical Machines,S.K.Kataria and Sons 2002.
3. Theraja ,B.L., Theraja, A.K.,A text book on Electrical technology, Volume–II, S.Chand Company & Ltd.,2005.

EEE203	ELECTRIC CIRCUIT ANALYSIS	L	T	P	C
		3	1	0	4

INTRODUCTION TO ELECTRIC CIRCUITS

Laws of Electric circuits – ohms, Kirchoff – network graph – tree and cut sets – cut set and tie set schedule – dual network – matrix representations and solution of AC and DC networks, analysis of AC and DC circuits – mesh, nodal – concept of impedance and admittance – resonance – series , parallel – bandwidth and Q-Factor

NETWORK THEOREMS AND TRANSFORMATIONS

Transformations – voltage and current source – star, delta transformations –theorems – superposition, reciprocity, substitution, maximum power transfer, Thevenin's, Norton's, Tellegan’s and Millman's theorems

COUPLED AND THREE PHASE CIRCUITS

Coupled circuits – coefficient of coupling – self and mutual inductances – analysis of coupled circuits – three phase circuits – balanced circuits – star and delta connected loads – phase sequence – unbalanced circuits – solution of unbalanced star and delta connected loads – power measurement by two wattmeter method

TRANSIENT ANALYSIS

Source free response – RL, RC & RLC circuits – forced response – RL, RC & RLC circuits – time constant, natural frequency of oscillation of circuits – Laplace transform application – RL, RC & RLC circuits – concept of complex frequency

TWO PORT NETWORKS

Driving point and transfer impedance/admittance – voltage and current ratios of two port networks – admittance, impedance, hybrid, transmission and image parameters for two port networks – impedance matching – equivalent π and T Networks

TEXT BOOK

1. Sudhakar, A., Shyam Mohan ,S.P., Circuits and Network Analysis and Synthesis, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1994

REFERENCES

1. Dorf R.C., Introduction to Electric Circuits, John Wiley & Sons Inc, New York, Second Edition, 2003.
2. Charles K.Alexander, Mathew N.O. Sadiku., Fundamentals of Electric Circuit, TataMcGraw Hill, N.Y, 2003.
3. Edminister, J.A., Theory and Problems of Electric Circuits, Schaum's outline series TataMcGraw Hill Book Company, 2nd Edition, 1983.

ECE256	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	1	0	4

SEMICONDUCTOR DEVICES

Conduction in semiconductors – types of semiconductors – N type, P type – working principle and overview of semiconductor devices – PN Junction Diode, Zener diode, BJT, FET – operation and characteristics – SCR, TRIAC, DIAC, UJT

DC AND AC ANALYSIS OF BJT AND FET

Biasing circuits of BJT, FET – Analysis and design of CC, CE and CB configurations – analysis and design of CS, CD, and CG configurations – multistage amplifiers – RC coupled , Transformer coupled amplifiers – thermal runaway in BJT and FET circuits

POWER AMPLIFIERS

Power amplifiers – Class A, B, C and AB – Class A amplifier with resistive and transformer coupled load – complementary symmetry amplifiers – Push Pull Amplifiers – class A, class B – MOSFET power amplifiers – harmonic distortion – cascade amplifier, Darlington Amplifier

FEEDBACK AMPLIFIERS AND OSCILLATORS

Properties of negative feed back – types of feedback configurations voltage shunt, voltage series, current series and current shunt – sinusoidal oscillator, RC oscillators – Weinbridge, Colpitt, Hartley, Clapp, Crystal Oscillators, non-sinusoidal Oscillators

APPLICATIONS OF ELECTRONIC DEVICES

Regulated Power supplies – voltage regulators – shunt, series – rectifiers – half wave, full wave – clipping and clamping circuits – multivibrators – monostable, bi-stable – Schmitt Trigger

TEXT BOOKS

1. Jacob Millman and Christos C.Halkias., Electronic Devices and Circuits Tata McGrawHill, 1999.
2. David A. Bell., Electronic Devices and Circuits Prentice Hall of India., 3rd Edition, 1998

REFERENCES

1. Donald A.Neaman., Semiconductor Physics and Devices,3rd edition., Tata McGraw Hill ,2002.
2. Salivahanan, S., Sureshkumar, N., Vallavaraj, A., Electronic Devices and Circuits, Tata McGraw Hill Publishing Company, 1998.

EEE281	MACHINES LABORATORY I	L	T	P	C
		0	0	3	2

1. Open circuit and load characteristics of DC separately and self excited shunt generator
2. Open circuit and load characteristics of DC self excited shunt generator
3. Load characteristics of differential DC compound generator
4. Load characteristics of DC shunt motor
5. Load characteristics of DC series motor
6. Speed control of DC shunt motor
7. Swinburne’s test
8. Load test on single–phase transformer
9. Load test on three phase transformer
10. Open circuit and short circuit tests on single phase transformer
11. Sumpner’s test on transformers
12. Separation of no–load losses in single phase transformer
13. Parallel operation of single phase transformers.

ECE296	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

1. Characteristics of PN junction diode & zener diode
2. Transistor biasing with and without stabilization.
3. Input and Output characteristics of Transistor
4. Amplifier using transistor
5. FET characteristics and evaluation of its parameters.
6. MOSFET characteristics.
7. FET biasing methods.
8. BJT and FET as a switch.
9. Class B complementary symmetry power amplifier
10. Half and full wave rectifiers.
11. Phase shift oscillator using BJT/FET.
12. RC coupled amplifier–frequency response.
13. Phase shift oscillator using BJT/FET.

SEMESTER IV

MAT211	NUMERICAL METHODS	L	T	P	C
		3	0	0	3

SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS

Review of open end methods - bracketed end methods - the intermediate theorem (excluding proof) - iterative method – Newton – Raphson method for single variable and for simultaneous equations with two variable – solutions of a linear system by Gaussian, Gauss – Jordan, Jacobain and Gauss – Seidel methods – Eigen value of a matrix by power method

INTERPOLATION

Newton forward and backward difference formulae – Newton’s divided difference formulae, Lagrange’s polynomials – Stirling’s Central difference formulae

NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical differentiation with interpolation polynomials – numerical integration by Trapezoidal, Simpson’s (1/3rd and 3/8th) rules – Two, Three point Gaussian quadrature formula – double integrals using Trapezoidal and Simpson’s rule

INITIAL VALUE PROBLEMS

Single step methods – Taylor Series, Euler and Modified Euler, Runge-Kutta method of order four for first and second order differential equations – multistep methods –Milne’s predictor and corrector methods

BOUNDARY VALUE PROBLEMS

Finite difference solution for the second order ordinary differential equations – finite difference solution for one dimensional heat

equation (implicit, explicit), one –dimensional wave equation – two-dimensional Laplace and Poisson equations

lab assignments for numerical methods using matlab / c / c++

TEXT BOOKS

1. Arumugam, S., et.al., Numerical Methods, Scitech Publications (India) (P) Ltd., Chennai.
2. Venkataraman, M.K., Numerical Methods in Science and Engineering, The National Publishing Company, Chennai.

REFERENCES

1. Jain M.K., Iyengar S.R.K., and Jain R.K., Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd Publishers, New Delhi.
2. Bali N.P., and Narayana Iyengar.N.Ch., Engineering Mathematics, Laxmi Publishers (p) Ltd , 6th edition, New Delhi

EEE204	CONTROL SYSTEMS	L	T	P	C
		3	1	0	4

INTRODUCTION

Open loop and closed loop systems – mechanical systems – translational, rotational electrical systems – basic components of control systems – potentiometer – synchros – tachogenerator – servo motor AC,DC – hydraulic and pneumatic systems – mathematical representation – transfer functions – block diagram, signal flow graph

TIME RESPONSE ANALYSIS

Time response – step response of first order and second order systems – time domain specification – type and order of a system – steady state error – static error and generalized error coefficient – concepts of stability – Routh Hurwitz stability – P, PI and PID controllers

FREQUENCY RESPONSE ANALYSIS

Frequency domain specifications of second order systems – analysis and stability using Bode plots, Polar plot, Nichols chart – Nyquist stability criterion

ROOT LOCUS AND COMPENSATORS

Root locus concept – Rules for constructing root loci – root contours – design of lag, lead and lag lead compensators

STATE SPACE ANALYSIS

Concepts of State – state variable and state models – state equation – state transition matrix – solution of state equation by classical and laplace transformation method – controllability and observability

TEXT BOOK

1. Nagrath and Gopal., Control Systems Engineering, New Age International Publishers, 4th Edition ,2005.

REFERENCES

1. Benjamin C Kuo, Automatic Control Systems, Prentice Hall,U.S.A.,7th Edition, 1995.
2. Ogata K, Modern Control Engineering, Prentice Hall, U.S.A., 4th Edition, 2003.

EEE205	AC MACHINES	L	T	P	C
		3	1	0	4

SYNCHRONOUS GENERATOR

Synchronous generator – construction, working principle, emf equation, armature windings – Synchronous machine model – determination of Synchronous reactance – armature reaction – regulation methods – EMF, MMF,ZPF methods – synchronizing to infinite bus bars – operating characteristics – capability curves – two reaction theory – parallel operation of synchronous generators – hunting

SYNCHRONOUS MOTOR

Synchronous motor – constructional features, principle of operation of synchronous motor – methods of starting – equivalent circuit of asynchronous motor – power developed by a synchronous motor – synchronous motor with different excitations – effect of increased load with constant excitation, effect of changing excitation constant load – torque equation – V curve and inverted V curve – hunting

THREE PHASE INDUCTION MOTOR

Three phase induction motors – principle of operation , constructional details – constant flux operation , torque – slip characteristics – starting torque, condition for maximum starting torque, rotor emf & reactance under running conditions, torque under running condition, condition for maximum torque under running condition – relation between torque and slip – losses and efficiency – power stages in an induction motor – no load and blocked rotor test – equivalent circuit – circle diagram – power balance equation – maximum power output – induction generator

SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES

Single phase induction motors – split phase induction motor, capacitor start induction run motor , capacitor start capacitor run motor, shaded pole induction motor – principle of operation – double revolving field theory – equivalent circuit (without and with core loss) – special machines – universal motor, stepper motor, linear induction motor , reluctance motor, repulsion motor, hysteresis motor and AC series motor

STARTING AND SPEED CONTROL OF INDUCTION MOTORS

Need for starter – types of starters – starting methods of three phase induction motor – cogging & crawling – speed control – voltage control – rotor resistance control – pole changing – frequency control

– slip – energy recovery scheme – double cage rotor – synchronous induction motor

TEXT BOOK

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

REFERENCES

1. Fitzgerald, A.E., et.al., Electric Machinery, Tata McGraw Hill publishing Company Ltd, 2005.
2. Gupta, J.B., Theory and Performance of Electrical Machines, S.K.Kataria and Sons, 2005.
3. Say, M.G., Alternating Current Machines, ELBS & Pitman, London, 5th edition, 1992.
4. Theraja, B.L., Theraja, A.K., A text book on Electrical technology, Volume-II, S. Chand company & Ltd.

EEE206	MEASUREMENTS AND INSTRUMENTATION	L	T	P	C
		4	0	0	4

FUNDAMENTALS AND CHARACTERISTICS

Functional elements of an instrument – static and dynamic characteristics – analog indicating instruments, hall effect instruments – rms, average and peak reading instruments errors – systematic and random errors, error analysis – errors in measurement – statistical evaluation of measurement data – standards and calibration

MEASURING INSTRUMENTS

Permanent Magnet Moving Coil instrument (PMMC) – Moving Iron instruments – electrodynamic instruments – instrument transformer – current transformer, potential transformer – measurement of power – electrodynamic, ferrodynamic – measurement of energy – induction type – watt-hour meters – maximum demand indicators – polyphase energy meters – power factor meters – frequency meters –

synchrosopes –Electronic voltmeters – differential voltmeters –
electronic multimeters

BRIDGES AND SIGNAL CONDITIONING DEVICES

Measurement of resistance – Wheatstone bridge, Kelvin's bridge,
mega ohm bridge –components of signal conditioning devices –
current to voltage and voltage to current converter – buffer amplifier
– differential amplifier – instrumentation amplifier –digital to analog
converters – analog to digital converters – components of data
acquisition systems – measurement of self inductance – Hay's,
Anderson's, Owen's bridges – measurement of capacitance –
Schering bridge

STORAGE AND DISPLAY DEVICES

Magnetic disk and tape – recorders, digital plotters and printers,
digital LED, LCD and dot matrix display – cathode ray oscilloscopes
– block diagram, electrostatic deflection, post deflection
acceleration, screens for CRTs, CRT circuits, oscilloscope
techniques, special oscilloscopes, digital oscilloscope – digital
frequency meter –digital voltmeters – magnetic tape recorders – FM
recorders

TRANSDUCERS

Classification of transducers – selection of transducers – resistive,
capacitive and inductive transducers – piezoelectric, optical and
digital transducers – pH electrodes –transducers for measurements –
measurement of displacement, temperature, level flows, pressure,
velocity, acceleration, torque, speed, viscosity and moisture

TEXT BOOKS

1. Sawhney, A.K., A Course in Electrical & Electronic
Measurements & Instrumentation, Dhanpat Rai and Co, 2004.

2. Albert D.Helfrick., William D.Cooper, Modern Electronic Instrumentation & measurement techniques, Prentice Hall of India 2003.

REFERENCES

1. Bouwens, J., Digital Instrumentation, Tata McGraw Hill, 2002.
2. Kalsi, H.S., Electronic Instrumentation, Tata McGraw Hill, 2006.
3. Doebelin, E.O., Measurement Systems – Application and Design, Tata McGraw Hill publishing company, 2005.
4. Golding, E.W., & Widdies, F.W., Measurements & measuring instruments, sir Issar Pitman & sons (p) Ltd.,1998.

ECE266	DIGITAL ELECTRONICS	L	T	P	C
		3	1	0	4

NUMBER SYSTEMS & BOOLEAN ALGEBRA

Review of binary, octal, hexadecimal number systems – representation of signed numbers – floating point number representation – BCD –ASCII–EBCDIC – excess 3 codes – gray code –error detecting, correcting codes – Boolean Algebra–postulates and theorems of Boolean Algebra – canonical forms – simplification of logic functions using karnaugh map and Quine Mcclausky method

COMBINATIONAL LOGIC DESIGN

Logic gates – implementation of combinational logic functions – encoders & decoders – multiplexers & demultiplexers – code converters – comparator –half adder, full adder – parallel adder – binary adder – parity generator/checker –implementation of logical functions using multiplexers

COUNTERS & REGISTERS

RS, JK, JK Master-slave, D&T flip flops – level triggering and edge triggering – excitation tables – asynchronous and synchronous

counters – modulus counters – shift register – Johnson counter – ring counter – timing waveforms – counter applications

SEQUENTIAL LOGIC DESIGN

Basic models of sequential machines – concept of state table – state diagram – state reduction through partitioning and implementation of synchronous sequential circuits – introduction to asynchronous sequential logic design

PROGRAMMABLE LOGIC DEVICES

Semi custom design – introduction to PLD's – ROM – PAL – PLA – architecture of PLD's – PAL 22V10, PLS 100/101 – implementation of digital functions – Logic Families – RTL, DTL, TTL families, Schottky – clamped TTL, Emitter Coupled (ECL), Integrated Injection Logic (IIL), MOS inverters, CMOS inverters, comparison of performance of various logic families

TEXT BOOK

1. Morris Mano, M., Digital Design, Prentice Hall of India (P) Ltd., New Delhi, 1999

REFERENCES

1. Tocci, R.J., Digital Systems – Principles & Applications, Prentice Hall of India, 2002.
2. Fletcher, W.I., An Engineering Approach to Digital Design, Prentice Hall of India, 1994.
3. Floyd, Digital Fundamentals, Prentice Hall of India, 2003.

CSE206	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	1	0	4

INTRODUCTION

Introduction to OOP – Basic Concepts of OOP – Applications of OOP- Introduction to C++ - Introduction to C++ stream I/O – declarations in C++ - Creating New data types in C++ - function Prototypes – Inline functions – Reference Parameters – Const Qualifier – Dynamic memory allocation – default arguments – Unary Scope resolution operator – Linkage specifications.

CLASSES, CONSTRUCTORS AND FRIEND CLASS

Introduction – Comparing class with Structure – Class Scope – Accessing Members of a class – Constructor – Destructor – Const objects – Const member functions – Friend class – Friend function – This pointer – Data abstraction and Information hiding – container classes and Iterators.

OVERLOADING & INHERITANCE

Operator Overloading – Fundamentals – Restrictions – Overloading stream – Insertion and stream extraction operators – Overloading unary & binary operators – Converting between types – Overloading ++ and --. Inheritance – Introduction – Protected members – Casting base _class pointers to derived _class pointers – Overloading Base class members in a Derived class – Public, Protocols and Private inheritance – Direct base classes and Indirect Base Classes – Using Constructors and Destructors in Derived classes – Implicit Derived class object to base class object conversion.

VIRTUAL FUNCTIONS, STREAMS AND FILES

Introduction – Type fields and switch statements – Virtual functions – Abstract base classes and concrete classes – Polymorphism – Dynamic binding – Virtual destructors. C++ Stream I/O: Streams – Stream Input – Stream Output – Unformatted I/O – Stream

manipulators – Stream format states – Stream error – States. Files: File Operations, File pointers, Error Handling during file Operations.

TEMPLATES & EXCEPTION HANDLING

Templates – Function templates – Class templates – Overloading template functions – Class template and non type parameters – Templates with Multiple parameters. Exception Handling - When exception handling, Basic of C++ exception, Catching an exception, re throwing an exception, exception specifications.

TEXT BOOK

1. Goran Svenk , Object-Oriented Programming Using C++ for Engineering and Technology, Thomson Delmer Learning, 2003

REFERENCES

1. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 2000.
2. John R.Hubbard, Programming with C++, Schaums outline series, TMH 2003.
3. Deitel H.M., and Deitel P.J., How to program C++, PHI 2003.

EEE282	MACHINES LABORATORY II	L	T	P	C
		0	0	3	2

1. Regulation of three phase alternator by emf and mmf methods
2. Regulation of three phase alternator by ZPF and ASA methods
3. Regulation of three phase salient pole alternator by slip test
4. Measurements of negative sequence and zero sequence impedance of alternators.
5. v and inverted v curves of three phase synchronous motor.
6. Load test on three–phase induction motor.
7. Speed control of three–phase induction motors
8. Load test on synchronous induction motor
9. Load test on three phase induction generators
10. Study and control of stepper motor

11. Measurement of transient and sub-transient reactance in direct and quadrature axis
12. Predetermination of performance characteristics of three-phase induction motor using computer.
13. Parallel operation of two alternators.
14. Load test on single-phase induction motor (capacitor-start and run motor).

CSE285	OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	2

1. Simple C++ programs.
2. Programs using Functions.
3. Function Overloading
4. Operator Overloading
5. Simple & Multiple Inheritance
6. Multilevel & Hybrid Inheritance
7. Virtual Functions
8. Polymorphism
9. File Handling
10. Templates
11. Exception Handling

SEMESTER V

EEE301	POWER ELECTRONICS	L	T	P	C
		3	1	0	4

POWER SEMI-CONDUCTOR DEVICES

Operation and characteristics – power diode, power transistor, SCR, TRIAC, power MOSFET, Power IGBT, GTO – silicon controlled rectifier – two transistor model, turn-on and turn-off methods, series and parallel operation, protection schemes

PHASE-CONTROLLED CONVERTERS

Single phase converters – phase angle control, single phase half wave controlled rectifiers, single phase full wave controlled rectifiers, performance factors of single phase converters, triggering circuit – three phase converters – three phase semi converter, three phase fully controlled bridge converter, performance factors of three phase converters – effect of source and load inductance, triggering circuit for three phase converters – dual converters

INVERTERS

Classification of inverters – single phase, three phase (both 120° mode and 180° mode) inverters – series inverter – parallel inverter – voltage control of single phase, three phase inverters – McMurray inverter, modified McMurray inverter – harmonic reduction in inverters – current source inverters

CHOPPERS

Step-down and step-up choppers – time ratio and current limit control – switching mode regulators – buck, boost, buck-boost and cuk converter – multiphase choppers – series and parallel resonant converters – chopper firing circuit – chopper control of DC motors

AC TO AC CONVERTERS

Single phase AC regulators – sequence control of AC regulators – three phase AC regulators – single phase to single phase cycloconverter – three phase half wave cycloconverter – control circuit output voltage equation

TEXT BOOK

1. Muhammad H. Rashid., Power Electronics: Circuits, Devices and Applications, Prentice Hall of India, Pearson education, 3rd edition, 2004

REFERENCES

1. Singh, M.D., Power Electronics, Tata McGraw Hill publications, 1st Edition, 2002
2. Ramamoorthy ,M., An Introduction to thyristor and their application, affiliated East west press (P) Ltd, 2nd edition, 1991
3. Ned Mohan.,et.al., Power Electronics: Converters, Applications and Design, John Wiley and sons, 3rd edition, 2003.

EEE302	TRANSMISSION AND DISTRIBUTION	L	T	P	C
		3	1	0	4

BASICS OF TRANSMISSION AND DISTRIBUTION

Structure of electric power system – types of transmission systems – AC systems, DC systems – requirements of good distribution system – types of distribution system – Extra High Voltage AC (EHVAC) Transmission – need, advantages, limitations –High Voltage Direct current Transmission (HVDC) – classifications, advantages, limitations – comparison of EHVAC and HVDC transmission

TRANSMISSION LINE PARAMETERS

Parameters of single and three phase transmission lines with single and double circuits – resistance, inductance and capacitance of solid, stranded and bundled conductors – symmetrical and unsymmetrical spacing and transposition – application of self and mutual GMD –

skin and proximity effect – interference with neighboring communication circuits

MODELLING AND PERFORMANCE OF TRANSMISSION LINES

Classification of lines – short line, medium line and long line – equivalent circuits, attenuation constant, phase constant, surge impedance transmission efficiency and voltage regulation – real and reactive power flow in lines – power angle diagram – surge impedance loading, loadability limits based on thermal loading, angle and voltage stability considerations – compensation in transmission lines, Ferranti effect and corona loss – sag and tension calculation, sag template, stringing chart – effect of atmospheric conditions on transmission lines – vibration of conductors and dampers

INSULATORS AND CABLES

Properties of an insulator – insulator materials – types of insulators – insulator string – voltage distribution, string efficiency, methods of increasing string efficiency – testing of insulators – cables – comparison of underground and overhead cables – construction, types, insulating materials, dielectric stress, grading, thermal characteristics

SUBSTATION AND GROUNDING SYSTEM

Types of substations – bus-bar arrangements – substation bus schemes – single bus scheme, double bus with double breaker, double bus with single breaker, main and transfer bus, ring bus, breaker – half with two main buses, double bus-bar with bypass isolators resistance of grounding systems – resistance of driven rods, resistance of grounding point electrode, grounding grids – design principles of substation grounding system – neutral grounding

TEXT BOOKS

1. Singh, S.N., Electric Power Generation, Transmission and Distribution, Prentice Hall of India (P) Ltd, New Delhi, 2006.
2. Gupta, B.R., Power System Analysis and Design, S.Chand Publications, New Delhi, 2005.

REFERENCES

1. Hadi Saadat., Power System Analysis, Tata McGraw Hill Publishing Company, 2005.
2. Luces M.Fualkenberry., Walter Coffey., Electrical Power Distribution and Transmission, Pearson education, 1996.

EEE303	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	1	0	4

INTEGRATED CIRCUIT TECHNOLOGY

Monolithic integrated circuit technology – planar process – bipolar junction transistor fabrication – fabrication of FET’s – CMOS Technology – monolithic diodes – metal – semiconductor contact – integrated circuit resistors – integrated circuit capacitors – integrated circuit packaging – characteristics of integrated circuit components – microelectronic circuit layout

CHARACTERISTICS AND APPLICATIONS OF OP-AMP

D.C Characteristics of ideal op-amp, pin configuration of 741 op-amp, bias, offsets, drift, bandwidth, A.C characteristics – slew rate, frequency compensation – applications – inverting and non-inverting amplifiers, inverting and non-inverting summers, difference amplifier, differentiator and integrator, log and antilog amplifiers, multiplier and divider, analog computers

COMPARATORS AND SIGNAL GENERATORS

Comparators – regenerative comparators, input output characteristics, signal generators – astable multivibrator, monostable multivibrator, triangular wave generators, RC-phase shift oscillator,

Wein bridge oscillator – voltage regulator –series op amp regulator, IC voltage regulator, 723 general purpose regulator, switching regulator

ACTIVE FILTERS, TIMERS AND MULTIPLIERS

Filters – low pass, high pass, band pass and band reject, Butterworth, Chebychev filters, first and second order filters – switched capacitor filters – 555 timer functional diagram, monostable and astable operation – multiplier – application

PLL, ADC AND DAC APPLICATION ICs

PLL – basic block diagram, operation, capture range and lock range – simple applications of PLL – AM detection, FM detection and FSK demodulation, ADC and DAC – weighted resistor DAC, R-2R and inverted R-2R DAC, monolithic DAC, Flash ADC, counter type ADC, successive approximation ADC, dual slope ADC, and conversion times of typical ADC

TEXT BOOKS

1. Ramakant A. Gayakward., Op–amps and Linear Integrated Circuits, Pearson Education, 4th edition, 2005
2. Roy Choudhary, D., Sheil B.Jani., Linear Integrated Circuits, New Age International, 2nd edition, 2003.

REFERENCES

1. Robert F.Coughlin., Fredrick F.Driscoll, Op–amp and Linear ICs, Pearson Education, 6th edition, 2005.
2. Franco., Design with Operational Amplifier and Analog Integrated Circuits, Tata McGraw Hill publishing company, 2005.

EEE304	DESIGN OF ELECTRICAL APPARATUS	L	T	P	C
		3	1	0	4

MAGNETIC CIRCUITS AND COOLING OF ELECTRICAL MACHINES

Concept of magnetic circuit – MMF calculation for various types of electrical machines – real and apparent flux density of rotating machines – leakage reactance calculation for transformers, induction and synchronous machine – thermal rating –continuous, short time and intermittent short time rating of electrical machines –cooling – direct and indirect cooling methods, cooling of turbo alternators

DESIGN OF DC MACHINES

Constructional details ,output equation ,main dimensions, choice of specific loadings, choice of number of poles – armature design – design of field poles and field coil, design of commutator and brushes – losses and efficiency calculations

DESIGN OF TRANSFORMERS

Constructional details of core and shell type transformers – output rating of single phase and three phase transformers – optimum design of transformers – design of core, yoke and windings for core and shell type transformers – equivalent circuit parameter from designed data – losses and efficiency calculations – design of tank and cooling tubes of transformers

DESIGN OF THREE PHASE INDUCTION MOTORS

Squirrel cage and slip ring motors – constructional details, output equation, main dimensions ,choice of specific loadings – stator, squirrel cage and slip ring rotor design – equivalent circuit parameters from designed data – losses and efficiency calculations

DESIGN OF SYNCHRONOUS MACHINES

Alternators – constructional details of cylindrical pole and salient pole alternators, output equation, choice of specific loadings, main

dimensions, short circuit ratio –design of stator and rotor of cylindrical pole and salient pole machines, design of field coil – performance calculation from designed data – computer aided design

TEXT BOOKS

1. Sawhney, A.K., A Course in Electrical Machine Design, Dhanpat Rai and Sons, New Delhi, 1994.
2. Sen, S.K., Principles of Electrical Machine Design with Computer Programmes, Oxford and IBH Publishing Co.(P) Ltd., New Delhi, 2004.

REFERENCES

1. Agarwal, R.K., Principles of Electrical Machine Design, S.K.Kataria and Sons, Delhi, 2002.
2. Mittle, V.N., and Mittle, A., Design of Electrical Machines, Standard Publications and Distributors, Delhi, 2002.

EEE381	POWER ELECTRONICS LABORATORY	L	T	P	C
		0	0	3	2

1. Static characteristics of MOSFET and IGBT
2. Transient characteristics of SCR and MOSFET
3. Single phase half/fully controlled converters
4. Three phase half/fully controlled converters
5. Single phase IGBT based PWM inverters
6. Series inverter.
2. Parallel inverter.
3. Step up and step down MOSFET based choppers.
4. Resonant dc-dc converters.
5. Single phase voltage controllers
6. Three phase voltage controllers
7. Single phase ac-dc cyclo converters.

EEE382	INSTRUMENTATION AND CONTROL LABORATORY	L	T	P	C
		0	0	3	2

(a) INSTRUMENTATION SYSTEM

1. Study of displacement and pressure transducers
2. AC & DC bridges.
3. Instrumentation amplifiers.
4. A/D and D/A converters.
5. Study of transients.
6. Calibration of single-phase energy meter.
7. Calibration of three phase Energy meter.
8. Measurement of three phase power and power factor.

(b) CONTROL SYSTEM

1. Determination of transfer function parameters of a DC & AC servo motor.
2. Analog simulation of type-0 and type-1 system.
3. Digital simulation of linear & non-linear systems.
4. Design of P, PI and PID controllers.
5. Closed loop control system.
6. Study of synchros.

SEMESTER VI

EEE305	POWER SYSTEM ANALYSIS	L	T	P	C
		3	1	0	4

MODELLING OF POWER SYSTEM COMPONENTS

Overview of power system analysis – importance of system planning and operational analysis – matrix formation by building algorithm – bus impedance matrix formation using LU factorization – per phase analysis of symmetrical three phase system – modelling of power system components – representation, single line diagram, per unit representation – primitive network and its matrices, bus admittance matrix formation – inspection method, singularity transformation method – bus impedance – π equivalent circuit of transformer with off nominal – tap ratio – phase shifting transformer

POWER FLOW ANALYSIS

Importance of power flow analysis– power flow problem – classification of buses – development of power flow model in Gauss-seidel power flow – numerical problems – computation of transmission line flows, losses and slack bus power – Newton-Raphson (N-R) method (polar form)– flowchart – numerical problems – development of Fast Decoupled Power Flow (FDPF) model, flowchart, numerical problems – comparison of the three methods of load flow.

SYMMETRIC FAULT ANALYSIS

Need for fault analysis – common approximations made in fault analysis – symmetrical short circuits – Thevenin's theorem and its applications – short circuit capacity – circuit breaker selections – systematic short circuit computations

UNSYMMETRICAL FAULT ANALYSIS

Unsymmetrical short circuits – short circuit analysis – symmetrical components method – derivation of fault current – LG, LL, LLG

short circuits – development of interconnection of sequence networks for LG, LL and LLG faults – short circuit analysis of unbalanced large scale systems

STABILITY ANALYSIS

Importance of stability analysis – classification of power system stability – single Machine Infinite Bus (SMIB) system – development of swing equation – synchronous machine representation by classical model – power – angle equation– equal area criterion – determination of critical clearing angle and time – algorithm for numerical solution of swing equation using modified Euler method – plotting of swing curves – small – signal stability of SMIB system – concept of synchronizing power coefficient – voltage instability in power system – power transfer limits –voltage stability analysis – counter measures against stability analysis

TEXT BOOK

1. Nagrath, I.J., Kothari, D.P., Modern Power System Analysis, Tata McGraw Hill Publishing Company, New Delhi, 2005.

REFERENCES

1. Hadi Saadat., Power System Analysis, Tata McGraw Hill Publishing Company, New Delhi, 2005.
2. John J. Grainger, W.D. Stevenson Jr., Power System Analysis, Tata McGraw Hill International Book Company, 2005.

EEE306	MICROPROCESSOR AND MICRO CONTROLLER	L	T	P	C
		3	1	0	4

8085 PROCESSOR

Organisation of 8085 microprocessor – instruction set – addressing modes – assembly language programming – machine cycles – read, write – bus cycles – states – wait state – HALT and HOLD state

8086 MICROPROCESSOR

Organisation of 8086 microprocessor – memory segmentation – addressing bytes and words – address formation – address modes in 8086 – assembly language programming – minimum mode and maximum mode

MICROPROCESSOR INTERFACING TECHNIQUES

Data transfer – programmable parallel ports – 8255 PPI – serial communication – asynchronous, synchronous – 8251A programmable communication interface – DMA – 8257 – 8237 – programmable DMA controller – 8259A programmable interrupt controller

INTERFACING MEMORY AND I/O DEVICES AND MICROPROCESSOR APPLICATIONS

Memory interface – input / output interface – keyboard/display interfacing – A/D interfaced D/A interface – applications – temperature controller – stepper motor controller – DC Motor controller – traffic light controller

8031 / 8051 MICROCONTROLLER

Organization of 8031 8051 microcontroller – I/O Ports – external memory – counters and timers – serial data input and output – interrupts – instruction set – addressing modes – assembly language programming – simple applications

TEXT BOOK

1. Gaonkar, R.S., Microprocessor Architecture Programming and Application, Wiley Eastern Ltd., New Delhi, 2005.

REFERENCES

1. Hall, D.V., Microprocessor and Interfacing Programming and Hardware, Tata McGraw Hill Publishing Company, 2nd edition, 2006.

2. YuCheng Liu & Glenn A Gibson, Microcomputer System, 8086/8088 Family, 2nd edition, Prentice Hall of India, 2005.
3. Rafiquzzaman M., Microprocessor Theory and Application – Intel and Motorola, Prentice Hall of India, 2002.

EEE383	DIGITAL CIRCUITS AND INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

(a) Digital Circuits

1. Implementation of combinational circuits(Adder/Subtractor)
2. Code converters(Gray to Excess 3, BCD to Gray, Gray to Binary)
3. Realisation of flipflops
4. Encoder and Decoder
5. Multiplexer and De-multiplexer (4:1,8:1 Mux and 1:4,1:8 De-Mux)
6. Shift registers(SISO,PISO,SIPO,PIPO)

(b) Integrated Circuits

7. Analog to digital converters
8. Digital to analog converters
9. Astable and monostable operation using 555 timers
10. Applications of operational–amplifiers

EEE384	MICROPROCESSOR AND MICRO CONTROLLER LABORATORY	L	T	P	C
		0	0	3	2

8-bit Microprocessor

1. Simple arithmetic operations
2. Programming with control instructions

3. Interface Experiments: A/D and D/A Interfacing and Traffic Light Controller.
4. Interface experiments using 8251, 8279, 8254.
5. Programming practice on assembler and simulator tools.

8-bit Micro controller

6. Basic instructions with 8051 micro controller execution.
7. Parallel port programming with 8051: stepper motor and D / A converter.
8. Programming exercise on RAM direct addressing and Bit addressing
9. Programming practice using simulation tools and C – compiler
10. Study of micro controllers with flash memory.

SEMESTER VII

EEE401	PROTECTION AND SWITCH GEAR	L	T	P	C
		3	0	0	3

PROTECTIVE RELAYS

Principles and need for protective schemes – nature and causes of faults – types of faults – essential qualities of protection – zones of protection – primary and back up protection – relay classification – principle types of electromagnetic relays – theory of induction disc relay – relay design – relay construction – general equation for electromagnetic relays – over current relays – directional relays – distance relays – differential relays

CIRCUIT BREAKERS

Physics of arc phenomena – maintenance of the arc – losses – arc interruption theories – circuit breaker rating – characteristics of restriking voltage – current chopping – types of circuit breakers – air break CB, Air blast CB, Oil CB, Vacuum CB, SF₆ CB – basic steps for design of circuit breaker – testing of circuit breakers

FEEDER PROTECTION

Over current, distance, pilot feeder, protection schemes – transformer protection – generator protection – motor protection – bus zone protection – auto reclosing – methods of testing protective gear – current transformer tests – potential transformer tests

OVER VOLTAGE PROTECTION

Causes of over voltages – lightning – switching – insulation failure and arcing grounds – methods of protection – ground wires, Peterson coils, surge absorbers and diverters – location of protective apparatus – insulation coordination – neutral earthing

STATIC RELAYS

Basis for static relay development – classification – components of static relays –elements of a static relay – over current relay – differential protection – static distance relay – microprocessor based relays – concepts of digital relaying

TEXT BOOKS

1. Sunil S.Rao., Protective Switch Gear, Khanna Publishers, New Delhi, 1999.
2. Ravindranath , B., Chander, N., Power Systems Protection and Switch Gear, Wiley Eastern (P) Ltd., 2001.

REFERENCES

1. Badri Ram., Vishwakarma, D.N., Power system protection and switchgear, Tata Mc Graw Hill publishing company Ltd., 2002.
2. Uppal, S.L., Electrical Power, Khanna Publishers, New Delhi, 2004.

EEE402	ELECTRICAL DRIVES	L	T	P	C
		3	1	0	4

CHARACTERISTICS OF ELECTRIC DRIVES

Speed – torque characteristics of various types of loads and drive motors – joint speed – torque characteristics – selection of power rating for drive motors with regard to thermal overloading and load variation factors – load equalization – starting, braking and reversing operations

DC DRIVES

Speed control of dc motors – Ward – Leonard scheme – drawbacks – thyristor converter fed dc drives – single, two and four quadrant operations – SRM drive – micro motor drive – chopper fed DC Drives – time ratio control and current limit control – single, two and four quadrant operations – effect of ripples on the dc motor performance

THREE PHASE INDUCTION MOTOR DRIVES

Speed control of three phase induction motors – stator control – stator voltage and frequency control – AC chopper, inverter and cycloconverter fed induction motor drives, rotor control – rotor resistance control and slip power recovery schemes – static control of rotor resistance using dc chopper – static Kramer, Scherbius drives

THREE PHASE SYNCHRONOUS MOTOR DRIVES

Speed control of three phase synchronous motors – voltage source and current source inverter fed synchronous motors – commutatorless DC motors – cycloconverter fed synchronous motors – effects of harmonics on the performance of AC motors – closed loop control of drive motors

DIGITAL CONTROL AND DRIVE APPLICATIONS

Digital techniques in speed control – advantages and limitations – microprocessor based control of drives – selection of drives and control schemes for steel rolling mills, paper mills, lifts and cranes

TEXT BOOKS

1. Pillai, S.K., A First Course on Electrical Drives, New Age International Publishers, 2nd Edition, 2002.
2. Subhramanyam, V., Thyristor control of Electrical Drives, Tata McGraw Hill Publishing company Ltd, New Delhi, 2002.

REFERENCES

1. Sen, P.C., Thyristor drives, John Wiley & sons, New York, 1993.
2. Ramamoorthy, M., An Introduction to Thyristor and their Application, Affiliated East West Press (P) Ltd, 2nd Edition, 1991.

EEE403	POWER SYSTEM OPERATION AND CONTROL	L	T	P	C
		3	1	0	4

LOADS ON POWER SYSTEM

System load variation – system load characteristics – load curves – daily, weekly and annual, load-duration curve – load factor – diversity factor – reserve requirements– installed reserves, spinning reserves, cold reserves, hot reserves – overview of system operation – load forecasting, unit commitment, load dispatching – overview of system control – governor control, LFC, EDC, AVR, system voltage control and security control

ECONOMIC DISPATCH AND UNIT COMMITMENT

Incremental cost curve – co-ordination equations – without loss and with loss – solution by direct method and λ -iteration method – base point and participation factors – economic dispatch controller added to LFC control – Statement of Unit Commitment (UC) problem – constraints in UC – spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints – UC solution methods – priority -list methods, forward dynamic programming approach

ACTIVE POWER – FREQUENCY CONTROL

Fundamentals of speed governing mechanism and modeling – speed-load characteristics – load sharing between two synchronous machines in parallel – concept of control area – LFC control of a single-area system – static and dynamic analysis of uncontrolled and controlled cases, economic dispatch control – multi-area systems – modelling of two-area system, static analysis and dynamic analysis of two area system – uncontrolled case-tie line with frequency bias control of two-area system derivation – state variable model

REACTIVE POWER–VOLTAGE CONTROL

Typical excitation system – modeling, static and dynamic analysis – stability compensation; generation and absorption of reactive power – relation between voltage, power and reactive power – method of voltage control – injection of reactive power – tap-changing transformer, numerical problems – system level control – generator voltage magnitude setting, tap setting of OLTC transformer and MVAR injection of switched capacitors to maintain acceptable voltage profile and to minimize transmission loss

COMPUTER CONTROL OF POWER SYSTEMS

Energy control centre – functions, monitoring, data acquisition and control – system hardware configuration – SCADA and EMS functions – network topology determination – state estimation, security analysis and control – various operating states – normal, alert, emergency, inextremis and restorative – state transition diagram showing various state transitions and control strategies

TEXT BOOKS

1. Olle. I. Elgerd., Electric Energy Systems Theory – An Introduction, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2nd edition, 2005.
2. Allen.J.Wood and Bruce F.Wollenberg., Power Generation, Operation and Control, John Wiley and Sons, Inc., 2004.

REFERENCE

1. Kothari ,D.P., and Nagrath., I.J., Modern Power System Analysis, Tata McGraw Hill Publishing Company Limited, New Delhi, 3rd edition, 2005.

EEE481	POWER SYSTEM SIMULATION LABORATORY	L	T	P	C
		0	0	3	2

1. Solution of Sparse matrix Equation $AX=b$
2. Y_{BUS} formation using singular transformation method
3. Z_{BUS} formation using bus building algorithm
4. Determination of Transmission line parameters
5. Load flow solution using Gauss – Seidal method
6. Load flow solution using Newton – Rapson method
7. Load flow solution using Fast Decoupled load flow method
8. Simulation of faults and analysis of faults on power system using MATLAB
9. Transient stability analysis using eTAP
10. Solution of economic dispatch control
11. Solution of two area load frequency control

MAJOR ELECTIVES

EEE306	SPECIAL ELECTRICAL MACHINES	L	T	P	C
		3	0	0	3

SYNCHRONOUS RELUCTANCE MOTORS

Constructional features – types – axial and radial air gap motors – operating principle – reluctance – phasor diagram – characteristics – Vernier motor

STEPPING MOTORS

Constructional features – principle of operation – variable reluctance motor – hybrid motor – single and multi stack configurations – theory of torque predictions – linear and non-linear analysis – characteristics – drive circuits

SWITCHED RELUCTANCE MOTORS

Constructional features – principle of operation – torque prediction – power controllers – non-linear analysis – microprocessor based control – characteristics – computer control

PERMANENT MAGNET BRUSHLESS DC MOTORS AND INDUCTION MACHINES

Principle of operation – types – magnetic circuit analysis – EMF and torque equations – power controllers – motor characteristics and control – induction voltage regulator – synchronous induction motor – power selsyn – position selsyn – linear motors

PERMANENT MAGNET SYNCHRONOUS MOTORS

Principle of operation – EMF and torque equations – reactance – phasor diagram – power controllers – converter – volt-ampere requirements – torque speed characteristics – microprocessor based control

TEXT BOOKS

1. Miller, T.J.E., Brushless Permanent Magnet and Reluctance Motor Drives, Clarendon Press, Oxford, 1989.
2. Aearnley P., Stepping Motors – A Guide to Motor Theory and Practice, PeterPerengrinus, London, 1982.

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1. Kenjo, T., Stepping Motors and Their Microprocessor Controls, Clarendon Press London, 1984.
2. Kenjo,T., Nagamori,S., Permanent Magnet and Brushless DC Motors, Clarendon Press, London, 1988.

EEE307	HIGH VOLTAGE ENGINEERING	L	T	P	C
		4	0	0	4

ELECTRICAL BREAKDOWN IN GASES, SOLIDS AND LIQUIDS

Break down in gases – liquids and solids – partial discharges – dielectric breakdown

GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS

Generation of high alternating and direct voltages, impulse and switching voltages – generation of high impulse currents

MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS

Measurement of high alternating and direct impulse voltages – digital recorders for impulse measurements – measurement of high currents

TRANSIENTS IN ELECTRICAL POWER SYSTEM

Basic concepts of transients – classification – lightning over voltage – switching over voltages – transformer winding behaviour under transient conditions – lightning discharge

HIGH VOLTAGE TESTING AND INSULATION COORDINATION

High voltage testing – testing of circuit breakers, insulators, bushings and surge diverters, transformers, cables – standards and specifications – non-destructive high voltage tests, tests on lightning arrestors – insulation coordination

TEXT BOOKS

1. Wadhwa,C.L., High Voltage Engineering, New Age International (P) Limited, New Delhi, 2001.
2. Naidu,M.S., Kamaraju,V., High Voltage Engineering, Tata McGraw Hill Publishing Company, New Delhi, 2004.

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1. Gallghar,P.J., Pearmain A.J., High Voltage measurement, Testing and Design,John Wiley and Sons,Newyork,1982.
2. Kuffel,E., Zaengl W.S., High Voltage Engineering Fundamentals , Pergamon press, Oxford, London, 2002

EEE308	SOLID STATE DRIVES	L	T	P	C
		3	0	0	3

DRIVE CHARACTERISTICS

Introduction – classification and advantages – equations governing motor load dynamics – equilibrium operating point and its steady state stability – mathematical condition for steady state stability and numerical problems – multi quadrant dynamics in the speed torque plane – basics of regenerative braking – typical load torque characteristics – acceleration, deceleration, starting and stopping

CONVERTER / CHOPPER FED DC MOTOR DRIVE

Phase controlled drives – four quadrant DC motor drive – steady state analysis of the single and three phase fully controlled converter fed separately excited DC motor drive: continuous and discontinuous

conduction mode – chopper fed DC drive – time ratio control and current limit control – four quadrant chopper

INDUCTION MOTOR DRIVES

Stator voltage control – braking and energy saving – slip-power recovery drives – adjustable frequency drives – v/f control, constant slip-speed control and constant air-gap flux control – principle of vector control – methods of improving power factor – basics of voltage, current fed inverters – block diagram of closed loop drive – switched reluctance and stepper motor drives

SYNCHRONOUS MOTOR DRIVES

Open loop v/f control and self – control of synchronous motor – marginal angle control and power factor control – VSI/CSI fed drives – need for leading power factor operation – excitation system – permanent magnet synchronous motor

DESIGN OF CONTROLLERS FOR DRIVES

Transfer function for DC motor, load and converter – closed loop control with current and speed feedback – armature voltage control and field weakening mode control – design of controllers – current controller and speed controller – converter selection and characteristics

TEXT BOOKS

1. Krishnan.R., Electric Motor & Drives: Modelling, Analysis and Control, Prentice Hall of India, 2005.
2. Bimal K. Bose, Modern Power Electronics and AC Drives, Pearson Education, 2005.

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1. Dubey, G.K., Power Semi-conductor Controlled Drives, Prentice Hall of India, 1989.
2. Pillai, S.K., A First Course on Electrical Drives, Wiley Eastern Limited, 2002.

- Murphy, J.M.D., Turnbull.F.G., Thyristor control of AC motors, Pergamon press,1988.

EEE309	CONTROL SYSTEM DESIGN	L	T	P	C
		3	1	0	4

INTRODUCTION TO DESIGN

System performance and specification – P,PI, PD and PID controllers – characteristics – design – tuning – manual and automatic – robust control system design

FREQUENCY DOMAIN DESIGN

Realization of compensators – design of lead, lag, lead-lag compensators – design using Bode plots – polar plots – Nichol's chart – MIMO design – feedback compensation

STATE VARIABLE DESIGN

Design by state feedback – output feedback – MIMO pole assignment technique – design of state and output regulators – design of reduced and full order observer – parameter optimization – H_α control

STATE ESTIMATION TECHNIQUES

Introduction – state observers, asymmetric observers, frequency domain interpretation – linear quadratic regulator (LQR) – statistical descriptions of noise, Kalman filter, stability margins

CASE STUDIES

Inverted pendulum – robo arm control – RADAR tracking control – satellite attitude control – process control

TEXT BOOKS

- Friedland.B., Control System Design, Tata McGraw Hill 1986.
- Anderson, B.D.O., Moore, J.B., Optimal Control – LQ Methods, Prentice Hall of India, New Delhi, 1991

- Doyle, J.C., Francis, B.A., Tannenbaum, A.R., Feedback Control Theory, Maxwell Macmilan International, 1992

REFERENCES

- Gopal, M., Control system Principles and Design, Tata McGraw Hill, New Delhi, 2002
- Goodwin, G.C., et al., Control system Design, Pearson education, 2003

EEE310	NON CONVENTIONAL ENERGY SOURCES	L	T	P	C
		3	0	0	3

PHOTOELECTRIC AND DIRECT ENERGY CONVERSION SYSTEM

Photoelectric energy conversion – concept and description of photovoltaic effect –solar cell – material and prospects – thermoelectric and thermionic generation –Seeback, Peltiar, Thomson effect – thermodynamics of fuel cells – selection of fuel cells – selection of fuels based on constructional features – practical problems

MAGNETO STATIC ENERGY CONVERSION

MHD generation – principle – Faraday and Hall effect generators – choice of generation parameters – magnetic field requirements – conductivity and ionization –recent development in MHD power systems

SOLAR ENERGY AND GEOTHERMAL ENERGY

Data collectors – flat plate collectors and parabolic concentrators – design, fabrication and performance – solar thermal power generation systems – solar air heating and cooling – solar thermal devices – solar stills, furnaces – cookers, refrigerators – solar pond – thermal storage – Geothermal energy – sources of geo thermal power –electrical power production – geo- thermal power efficiency

WIND ENERGY AND HYDRO ELECTRIC SYSTEMS

Energy from wind – theory of wind mills – site selection, types, construction – wind energy conversion systems – wind energy collectors – performance – wind energy storage – applications – hydro electric systems – schematic layout – generation and efficiency – tidal power – single and double basin systems – ocean Thermal energy conversion systems – wave energy

ENERGY FROM BIOMASS

Biomass – sources of biomass – animal, human, industrial, municipal and agricultural waste – methods of beneficiation and utilization – biogas production – factors affecting biogas production – gasification – types of gasifiers – advantages and disadvantages – pyrolysis, wood distillation, briquetting – liquefaction – energy plantations and fast growing varieties – significance of energy plantations

TEXT BOOKS

1. Duffy and Buckman., Solar energy thermal process, John wiley and sons,2002.
2. CulpA.W., Principles of Energy Conversion, Tata McGraw Hill Publication, New Delhi,2001.

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1. Rai, G.D., Non–conventional Energy Sources, Khanna Publishers, New Delhi,2003.
2. Sathyajith Mathew, Wind energy–Fundamentals, Resource Analysis and Economics, Springer, 2006.

EEE311	NETWORK ANALYSIS AND SYNTHESIS	L	T	P	C
		3	0	0	3

ANALYSIS OF NETWORKS IN S DOMAIN

Network elements – one port and two port networks – driving point immittance – transfer function – necessary conditions for driving

point function and transfer function – poles and zeros – significance of poles and zeros – restriction and the location of poles and zeros – time domain behavior from pole zero plot – stability criterion for active network – solved problems

METHODS FOR COMPUTER AIDED NETWORK ANALYSIS State variable method – analytic and numerical solutions – graph theoretic analysis for large scale networks, formulation and solution of network graph of simple networks – state space representation

TWO-PORT NETWORKS

Two port network – open circuit impedance (Z) parameters – short circuit admittance (Y) parameters – transmission (ABCD) parameters – inverse transmission ($A'B'C'D'$) parameters – hybrid (h) parameters – inverse hybrid (g) parameters – inter relationship of different parameters – inter connection of two port networks – T and π representation – terminated two port networks – lattice networks – image parameters

ELEMENTS OF NETWORK SYNTHESIS

Network reliability – Hurwitz polynomials – positive real functions – properties of RC, RL & LC networks – Foster and Cauer forms of realization (Synthesis of RL and RC Network) – transmission zeroes – synthesis of transfer functions

DESIGN OF FILTERS

Filters and attenuators – design of constant – K , m -derived and composite filters – qualitative treatment of active filters – Butterworth and Chebyshev filters

TEXT BOOKS

1. Franklin F. Kuo., Network Analysis and Synthesis, John Wiley 1996

2. Louis Weinberg., Network Analysis and Synthesis, Tata McGraw Hill Book Company Inc., 1962.
3. Vanvalkenburg., Network Analysis, Prentice Hall of India (P) Ltd., New Delhi, 1989

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1. Someshwar C.Gupta., et. al., Circuit Analysis with computer applications to problem– solving, Wiley–Eastern Ltd., 2001.
2. Vasudev K. Aartre, Network Theory and Filter Design ,Wiley–Eastern Ltd., 2nd edition, 1993.
3. Lawrence P. Huelsman, Active and Passive Analog Filter Design, McGraw Hill, 1993.

EEE404	HVDC AND FACTS	L	T	P	C
		3	0	0	3

DC POWER TRANSMISSION TECHNOLOGY

Introduction – comparison of HVAC and HVDC –application of DC transmission – description of DC transmission system planning for HVDC transmission – modern trends in DC transmission – limitations

ANALYSIS OF CONVERTERS AND HVDC SYSTEM CONTROL

Thyristor converter circuits – choice of converter configurations – control characteristics – simplified analysis of Graetz circuit – system control hierarchy –firing angle contro – current and extinction angle control

BASIC CONCEPTS OF FACTS

Lack of control on active reactive power flow – conventional control mechanisms – Need for FACTS Devices – Advances in power semiconductor devices – types of FACTS controllers – importance of facts controllers – operating principles

THRISTOR BASED FACTS DEVICES

Classification – thyristor controlled reactor (TCR), thyristors switched reactor (TSR), thyristor switched capacitor (TSC), saturated reactor (SR), and fixed capacitor (FC) thyristor controlled series capacitor (TCSC), static var compensator (SVC)

VSC BASED FACTS DEVICES

Basic concepts of VSC – STATCOM – principle of operation – V-I characteristics – static synchronous series capacitor (SSSC) – unified power flow controller (UPFC) – principle of operation – applications – modeling of UPFC for power flow

TEXT BOOKS

1. Padiyar,K.R., HVDC Power Transmission System, Wiley Eastern Limited, New Delhi,1st edition,1990.
2. Narin G.Hingorani, Flexible AC Transmission, IEEE Spectrum, April 1993.

REFERENCES

1. Arrilaga,J., High Voltage Direct Current Transmission, Peter Pregrinus,London,1983.
2. Edward Wilson Kimbark, Direct Current Transmission, Wiley inerscience,NewYork,London,Sydney,1971.
3. Mohan Mathur, R., & Rajiv k. Varma., Thyristor based FACTS controllers for Electrical transmission systems, IEEE press, wiley Inter Science, 2002.

EEE405	POWER SYSTEM DYNAMICS	L	T	P	C
		3	1	0	4

MODELING OF POWER SYSTEM COMPONENTS

Mathematical description of synchronous machine – dqo transformation – per unit representation – equivalent circuit for d and q axis – steady state analysis –conditioning of Y Matrix sis – magnetic saturation – simplified model with amortisseurs neglected

– classical model – constant flux linkage model including the effect of sub transient circuits – reactive capability limits – modeling of transformer and transmission lines – load modelling

SMALL SIGNAL STABILITY ANALYSIS

Basic concepts and definitions – classification of stability – stability of dynamic system – state-space representation – eigen properties of state matrix – participation factor – SMIB configuration – effects of field circuit dynamics – effect of field flux variation on system stability – analysis with numeric examples

TRANSIENT STABILITY ANALYSIS

Factors influencing transient stability – numerical integration method – Euler and Runge Kutta method – simulation of power system dynamic response – structure of power system model – synchronous machine representation – transmission network and load representation – overall system equation and their solution – simplified transient stability simulation using simultaneous implicit method – principle behind transient stability enhancement method – regulated shunt compensation – dynamic braking – reactive switching – high speed excitation system

STABILITY ENHANCEMENT

Effect of excitation system– thyristor excitation system – AVR – Effect of AVR on synchronizing and damping components – principle behind small signal stability improvement methods – delta-omega and delta P – Omega stabilizers – transient stability enhancement

VOLTAGE STABILITY

Basic concepts related to voltage stability – voltage collapse – classification of voltage stability – voltage stability analysis – prevention of voltage collapse – system design & measures – system operating measures

TEXT BOOKS

1. Padiyar,K.R., Power system dynamics, Wiley Eastern Limited,New Delhi. 2002
2. Kundur, P., Power system stability and control, Tata McGraw Hill,2006

REFERENCE

1. Pai, M.A., Computer techniques in power system analysis, Tata McGraw Hill, New Delhi 1979

EEE406	POWER SYSTEM OPTIMIZATION	L	T	P	C
		3	1	0	4

ECONOMIC DISPATCH

Incremental cost curve – co-ordination equations without loss and with loss – solution by direct method and lamda iteration method – base point and participation factors – two generator system, coordination equations, incremental losses and penalty factors

UNIT COMMITMENT

Constraints in unit commitment – spinning reserve, thermal unit constraints, other constraints – solution using priority list method, dynamic programming method – forward DP approach – Lagrangian relaxation method, adjusting λ

GENERATION SCHEDULING–THERMAL AND HYDROTHERMAL SYSTEM

Long range hydro scheduling – short range hydro scheduling – hydro electric plant models – scheduling problems – short term hydrothermal scheduling problem – solution using lamda iteration method – dynamic programming, pumped storage schemes

OPTIMAL POWER FLOW

Solution of optimal power flow (OPF) – Gradient method, Newton’s method, linear sensitivity analysis – LP methods with real power

variables only – LP method with AC power flow variables and detailed cost functions – security constrained optimal power flow – interior point algorithm – bus incremental costs

MAINTENANCE SCHEDULING

Factors considered in maintenance scheduling – generator units, turbines, boilers– maintenance scheduling using mathematical programming

TEXT BOOK

1. Dhillon.J., Kothari.D.P., Power System Optimization, Prentice Hall India,2004

REFERENCES

1. Allen J.Wood., Bruce F Wollenberg, Power Generation, Operation and Control,John Wiley and sons, Newyork, 2004.
2. Mahalanabis.A.K., et.al., Computer Aided Power System Analysis and Control, Tata McGraw Hill Publishing Co. Ltd., NewDelhi 1988

EEE407	ELECTRIC ENERGY GENERATION, UTILISATION AND CONSERVATION	L	T	P	C
		3	0	0	3

GENERATION

Generation of electrical power by conventional methods – brief review – generation from tidal, wind, MHD, geothermal and solar sources – concept of distributed generation – effect on system operation

CONSERVATION

Economics of generation – definitions – load curves – number and size of units – cost of electrical energy – tariff – need for electrical energy conservation – methods – energy efficient equipment –

energy management – energy auditing – economics of power factor improvement – design for improvement of power factor using power capacitors – power quality – effect on conservation

ILLUMINATION, HEATING AND WELDING

Nature of radiation – definition – laws of photometry – lighting calculations – design of illumination systems – residential, industrial, commercial, health care, sports and administrative complexes, street lighting – types of lamps – energy efficient lamps – methods of heating, requirement of heating material – design of heating element – furnaces – welding generator – welding transformer and its characteristics

ELECTRIC TRACTION

Requirements of an ideal traction system – supply systems – mechanics of train movement – traction motors and control – multiple units – braking – current collection systems – recent trends in electric traction

DRIVES AND THEIR INDUSTRIAL APPLICATIONS

Motor selection and related factors – loads – types – characteristics – steady state and transient characteristics – load equalization – industrial applications – modern methods of speed control of industrial drives

TEXT BOOKS

1. Openshaw Taylor, E., Utilization of Electrical Energy, Orient Longman (P) Ltd, 2003.
2. Wadhwa, C.L., Generation, Utilisation and Distribution, New age International, 2003.

REFERENCES

1. Partab, H., Art and Science of Utilisation of Electrical Energy, Dhanpat Rai and Co, New Delhi, 2004.

2. Gupta, B.R., Generation of Electrical Energy, Eurasia Publishing House (P) Ltd, New Delhi, 2003.
3. Gupta, J.B., Utilization of Electric Power and Electric Traction, S.K.Kataria and Sons, 2002.

EEE408	MODERN CONTROL THEORY	L	T	P	C
		3	1	0	4

STATE VARIABLE ANALYSIS

State variable systems – description – state equations for dynamic systems – state estimation in the presence of noise – solution of state equations – linear time varying – time in varying – linear discrete time systems – controllability and observability

STATE SPACE DESIGN

Design methods – state feedbacks – output feedback – pole placement techniques –full order and reduced order – observers – dead beat control – MIMO system

PHASE PLANE AND DESCRIBING FUNCTION ANALYSIS

Common types of non-linear phenomena – linearization – singular points – phase- plane method – construction of phase trajectories – describing functions – derivation

STABILITY

Stability of linear time invariant system – stability of non-linear systems by describing function method – Liapunov’s method of stability studies – Popov’s criterion

ADVANCE TOPICS IN CONTROL SYSTEM

Optimal control, adaptive control, robust control and intelligent control methods – model predictive control

TEXT BOOKS

1. Stanley M.Shiners., Modern Control System theory and Design, John Wiley and Sons, Singapore, 1992.
2. Ogata, K., Modern Control Engineering, Prentice Hall of India, New Delhi,1982.

REFERENCES

1. Gopal., Control Systems, Wiley Eastern, reprint, 1995.

EEE409	INDUSTRIAL AUTOMATION	L	T	P	C
		3	0	0	3

INTRODUCTION

Definition of Supervisory Control And Data Acquisition (SCADA) – applicable processes – elements of SCADA systems – SCADA Architecture – operation and control using SCADA – development from telemetry – dependence on communications and computers

COMPONENTS OF AUTOMATED SYSTEMS

Sensors, transducers and actuators – forgotten cost – special considerations – standardization and maintenance – remote terminal unit – communication interface – protocol detailed – discrete control – analog control – pulse control , serial control – monitor discrete and analog signals – monitor pulse count and serial signals – master terminal unit – communication interface – configuring a picture of the process – data storage – applications

COMMUNICATIONS

Analog to digital conversion – communication models and types – communication standards – communications system components – protocol – modems – field buses – synchronous or asynchronous – telephone cable or radio

PROGRAMMABLE LOGIC CONTROLLERS

Structure of PLC – control program – programming – simple relay layouts and schematics – PLC connections – ladder logic inputs – ladder logic outputs – tutorial problems – case studies

SUBSTATIONS AND DISTRIBUTION AUTOMATION

Substation automation – structure of subsystem automation – substation communications – substation functions through SCADA – distribution automation– functions of distribution automation – distribution automation for improved energy management – relative rating of communication media for DA – automation in process industries – SCADA systems in industries – requirements of industrial automation system – SCADA system in sugar industries– purification systems – evaporation – crystallization – centrifugation and sugar handling

TEXT BOOK

1. Stuart A. Boyer., SCADA: Supervisory Control and Data Acquisition, 3rd Edition, ISA–The instrumentation systems and Automation Society

REFERENCES

1. ISA’s Practical Guide Series, Analytical Instrumentation (1996), Maintenance of Instrumentation and systems – 2nd Edition (2005), Fundamentals of Industrial Control – 2nd Edition (2006).

EEE410	NEURAL NETWORK AND FUZZY LOGIC	L	T	P	C
		3	0	0	3

NEURAL NETWORKS

Overview of biological neuro-system – mathematical models of neurons – learning rules – learning paradigms – supervised – unsupervised and reinforcement learning

FEEDFORWARD AND FEEDBACK NETWORKS

Perceptron networks – training rules – multilayer perceptron – back propagation algorithm – associative memories – Hopfield networks – Boltzman machine – self organizing map

FUZZY LOGIC

Overview of classical sets – introduction to fuzzy logic – membership function – fuzzy rule generation – operations on fuzzy sets – compliment – intersections – unions – combinations of operations – fuzzy if-then rule – fuzzy inferencing –Mamdani, TSK – defuzzification

NEURO FUZZY SYSTEM

Adaptive neuro fuzzy inference systems (ANFIS) – architecture – hybrid learning algorithm – parameter identification – rule base structure identification – input selection – input space partitioning – neuro-fuzzy control

APPLICATIONS OF NEURAL NETWORK AND FUZZY LOGIC

Applications of neural network – pattern recognition – fuzzy logic control – inverted pendulum – image processing – home heating system – biomedical applications – applications of neuro fuzzy system – character recognition – channel equalization – noise cancellation

TEXT BOOKS

1. Jang,J.S.R., Sun.C.T., E.Mizutani., Neuro-Fuzzy and Soft Computing , Prentice Hall of India (P) Ltd,New Delhi,2005
2. Timothy J. Ross., Fuzzy Logic with Engineering Applications, Tata McGraw Hill, 1997.

REFERENCES

1. Laurance Fausett, Englewood cliffs, N.J., Fundamentals of NeuralNetworks, Pearson Education, 1992.

2. Zimmermann, H.J., Fuzzy Set Theory & its Applications, Allied Publication Ltd., 1996.
3. John Yen & Reza Langari., Fuzzy Logic – Intelligence Control & Information, Pearson Education, New Delhi, 2003.

MINOR ELECTIVES

ECE301	DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	1	0	4

INTRODUCTION

Basic elements of a digital signal processing system – advantages of digital over analog signal processing, applications of DSP, FFT algorithms – radix-2 FFT algorithms – decimation in time – decimation in frequency algorithms – applications of FFT algorithms

IIR FILTERS

Design of Butterworth filters, Chebyshev Type I and Type II filters, IIR filter design using bilinear transformation, impulse invariant transformation – frequency transformation in analog and digital domain

FIR FILTERS

Design of linear phase FIR filters using rectangular, hamming, Kaiser Windows – design of linear phase FIR filters using frequency sampling techniques

FINITE WORD LENGTH EFFECTS

Number representations – fixed point and floating point numbers, quantization of fixed and floating point numbers, coefficient quantization, over flow error – truncation error – co-efficient quantization error, limit cycle oscillation – signal scaling

MULTIRATE DSP

Decimation by a factor D, interpolation by a factor I, filter design and implementation for sampling rate conversion, multistage implementation of sampling rate conversion – sampling rate conversion by an arbitrary factor – applications of multirate signal processing

TEXT BOOK

1. John G Proakis., Dimtris Manolakis, G., Digital Signal Processing Principles, Algorithms and Application, Prentice Hall of India, 3rd Edition, 2000.

REFERENCES

1. Oppenheim, Schafer., Discrete Time Signal Processing, Prentice Hall of India, 1992.
2. S.K.Mitra., Digital Signal Processing - A Computer based approach, Tata McGraw Hill, 1998.

CSE301	COMPUTER ARCHITECTURE AND ORGANISATION	L	T	P	C
		3	0	0	4

BASIC STRUCTURE OF COMPUTERS

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

ARITHMETIC UNIT

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

BASIC PROCESSING UNIT

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

MEMORY SYSTEM

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory - Memory Management requirements – Secondary storage.

I/O ORGANIZATION

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw-Hill, 2002, 5th Edition.

REFERENCES

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, 6th Edition, 2003.
2. David A.Patterson and John L.Hennessy, Computer Organization and Design: The hardware software interface, Morgan Kaufmann, 2nd Edition, , 2002.
3. John P.Hayes, Computer Architecture and Organization, McGraw Hill, 3rd Edition, 1998.

ECE356	COMMUNICATION ENGINEERING	L	T	P	C
		3	1	0	4

AMPLITUDE MODULATIONS

Generation and demodulation of AM, DSB–SC, SSB–SC, VSB signals, filtering of sidebands, comparison of amplitude modulation systems, frequency translation, frequency division multiplexing, AM transmitters –superhetrodyne receiver, AM receiver

ANGLE MODULATION

Angle modulation, frequency modulation, narrowband and wideband FM, transmission bandwidth of FM signals, generation of FM signal – direct FM – indirect FM, demodulation of FM signals, FM stereo multiplexing, PLL – non-linear model and linear model of PLL, non-linear effects in FM systems, FM broadcast receivers, FM stereo receives

NOISE PERFORMANCE OF DSB, SSB RECEIVERS

Noise – shot noise, thermal noise, white noise, noise equivalent bandwidth, narrowband noise, representation of narrowband noise in terms of envelope and phase components, sinewave plus narrowband noise, receiver model, noise in DSB-SC receiver, noise in SSB receiver

NOISE PERFORMANCE OF AM AND FM RECEIVERS

Noise in AM receivers threshold effect, noise in FM receivers capture effect, FM threshold effect, FM threshold reduction, pre-emphasis and de-emphasis in FM, comparison of performance of AM and FM systems

INFORMATION THEORY

Uncertainty, information and entropy, source coding theorem, data compaction, discrete memory less channels, mutual information, channel capacity, channel coding theorem, differential entropy, and mutual information for continuous ensembles, information capacity theorem, implication of the information capacity theorem, rate distortion theory, dompression of information

TEXT BOOK

1. Simon Haykin., Communication Systems, John wiley & sons, New York, 4th Edition, 2001.

REFERENCES

1. Roddy., Coolen., Electronic communication, Prentice Hall of India, New Delhi, 4th edition, 2003.
2. Taub, Schilling, Principles of communication systems, Tata McGraw Hill Publishing company, New Delhi, 1995.
3. Bruce Carlson et al, Communication systems, Tata McGraw Hill International, 4th edition, 2002.

CSE356	VISUAL LANGUAGES AND APPLICATIONS	L	T	P	C
		3	1	0	4

FUNDAMENTALS OF WINDOWS AND MFC

Messages – windows programming – SDK style – Hungarian notation and windows data types – SDK programming in perspective – benefits of C++ and MFC – MFC design philosophy – document/view architecture – MFC class hierarchy – AFX functions – application object – frame window object – message map
 Drawing the lines – curves – ellipse – polygons and other shapes - GDI pens – brushes – GDI fonts – deleting GDI objects and deselecting GDI objects–getting input from the mouse-client and non-client – area mouse messages – mouse wheel – cursor– getting input from the keyboard – input focus – keystroke messages – virtual key codes – character and dead key messages

RESOURCES AND CONTROLS

Creating a menu – loading and displaying a menu – responding to menu commands – command ranges – updating the items in menu, update ranges –keyboard accelerators – creating menus programmatically – modifying menus programmatically – The system menu – owner draw menus – cascading menus – context menus.

The C button class – C list box class – C static class – The font view application – C edit class – C combo box class – C scrollbar class– model dialog boxes – modeless dialog boxes

DOCUMENT / VIEW ARCHITECTURE

The inexistence function revisited – document object – view object – frame window object – dynamic object creation – SDI document template – command routing. synchronizing multiple views of a document – mid squares application – supporting multiple document types – alternatives to MDI – splitter windows – dynamic splitter window – static splitter windows

Creating and initializing a toolbar – controlling the toolbar's visibility – creating and initializing a status bar – creating custom status bar panes – status bar support in appwizard – opening, closing and creating the files – reading & writing – C file derivatives – serialization basics – writing serializable classes

FUNDAMENTALS OF VISUAL BASIC

Menu bar – tool bar – project explorer – toolbox – properties window – form designer – form layout – intermediate window – designing the user interface – aligning the controls – running the application – visual development and event driven programming

Variables – declaration – types – converting variable types – user defined data types – lifetime of a variable. constants – arrays – types of arrays – procedures – subroutines – functions – calling procedures – text box controls – list box and combo box controls – scroll bar and slider controls – file controls

DATABASE PROGRAMMING WITH VB

Record sets – data control – data control properties, methods – visual data manager: specifying indices with the visual data manager – entering data with the visual data manager – data bound list control – data bound combo box – data bound grid control. mapping databases: database object – table def object, query def object. Programming the active database objects – ADO object model – establishing a connection – executing SQL statements – cursor types and locking mechanism – manipulating the record set object – simple record editing and updating

TEXT BOOKS

1. Jeff Prosise., Programming Windows With MFC, Second Edition, WP Publishers & Distributors [P] Ltd, Reprinted 2002.
2. Evangelos Petroustos, Mastering Visual Basic 6.0, BPB Publications, 2002.

REFENENCES

1. Herbert Schildt, MFC Programming From the Ground Up, Second Edition, Tata McGraw Hill, reprinted 2002.
2. John Paul Muller, Visual C++ 6 From the Ground Up Second Edition, Tata McGraw Hill, Reprinted 2002.
3. Curtis Smith and Micheal Amundsen, Teach Yourself Database Programming with Visual Basic 6 in 21 days, Techmedia Publications, 1999.

CSE306	DATA COMMUNICATION AND NETWORKS	L	T	P	C
		3	1	0	4

DATA COMMUNICATION OVERVIEW

Data Communications, - Data Networking - the Internet - Protocol Architecture - TCP/IP - Internet based Application

DATA COMMUNICATION

Data Transmission - Guided and Wireless Transmission - Digital Data Communication Techniques - Data Link Control - Multiplexing

WIDE AREA NETWORKS

Circuit Switching - Packet Switching - Routing in Switched Networks - Congestion Control in Switched Data Networks - Cellular Wireless Networks

LOCAL AREA NETWORKS AND TRANSPORT PROTOCOLS

Local Area Network Overview - High-Speed LANs - Wireless LANs - Internetwork Protocols - Internetwork Operation - Transport Protocols

INTERNETWORK APPLICATIONS

Internet Applications - Electronic Mail and Network Management - Internet Applications - Internet Directory Service and World Wide Web - Voice over IP - Session Initiation Protocol - Real Time Transport Protocol.

TEXT BOOK

1. William Stallings, Data And Computer Communication, 8th Edition, 2005

REFERENCES

1. Tanenbaum A. S., Computer Networks, Prentice Hall, 4th Edition, 2003.
2. Leon-Garcia A., and Widjaja I., Communication Networks: Fundamental Concepts and Key Architectures, McGraw-Hill, 2nd Edition, 2004.

CSE207	OPERATING SYSTEMS	L	T	P	C
		3	1	0	4

INTRODUCTION

Computer – system organization – computer–system architecture – operating-system structure – user operating–system interface – system calls – types of system calls – system programs – operating-system design and implementation – operating-system structure – operating-system generation

PROCESS MANAGEMENT

Process concept – process scheduling – operations on processes – interprocess communication – examples of IPC – communication in client-server systems – threads – overview – multithreading – CPU scheduling – concepts – scheduling criteria – scheduling algorithms – multiple-processor scheduling – process synchronization – the critical-section problem – synchronization hardware – semaphores – classic problems of synchronization – critical regions – monitors

DEADLOCKS

System model – deadlock characterization – methods for handling deadlocks – deadlock prevention – deadlock avoidance – deadlock detection – recovery from deadlocks – memory management – main memory – swapping – contiguous memory allocation – paging – segmentation – segmentation with paging

STORAGE MANAGEMENT

Virtual memory – demand paging – copy-on-write – page replacement – allocation of frames – thrashing – memory mapped files – allocating kernel memory – file concept – access methods – directory structure – file system mounting – file sharing – protection – file system structure – file system implementation – directory implementation – allocation methods – free-space management

DISK MANAGEMENT

Mass storage structure – disk structure – disk scheduling – disk management – swap-space management – raid structure – stable-storage implementation – tertiary-storage structure – i / o hardware – kernel i/o subsystem – protection and security – case study: the linux system, windows xp – introduction real time and multimedia systems

TEXT BOOK

1. Abraham Silberschatz , Peter Galvin, Greg Gagne, Operating System Concepts, John Wiley & Sons , 7th Edition ,2004

REFERENCES

1. William Stallings, Operating Systems, Prentice Hall, 5th Edition 2004.
2. Andrew S. Tanenbaum, Albert S Woodhull, Operating Systems Design and Implementation, Prentice Hall, 3rd Edition 2006.
3. Gary Nutt, Operating Systems: A Modern Perspective, Addison-Wesley, 3rd Edition 2004.

EIE314	VLSI DESIGN	L	T	P	C
		3	0	0	3

BASIC DEVICE CHARACTERISTICS

NMOS - PMOS - CMOS devices characteristics - linear, saturation modes - bulk effect capacitance - device models for simulation - CMOS device fabrication principles

BASIC CIRCUITS DIGITAL SYSTEMS

CMOS inverter - design principles – design layout rules - construction of multiplexers - transmission gates – latches - flip flops - timing - fan-out considerations

BUILDING BLOCKS OF DIGITAL SYSTEMS

Combinational logic - sequential logic circuits - data path circuits - adder multiplier architecture - accumulators

PROGRAMMABLE LOGIC DEVICES AND FPGAs

Programmable logic interconnect principles – types - programmable logic elements - AND-OR arrays - routing procedures in FPGAs and CPLD - programming methods for FPGAs and CPLDs - Comparison of ACTEL, Altera AND Xilinx FPGAs

PRINCIPLES OF HDL

Introduction to VHDL – sequential - concurrent descriptions - signal, port and variable statements - wait, case - other sequential statements

- block, process component and generate descriptions - test branch creation - principles of operation of VHDL simulator – verilog - brief comparison with VHDL

TEXT BOOKS

1. Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic with VHDL Design, Tata McGraw-Hill, New Delhi, 2005

REFERENCES

1. Smith, M.J., Application Specific Integrated Circuits Addison Wesley Press, 1999
2. Weste, N.H.E. and Ershingian, K., Principles of CMOS VLSI Design: A Design Perspective, Addison Wesley, 1996
3. Chales H. Roth Jr., Digital System Design using VHDL, Thomson Asia Pte. Bhasker, J., VHDL Primer, Prentice Hall 1995

MEC308	MECHATRONICS	L	T	P	C
		3	0	0	3

INTRODUCTION TO MECHATRONICS

Introduction to mechatronics systems - measurement systems-control systems

SENSORS AND TRANSDUCERS

Introduction-performance terminology-displacement, position and proximity-velocity and motion-fluid pressure-temperature sensors-light sensors-selection of sensors-signal processing

8085 MICROPROCESSOR

Introduction – architecture - pin configuration - instruction set - programming of microprocessors using 8085instructions-interfacing input and output devices-interfacing D/A converters and A/D converters-applications-temperature control-stepper motor control-traffic light controller

PROGRAMMING LOGIC CONTROLLERS

Introduction-basic structure-input / output processing-programming - mnemonics-timers, internal relays and counters-data handling-analog input/output-selection of a PLC

DESIGN OF MECHATRONIC SYSTEMS

Stages in designing mechatronic systems - traditional and mechatronic design -possible design solutions-case studies of mechatronic systems - pick and place robot - automatic car park system -engine management system

LAB PRACTISE

1. Addition of Two 8-bit numbers, Sum of 8-bits and 16bits.
2. Decimal addition of two 8-bit numbers Sum: 16 bits
3. Multi-byte Subtraction.
4. Analog to Digital Conversion.
5. Digital to Analog Conversion.
6. Stepper Motor Controller.

TEXT BOOK

1. Bolton, W., Mechatronics, Longman, Second Edition, 1999.

REFERENCES

1. Michael, B.H., and David, G.A., Introduction to Mechatronics and measurement systems, McGraw Hill International Editions, 1999.
2. Bradley, D.A., Dawson, D., Buru, N.C., and Loader, A.J., Mechatronics, Chapman and Hall, 1993.
3. Ram, K., Fundamentals of Microprocessors and Microcomputers, Dhanpat Rai Publications, Fourth Revised Edition, 1999.

EIE409	BIO-MEDICAL INSTRUMENTATION	L	T	P	C
		3	0	0	3

ANATOMY, PHYSIOLOGY AND TRANSDUCERS

Brief review of human physiology - anatomy – cell structures – electrical activities - mechanical activities - chemical activities – action potential - resting potential – different types of electrodes – sensors used in biomedicine – selection criteria for transducers - electrodes – necessity for low noise pre-amplifiers – difference amplifiers – difference amplifiers – chopper amplifiers – electrical safety – grounding - isolation

MEASUREMENT OF BIOPOTENTIAL AND PHYSIOLOGICAL PARAMETERS

ECG – Phonocardiography – Neurophysiology – Central nervous system – EEG – Respiratory system – Muscular system - EMG, - Eye – ERG, Physiological Transducers - Measurement of Blood pressure – Blood flow - Cardiac output measurement – heart rate – respiration rate – measurement of lung volume – Oximeters – Audiometer

THERAPEUTIC AND SURGICAL EQUIPMENTS

Electro Surgical unit – short wave - microwave diathermy – Laser surgical unit – Anesthesia machine – Pacemakers – Total artificial heart (TAH) – Dialyser – Heart lung machine – Defibrillators – Ventilators – Nerve stimulators – centralized and Bedside patient monitoring system – Nerve stimulators

BIOMEDICAL EQUIPMENTS AND ELECTRICAL SAFETY

-Flame photometer – spectrophotometer – chromatography – pH, pCO₂, analysis – sterilizers – Electrical safety hazards in hospitals

IMAGING SYSTEMS AND TELEMETRY

Computerized Tomography (CT) – MRI instrumentation – Ultrasound scanner – X-ray machine – Fluoroscopic techniques –

angiography – Cardiac catheterisation lab – Echo cardiograph – vector cardiograph – Biotelemetry

TEXT BOOKS

1. Kandpur, R.S., Handbook of Biomedical Instrumentation, TMH, 2003
2. Richard Aston, Principles of Biomedical Instrumentation and Measurement, Merrill publishing company, 1990

REFERENCES

1. Arumugam, M., Biomedical Instrumentation, Anuradha Agencies, Publishers, Kumbakonam, 1992
2. Geddes, L.A. and Baker, L.E.,:Principles of Applied Biomedical Instrumentation, John wiley and Sons, 1989

ECE431	WIRELESS COMMUNICATION	L	T	P	C
		3	0	0	3

CELLULAR CONCEPT

Frequency reuse – channel assignment strategies – hand off strategies – interference and system capacity – Trunking and grade of Service – improving coverage and capacity in cellular systems.

RADIO PROPAGATION

Free Space Propagation Model – propagation Mechanisms – reflection, diffraction and scattering – models for path loss – small scale, multipath propagation - parameters of mobile multipath channels – small scale fading types.

MULTIPLE ACCESS TECHNIQUES

FDMA – TDMA – CDMA – spread spectrum multiple access – multiplexing and OFDM – Packet Radio protocols – capture effect – capacity of cellular systems.

EQUALIZATION, DIVERSITY AND CODING

Linear and nonlinear equalization – adaptive equalization – diversity techniques – RAKE Receiver – fundamentals of channel coding – Block codes and finite fields – convolutional codes – coding gain – Trellis coded Modulation – Turbo Codes.

WIRELESS STANDARDS

GSM – IS-95 –UMTS – IMT-2000 – signaling – call control – mobility management and location tracing.

TEXT BOOK

1. T.S.Rappaport, Wireless Communications: Principles and Practice, 2nd Edition, Pearson Education, 2003.

REFERENCES

1. W.C.Y.Lee, Mobile Communications Engineering: Theory and applications, 2nd Edition, McGraw-Hill International, 1998.
2. R. Blake, Wireless Communication Technology, Thomson Delmar, 2003.

EIE412	OPTIMAL AND ADAPTIVE CONTROL	L	T	P	C
		3	0	0	3

PROBLEM FORMULATION

Mathematical model – physical constraints- performance measure - optimal control problem - performance measures for optimal control problem - selection a performance measure

DYNAMIC PROGRAMMING

Optimal control law – principle of optimality-an optimal control system - a recurrence relation of dynamic programming – computational procedure characteristics of dynamic programming solution hamilton – jacobi – bellman equation continuous linear regulator problems

CALCULUS OF VARIATIONS

Fundamental concepts – functionals - piecewise – smooth externals
constrained extrema

VARIATIONAL APPROACH TO OPTIMAL CONTROL PROBLEMS

Necessary conditions for optimal control – linear regulator problems-
linear tracking problems - pontryagin's minimum principle and state
inequality constraints

ADAPTIVE CONTROL

Classification – MRAC systems – different configuration,
classification, mathematical description – direct and indirect MRAC
– self tuning regulator – different approach to self tuning, recursive
parameter estimation, implicit and explicit STR

TEXT BOOKS

1. Donald E. Kirk, Optimal Control Theory: An Introduction, Prentice-Hall networks series, 1970
2. Chalam, V.V., Adaptive control systems Marcel Dekker, INC New York and Bassel, 1987
3. Anderson B.D.O., and Moore, J. B., Optimal control Linear Quadratic methods, Prentice Hall of India, New Delhi, 1991

REFERENCES

1. Sage, A.P, and White.C. C, Optimum Systems Control, Second Edition, Prentice Hall, 1977
2. Astrom, K.J. and Wittenamrk, B., Adaptive control, Addison Wesley Publishing Co. USA, 1989
3. Sastry S. and Bodson M. Adaptive control Stability, Convergence and Robustness, Prentice Hall, New Jersey, 1989

ECE366	EMBEDDED SYSTEMS	L	T	P	C
		3	0	0	3

EMBEDDED ARCHITECTURE

Embedded computers, characteristics of embedded computing applications, challenges in embedded computing system design, embedded system design process – requirements, specification, architectural design, designing hardware and software components, system integration, formalism for system design – structural description, behavioral description, design example: model train controller

EMBEDDED PROCESSOR AND COMPUTING PLATFORM

ARM processor – processor and memory organization, data operations, flow of control, SHARC processor – memory organization, data operations, flow of control, parallelism with instructions, CPU bus configuration, ARM bus, SHARC bus, memory devices, input/output devices, component interfacing, designing with microprocessor development and debugging, design example : alarm clock

NETWORKS

Distributed embedded architecture – hardware and software architectures, networks for embedded systems – I2C, CAN Bus, SHARC link p ports, ethernet, myrinet, internet, network – based design – communication analysis, system performance analysis, hardware platform design, allocation and scheduling, design example: elevator Controller

REAL-TIME CHARACTERISTICS

Clock driven approach, weighted round robin approach, priority driven approach, dynamic versus static systems, effective release times and deadlines, optimality of the earliest deadline first (EDF) algorithm, challenges in validating timing constraints in priority driven systems, off-line versus on-line scheduling

SYSTEM DESIGN TECHNIQUES

Design methodologies, requirement analysis, specification, system analysis and architecture design, quality assurance, design example: telephone pbx – system architecture, ink jet printer – hardware design and software design, personal digital assistants, set-top boxes

TEXT BOOKS

1. Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design, Morgan Kaufman Publishers, 2001.
2. Jane.W.S. Liu Real-Time systems, Pearson Education Asia, 2000

REFERENCES

1. C. M. Krishna and K. G. Shin , Real-Time Systems, ,McGraw-Hill, 1997
2. Frank Vahid and Tony Givargi, Embedded System Design: A Unified Hardware/Software Introduction, s, John Wiley & Sons, 2000.

EIE414	MICRO-CONTROLLER BASED SYSTEM DESIGN	L	T	P	C
		3	0	0	3

ROLE OF MICRO-CONTROLLERS

Types and selection – Application example

MICRO-CONTROLLER RESOURCES

Family members - bus width program - data memory parallel ports - D/A - A/D converters - reset circuitry - watchdog timers - power – down considerations

REAL-TIME CONTROL

Interrupt structures programmable timers - real-time clock – latency – interrupt - density - interval constraints

PROGRAMMING FRAMEWORK

CPU register – Structure - addressing modes - instruction sets - assembly languages - assemblers

SOFTWARE BUILDING BLOCKS

Queues, tables and strings - program organization - micro controller expansion methods - I/O hardware alternatives - development tools - motorola - Intel micro controller details

TEXT BOOKS

1. John B. Peatman, Design with Micro-controllers, McGraw Hill International Ltd., 1989
2. Michael Slater, Microprocessor based design: A Comprehensive Guide to Effective Hardware Design, Prentice Hall, 1989

REFERENCES

1. Yeralan, S. and Ahluwalia.A., Programming and Interfacing the 8051 Micro controller, Addison Wesley, 1995
2. Intel Manual on 16 bit – embedded controllers, 1991
3. Mathivanan. N., Microprocessors, PC hardware and interfacing, Prentice-Hall of India Private Ltd.,2003

HUMANTIES ELECTIVES

HSS001	TOTAL QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

INTRODUCTION TO QUALITY MANAGEMENT

Definitions – TOM framework, benefits, awareness and obstacles - Quality – vision, mission and policy statements - Customer Focus – customer perception of quality, Translating needs into requirements, customer retention. Dimensions of product and service quality. Cost of quality

PRINCIPLES AND PHILOSOPHIES OF QUALITY MANAGEMENT

Overview of the contributions of Deming, Juran Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Taguchi, Shingeo and Walter Shewhart - Concepts of Quality circle, Japanese 5S principles and 8D methodology

STATISTICAL PROCESS CONTROL AND PROCESS CAPABILITY

Meaning and significance of statistical process control (SPC) – construction of control charts for variables and attributed - Process capability – meaning, significance and measurement – Six sigma concepts of process capability - Reliability concepts – definitions, reliability in series and parallel, product life characteristics curve - Business process re-engineering (BPR) – principles, applications, reengineering process, benefits and limitations

TOOLS AND TECHNIQUES FOR QUALITY MANAGEMENT

Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements

of reliability, failure rate, FMEA stages, design, process and documentation

TAGUCHI TECHNIQUES

Taguchi techniques – introduction, loss function, parameter and tolerance design, signal to noise ratio - Seven old (statistical) tools - Seven new management tools - Bench marking and POKA YOKE

REFERENCES

1. Dale H.Besterfield et al, Total Quality Management, Perarson Education, Thrid edition, (First Indian Reprints 2004).
2. Shridhara Bhat K, Total Quality Management – Text and Cases, Himalaya Publishing House, First Edition, 2002.
3. William J.Kolarii, Creating quality, Mcgraw Hill, 1995
4. Poornima M.Charantimath., Total quality management, Pearson Education, First Indian Reprint, 2003.

HSS002	ENGINEERING MANAGEMENT	L	T	P	C
		3	0	0	3

INTRODUCTION

Demand and Revenue Analysis - Demand Forecasting - Production Analysis - Cost and Supply Analysis, Price and output Determination - Investment Analysis - Plant Location - Economic Optimization.

FORMS OF BUSINESS AND FUNCTIONS

Types of Business Organisation, Forms - Planning - Organizing - Designing effective organisations - Coordination

HUMAN RESOURCE DEVELOPMENT

Motivating individuals and workgroups - Leadership for Managerial Effectiveness - Team working and Creativity - Managerial Communication - Personal Management – Time Management - Stores Management - Career Planning.

FINANCIAL MANAGEMENT

Product development - Management techniques in product development - Nature of controlling - Operations Management - Just-in-Time.

GLOBAL ENVIRONMENT

Managing World Economic Change - The global environment - Multinational Strategies - Economic Cycles and Director Investment - Change and Organisation Development - Managerial Ethics and Social responsibilities.

REFERENCES

1. Harold Koontz& Heinz Wehrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.
2. Koontz, Wehrich& Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.
3. Tripathi, Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.
4. Hampton, Management, Tata McGraw Hill publishing company Ltd.
5. L.M.Prasad, Principles of Management.

HSS004	INDUSTRIAL PSYCHOLOGY	L	T	P	C
		3	0	0	3

INTRODUCTION

The role of the psychologist in industry, the field of occupational Psychology - Study of behaviour in work situation and applications of Psychological principles to problems of selection, Placement, Counseling and training

DESIGN OF WORK ENVIRONMENTS

Human engineering and physical environment techniques of job analysis, Social environment- Group dynamics in Industry Personal psychology - Selection, training, placement, promotion, counseling,

job motivations, job satisfaction .Special Study of problem of fatigue, boredom and accidents

UNDERSTANDING CONSUMER BEHAVIOUR

Consumer behavior, study of consumer preference, effects of advertising, Industrial morale - the nature and scope of engineering psychology, its application to industry

WORK METHODS

Efficiency at work, the concept of efficiency, the work curve, its characteristics - The work methods; hours of work, nature of work, fatigue and boredom, rest pauses. The personal factors; age abilities, interest, job satisfaction The working environment - noise, illumination, atmospheric conditions - Increasing efficiency at work; improving the work methods, Time and motion study, its contribution and failure resistance to time and motion studies, need for allowances in time and motion study.

WORK AND EQUIPMENT DESIGN

Criteria in evaluation of job-related factor, job design, human factors, Engineering information, input processes, mediation processes, action processes, methods design, work space and its arrangement, human factors in job design. Accident and Safety - The human and economic costs of accidents, accident record and statistics, the causes of accidents situational and individual factors related to accident reduction

REFERENCES

1. Tiffin, J and McCormic E.J., Industrial Psychology, Prentice Hall, 6th Edn., 1975.
2. McCormic E.J., Human Factors engineering and design, McGraw Hill, 4th Edn., 1976.
3. Mair, N.R.F., Principles of Human relations
4. Gilmer, Industrial Psychology
5. Ghiselli & Brown, Personnel and Industrial Psychology.

6. Myer, Industrial Psychology.
7. Dunnette, M.D., Handbook of Industrial and Organizational Psychology.
8. Blum & Taylor, Industrial Psychology.

HSS006	PROFESSIONAL ETHICS	L	T	P	C
		3	0	0	3

ENGINEERING ETHICS

Functions of Being a Manager – Stock holder and stakeholder management - Ethical treatment of employees - ethical treatment of customers- supply chain management and other issues.

ENGINEERING AS SOCIAL EXPERIMENTATION

Senses of Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas - Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues – Theories about right action – Self-interest – Customs and religion – Use of Ethical Theories.

ENGINEER RESPONSIBILITY FOR SAFETY

Corporate social responsibility - Collegiality and loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Discrimination.

RESPONSIBILITY AND RIGHTS

Moral imagination, stake holder theory and systems thinking - One approach to management Decision – making Leadership.

GLOBAL ISSUES

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers –

Consulting Engineers – Engineers as Expert Witnesses and Advisors
 – Moral Leadership – Sample code of conduct.

REFERENCES

1. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York, 1996.
2. Charles D Fledderman, Engineering Ethics, Prentice Hall, New Mexico, 1999.
3. Laura Schlesinger, How Could You Do That: The Abdication of Character, Courage, and Conscience, Harper Collins, New York, 1996.
4. Stephen Carter, Integrity, Basic Books, New York, 1996.
5. Tom Rusk, The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life, Viking, New York, 1993.

HSS014	MARKETING MANAGEMENT	L	T	P	C
		3	0	0	3

MARKETING

Meaning - concept - functions - marketing Planning & implementation marketing Programmes - Marketing environment – Market Segmentation and consumer behaviour – Influencing factors, Decision process – Marketing mix – Marketing department.

PRODUCT

Meaning - Product planning - policies - positioning - New product development Product life cycle – BCG Matrix-branding. Packing, labeling.

PRICING

Pricing objectives – Setting and modifying the price – Different pricing method Product line pricing and new product pricing

DISTRIBUTION

Nature of Marketing channels - Types of Channel flows - Channel functions - Channel co-operation, conflict and competition - Direct Marketing Telemarketing, Internet shopping.

PROMOTION

Promotion Mix - Advertisement - Message - copy writing - Advertisement budgeting - Measuring advertisement effectiveness - Media strategy - sales promotion -Personal selling, publicity and direct marketing

REFERENCES

1. Philip Kotler, Marketing Management- Analysis Planning and Control, Prentice Hall of India, New Delhi.
2. Cundiff, Still & Govoni, Fundamentals of Modern Marketing, Prentice Hall of India, New Delhi.
3. Ramaswamy. V S & Namakumari. S, Marketing Management- Planning Implementation and Control, Macmillan Business Books, 2002.
4. Jobber, Principles and Practice of Marketing, McGraw-Hill.

HSS015	MANAGEMENT CONCEPTS AND TECHNIQUES	L	T	P	C
		3	0	0	3

DEVELOPMENT OF MANAGEMENT THOUGHT

Scientific Management Movement, Administrative Movement, Human-Relations Movement, Decision-Science Movement, Behavioral Movement, Systems Movement, Contingency Movement

ESSENTIALS OF PLANNING

Objectives, goals, Programmed Decisions and Un programmed Decisions; Decision-Making, Creativity in Decision-Making, Forecasting and Strategy to Formulation.

EFFECTIVE ORGANIZING

Span of Control, Departmentation, Authority; Responsibility, Bureaucracy and Adhocracy; Group Dynamics

REALITIES OF ORGANIZATIONAL LIFE

Organizational Politics, Organizational Power, Organizational Conflict

COMMUNICATION & CONTROL

Communication Process Evaluation, Control Process, Qualities of a Good Control System, Management Audit, Human – Offset Accounting, Cost Benefit Analysis.

REFERENCES

1. Harold Koontz & Heinz Weihrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.
2. Koontz, Weihrich & Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.
3. Tripathi & Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.
4. Hampton, Management, Tata McGraw Hill publishing company Ltd.
5. L.M.Prasad, Principles of Management.

HSS016	ORGANIZATIONAL PSYCHOLOGY	L	T	P	C
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FOCUS AND PURPOSE

Definition, need and importance of organizational Behaviour – nature and scope – frame work.

INDIVIDUAL BEHAVIOUR

Personality – types – factors influencing personality – theories – learning – types of learners – learning theories – organizational Behaviour modification. Attitudes – characteristics – components –

formation – measurement. Perceptions – importance – factors influencing perception – interpersonal perception.

GROUP BEHAVIOUR

Organization structure – formation – groups in organizations – influence – group dynamics – emergence of informal leaders and working norms – group decision making techniques – interpersonal relations – communication – control.

POWER

Leadership styles – theories – leaders Vs managers – sources of power – power centers – power and politics.

DYNAMICS OF ORGANIZATIONAL BEHAVIOURS

Organizational climate – factors affecting organizational climate – importance. Job satisfaction – determinants – measurements – influence on behavior. Organizational change – importance – stability Vs change – proactive Vs reaction change – the change process – resistance to change – managing change. Organizational development – characteristics – objectives – team building. Organizational effectiveness – perspective – effectiveness Vs efficiency – approaches – the time dimension – achieving organizational effectiveness.

REFERENCES

1. Stephen P.Robins, Organisational Behavior, Prentice Hall of India, 9th edition, 2001.
2. Hellriegel, Slocum and Woodman, Organisational Behavior, South-Western, Thomson Learning, 9th edition, 2001.
3. Schermerhorn, hunt and Osborn, Organisational behavior, John Wiley, 7th edition, 2001.
4. Jit S.Chand, Organisational Behavior, Vikas publishing House Pvt. Ltd. 2nd edition, 2001.
5. Fred Luthans, Organisational Behavior, McGraw Hill Book Co., 1998.

6. New Strom & Davis, Organisational behaviour, McGraw Hill, 2001.
7. Jaffa Harris and Sandra Hartman, Organisational Behaviour, Jaico, 2002.

HSS017	INTERNATIONAL ECONOMICS	L	T	P	C
		3	0	0	3

INTRODUCTION

The Traditional Theory of International Trade, The Basic Trade Model, Heckscher-Ohlin-Samuelson Model, Effects of Tariffs & Quotas, Theory of Factor Movements - New Theories of International Trade and Industrial Policies.

EXCHANGE RATE & BALANCE OF PAYMENT

The Balance of Payments and National Accounts, Determinants of Exchange Rates The Exchange-Rate Regime Choice and a Common Currency Area, International Debt and Currency Crises.

INTERNATIONAL REGULATORY AUTHORITY

Political Economy of Trade Disputes, the FTA and the WTO - The role of the IMF and other International Financial Organizations. Reasons for Protection World Trade, International Movements of Capital - The Balance of Trade and Other Measures of International Transactions. Export and import policies.

INTERNATIONAL MACROECONOMICS

European Monetary Unification and the Euro - Preferential Trading Arrangements and the NAFTA International Policies for Economic Development, Trade Outsourcing and Off shoring

REFERENCES

1. N. Bhagwati, A. Panagariya and T. N. Srinivasan, Lectures on International Trade, MIT Press, 2nd edition, 1998.

2. M. Obstfeld and K. Rogoff, Foundation of International Macroeconomics, McGraw-Hill, 1996.
3. Romer, D., Advanced Macroeconomics, McGraw Hill, 1996.

HSS018	COMMUNICATION SKILLS	L	T	P	C
		3	0	0	3

COMMUNICATION IN BUSINESS

Systems approach, forms of business communication, management and communication, factors facilitating communication.

COMMUNICATION PROCESS

Interpersonal perception, selective attention, feedback, variables, listening barriers to listening, persuasion, attending and conducting interviews, participating in discussions, debates and conferences, presentation skills, paralinguistic features, oral fluency development.

BUSINESS CORRESPONDENCE

Business letter. Memos, minutes, agendas, enquiries, orders, sales letters, notice, tenders, letters of application, letter of complaints.

TECHNICAL REPORTS

Format, Choice of vocabulary, coherence and cohesion, paragraph writing, organization.

PROJECT REPORTS

Project proposal, project reports, and appraisal reports.

REFERENCES

1. Sharan J.Genrson and Steven M.Gerson, Technical Writing - Process and Product, Pearson Education, 2000.
2. Raymond V.Lesikar, John D. Pettit and Mary E.Flatley, Lesikass Basic Communication, Tata McGraw Will, 8th Edition, 1999.

3. Stevel. E. Pauley, Daniel G.Riordan, Technical Report Writing Today, AITBS Publishing & Distributors, India 5th edition, 2000.
4. Robert L.Shurter, Effective letters in business, Third Ed., 1983.
5. McGraith, Basic Managerial Skills for all Prentice Hall of India, 6th Edition, 2002.
6. Halliday, M.A.Ky R.Hasan, Cohesion in English, Longman, London, 1976.

HSS019	OPERATIONS RESEARCH	L	T	P	C
		3	1	0	4

INTRODUCTION TO OPERATIONAL RESEARCH

Mathematical modeling, formulations of real–world problems as linear programming or integer programming models – graphical solutions of some LP – models, replacement models, decision making

LINEAR PROGRAMMING

Simplex method, the simplex algorithm for solving linear programming problems – primal and dual simplex, corresponding dual problem to an LP – interpretation of the dual problem, relationship between the primal and dual problems – complementary slackness, lp limitations,sensitivity analysis, revised simplex

TRANSPORTATION AND NETWORK MODELS

Transportation models, the assignment and the transshipment models network models maximum flow, shortest route, spanning tree problems, PERT / CPM

DYNAMIC PROGRAMMING

Concepts, formulation, recursive approach, computation procedure

GAME THEORY

Simple game, mixed strategy games using graphical method , formulation of two-person zero-sum game, simple games, mixed strategy games using LP, reduction using dominated strategies, saddle point condition

WAITING LINE MODELS

Queuing models, queuing characteristics and terminology, poisson and non-poisson models

REFERENCES

1. Hamdy A. Taha , An introduction to Operations Research, TMH Publications
2. Don T.Phillips, A.Ravindran & James Solberg, Operations Research: Principles and practice, John Wiley & Sons, 1992.
3. Harvey M. Wagner ,An introduction to Operational Research
Frederick S.Hiller, Gerald J.Lieberman ,Introduction to Operations Research

HSS020	HUMAN RESOURCE MANAGEMENT	L	T	P	C
		3	0	0	3

INTRODUCTION

Functions of a human resources manager - recruitment and selection processes interview methods.

HR- EVALUATION AND DEVELOPMENT

Performance appraisal, Training and development, disciplinary procedures, collective bargaining and employee welfare.

TRENDS IN HRM

The recent methods and trends in HRM with a few case studies in the context of globalization.

STRATEGIC ROLE OF HUMAN RESOURCE MANAGEMENT

Job analysis Personnel planning and recruiting Employee testing and selection, interviewing candidates, Appraising performance.

CAREER AND COMPENSATION

Managing careers Compensation Benefits and services Labor relations and collective bargaining Employee safety and health

REFERENCES

1. Decenzo and Robbins, Human Resource Management, Wiley, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.
3. Eugene McKenna and Nic Beach, Human Resource Management, Pearson Education.
4. Dessler, Human Resource Management, Pearson Education Limited, 2002.
5. Mamoria C.B and Mamoria S., Personnel Management, Himalaya Publishing.
6. Wayne Cascio, Managing Human Resources, McGraw-Hill, 1998.
7. Ivancevich, Human Resource Management, McGraw-Hill, 2002.

HSS023	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
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ENTREPRENEURIAL COMPETENCE

Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneur – Personality Characteristics of Successful Entrepreneur – Knowledge and Skills Required for an Entrepreneur.

ENTREPRENEURIAL ENVIRONMENT

Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support

Organisational Services - Central and State Government Industrial Policies and Regulations - International Business.

BUSINESS PLAN PREPARATION

Sources of Product for Business – Pre-feasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

LAUNCHING OF SMALL BUSINESS

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching.

MANAGEMENT OF SMALL BUSINESS

Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units - Effective Management of small Business.

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