Inspiring Education for Aspiring Engineers

G. Pulla Reddy Engineering College

(Autonomous)

KURNOOL - 518 007.

Accredited by NBA of AICTE and NAAC of UGC

An ISO 9001 : 2008 Certified Institution

Affiliated to JNTUA, Anantapur.

Sponsored and Managed by Gunampalli Pulla Reddy Charities Trust

SCHEME - 2010

Scheme & Syllabus For II, III & IV Years of Four Year B.Tech. Degree Course

(With effect from the batch admitted in 2010 - 2011)

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2010 –11)

II B. Tech (EEE) – I Semester **Scheme: 2010**

S. No.	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examin Maximum Mar	
				L	D/T	P		End Exam	Internal Assessment
I	**Theory**								
1	Electrical Circuits –I	EC1	5	4	1	–	3	70	30
2	Engineering Mathematics–III	EM3	5	4	1	–	3	70	30
3	Electronic Devices & Circuits	EDC	4	4	0	–	3	70	30
4	Power Systems – I	PS1	5	4	1	–	3	70	30
5	Electrical Measurements	EM	4	3	1	–	3	70	30
6	Electrical Machines –I	EMC1	5	4	1	–	3	70	30
7	Soft Skills	SS	2	1	2	–	–	–	100
II	**Practical**								
8	Electrical Machines–I Lab	EMC1(P)	2	–	–	3	3	70	30
9	Electrical Measurements Lab	EM(P)	2	–	–	3	3	70	30
	Total		**34**	**24**	**7**	**6**		**560**	**340**

ELECTRIC CIRCUITS – I (EC1)
(For II B. Tech EEE - I Semester)

Scheme : 2010
Contact Periods : (4L +1T)/week
Credits : 5
Duration : 3hrs

Internal assessment : 30
End Exam Marks : 70
End Exam

Course Objectives:

- To review the basic electrical concepts of voltage, current and resistance.
- To review the components of a basic electrical circuit and make the students proficient in basic analysis, design and measurement of linear analogy electrical systems important across engineering disciplines.

Unit – I
Basic circuit concepts: Circuit elements, active, passive, unilateral, bilateral, lumped, distributed, linear, nonlinear, time variant & time invariant elements. Energy sources, source transformation, ohms law, Kirchhoff's laws
Unit – II
Analysis of R-L-C Circuits: Concept of power and energy of R,L & C elements, Maxwell's loop analysis and nodal analysis- matrix methods, response of RLC circuits for arbitrary excitations.
Unit – III
AC Fundamentals: Average value, R.M.S value, form factor and peak factor of AC and non AC quantities. Phasor representation of AC quantities
Unit – IV
Analysis of AC Concepts: Concept of impedance, impedance triangle, admittance, concept of complex power, real, reactive power and power factor.
Unit – V
Analysis of series, parallel and series-parallel circuits with suitable examples and phasor diagrams, star-delta transformation, representation of vectors in various forms & their applications.
Unit – VI
Coupled Circuits: Concept of self and mutual inductance, co-efficient of coupling, dot convention dot rule, conductively coupled and inductively coupled equivalent circuits with suitable problems.
Unit – VII
Network Theorems: Superposition Theorem, Reciprocity, Thevinin's, Norton's, Maximum power transfer, Millmans, Tellegens and Compensation theorems.
Unit – VIII
Resonance: Series & Parallel resonance, Resonant Frequency, Voltage Magnification, Q-Factor, Band-Width, Half-Power Frequencies, capacitive and inductive tuning & Maximum voltage drop across L and C

TEXT BOOKS:

1. *Joseph Edminister (1983) , "Electric Circuits", 2nd Edition, Schaum's Series , TMH*
2. *Ajith Chakravarthy (2006), "Circuit Theory", 5th Edition, Danpat Rai & Sons*
3. *R.P.Punagin , (1994) "Electrical Circuit Analysis", Interline Publishers, Bangalore.*
4. *Sivanaga Raju, G. Kishor and C. Srinivasa Rao (2010) , "Electrical Circuit Analysis", Cengage Learning*

REFERENCE BOOKS:

1. *Vanvalken Berg (2004) ,"Network Analysis" 3rd Edition, PHI*
2. *Sudhakar & Shyam Mohan (2007), "Circuits & Network", 5th Edition, TMH*
3. *Roy Choudary (2007), "Networks & Systems" , New Age .*
4. *R.L.Boylstad, (1994) "Introductory Circuit Analysis" , McMillan Publishers, 7th Edition.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students can analyze complex dc & ac linear circuits and can design simple linear electrical circuits.

ENGINEERING MATHEMATICS – III (EM 3)
(Common to II B. Tech I Semester EEE & ECE)

Scheme: 2010
Contact Periods: (4L+1T) / Week
Credits: 5

Internal Assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To make the students to understand Complex variables, complex series, conformal mapping and complex integration. Special functions.
- To make the students to understand interpolation, numerical differentiation and differential equations. Correlation coefficient, lines of regression.

Unit – I

Complex Variables: Analytic functions, Cauchy-Riemann equations, sufficient condition for analyticity, Harmonic function, Method to find the Conjugate function, Milne – Thomson method.

Unit – II

Complex Series and Conformal Mapping: Conformal Mapping (e^z , z^n, sinz, cosz), Bilinear transformation, Taylor's and Laurent's series.

Unit – III

Complex Integration: Cauchy's Integral theorem, Cauchy's integral formula, Residue, Residue theorem, Method of finding residues, evaluation of real integrals by contour integration, Integration round the unit circle and in the interval $(-\infty, \infty)$.

Unit – IV

Bessel Functions: Solution of Bessel's equation**,** Recurrence formula for Jn(x), Generating function, Jacobi series. Orthogonality of Bessel's function.

Unit – V

Legendre Functions: Solution of Legendre's equation, Rodriguez formula, Legendre polynomials, Generating function, and recurrence relation formula for Pn (x), Orthogonality of Legendre polynomials.

Unit – VI

Interpolation: Newton's forward and backward interpolation formulae. Gauss forward and backward interpolation formulae. Numerical Differentiation.

Unit – VII

Numerical Methods: Solution of first order Differential equations. Taylor's method, Picard's method, Euler's and modified Euler's methods. Runge-Kutta methods of second and forth order. Milne's Predictor-Corrector method.

Unit – VIII

Probability: Definitions, Baye's theorem, Random variables, discrete random variables, probability mass function, Discrete distribution function, Continuous random variables, probability density function, Mean and variance of a random variable.

TEXT BOOKS:

1. B.S. Grewal (2005), "Higher Engineering Mathematics", KhannaPublishers, New Delhi.
2. B.V. Ramana (2005), "Engineering Mathematics", TMH Publishers, New Delhi.

REFERENCE BOOKS:

1. S.C. Gupta and V.K.Kapoor (1984), "Elements of Mathematical Statistics", S.Chand Publishers, New Delhi.
2. Bali Iyengar (2004), "A Text Book of Engineering Mathematics", Laxmi Publications, New Delhi.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students able to understand and apply complex series and integration in engineering problems. Students able to understand Rodrigue's formula and apply to engineering problems.
- An ability to identify, formulate and solve engineering problems. Students able to understand numerical methods and apply to engineering problems.

ELECTRONIC DEVICES AND CIRCUITS (EDC)
(Common to II B. Tech I Semester EEE & ECE)

Scheme : 2010 | Internal Assessment : 30
Contact Periods : (4L) / Week | End Exam Marks : 70
Credits : 4 | End Exam Duration : 3 hrs

Course Objectives:

- To understand the basic physical structure, principle of operation, electrical characteristics and circuit models of the most important semiconductor devices and able to use this knowledge to design and analyze basic electronic application circuits with the help of diodes, BJT, FET etc.

Unit – I

Semiconductor Physics: Electrons and holes in intrinsic semiconductors, Extrinsic semiconductors, Donor and acceptor impurities, Charge densities in a semiconductor, Electrical properties of semiconductor materials, Hall effect, Fermi-level, Diffusion, Generation and recombination of charges, Continuity equation, Minority carrier injection, Potential variation within graded semiconductor, Contact potential difference.

Unit – II

Junction Diode: Theory of p-n junction, Forward and reverse biases, Current components in p-n diode, Diode current equation, Volt ampere characteristics, Temperature dependence, Diode resistance and capacitance, Breakdown mechanisms, Breakdown diode (Zener diode), Zener diode as voltage regulator.

Unit – III

Diode Applications: Rectifiers – half-wave and full-wave (Centre tapped and Bridge rectifiers), Ripple factor and voltage regulation, Inductive, Capacitive, LC and CLC filters, Concept of critical inductance and bleeder resistor.

Unit – IV

Bipolar junction Transistor (BJT): BJT fundamentals, Transistor current components, Transistor as an amplifier, Early effect, Transistor configurations (CB, CE & CC) and characteristics, Eber's moll model,. Introduction to small signal model, Graphical determination of h parameters.

Unit – V

Junction Field Effect Transistor (JFET): Principle of operation, Characteristics of JFET, FET small signal model, Graphical determination of g_m and r_d, FET as Voltage Variable Resistor (VVR), Advantages of FET over BJT.

Unit – VI

Transistor Biasing: Need for biasing, Operating point, DC and AC load lines, bias stabilization techniques: fixed bias, collector to base bias, self bias, Stabilization against variations in I_{co}, V_{BE} and β for the self bias circuit, bias compensation techniques, thermal runaway and thermal stability.

Unit – VII

FET Biasing and MOSFETS – Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias, Depletion and enhancement types of MOSFETs.

Unit – VIII

Special semiconductor devices: Principle of operation, Characteristics and applications of- Tunnel diode, Varactor diode, UJT, Photo Diode, Photo transistor, LCD, LED, DIAC and TRIAC.

TEXT BOOKS:

1. *J.Milliman, C.Halkias & Satyabrata Jit (2007), "Electronic Devices and Circuits", 2nd edition, TMH, New Delhi.*
2. *J. Milliman & C.Halkias, "Integrated electronics", TMH, New Delhi.*
3. *Robert Boylestad & Lowis Nashelsky (1993), "Electronic Devices and Circuit Theory" , 5th edition , PHI.*
4. *Allen Mottershed, "Electronics devices and circuits", PHI*

REFERENCE BOOKS:

1. *Ben.G.Streetman (1994) , "Solid state electronic devices", PHI*
2. *David .A. Bell (1999) , "Electronic devices and circuits", 4th edition, PHI.*
3. *Nagrath , "Analog and Digital Circuits", TMH*

Note : The question paper shall consist of **EIGHT** questions , **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students learn basic theory and to realize them in simple practical circuits.

POWER SYSTEMS – I (PS1)
(For II B. Tech EEE - I Semester)

Scheme : 2010 — Internal Assessment : 30
Contact Periods: (4L+1T) / Week — End Exam Marks : 70
Credits : 5 — End Exam Duration : 3 hrs

Course Objectives:

- To realize the basic concepts of different types of power generating systems.
- To understand the basic concepts of dc and ac distribution.

Unit – I

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses - Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Unit – II

Hydro – Electric Power stations: Arrangement and location of hydro electric station, principle of working of a hydro – electric plants, components, Advantages and disadvantages

Unit – III

Gas and Nuclear Power Stations: Nuclear Power Stations: Nuclear Fission and Chain reaction.- Nuclear fuels.- Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants.- Radiation hazards: Shielding and Safety precautions.- Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

Unit – IV

Economic Aspects of Power Generation: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems.

Unit – V

Tariff Methods: Costs of generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method.-Tariff Methods: Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods, Types of Depreciation and Numerical Problems

Unit – VI

Power factor and Voltage Control: Causes of low p.f -Methods of Improving p.f -Phase advancing and generation of reactive KVAR using static Capacitors-Most economical p.f. for constant kW load and constant kVA type loads, Numerical Problems.

Unit – VII

General Aspects of Distribution Systems and D.C. Distribution Systems: Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over - Head Distribution Systems- Requirements and Design features of Distribution Systems- Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

Unit – VIII

A.C. Distribution Systems: Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

TEXT BOOKS:

1. *M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti(1999), "A Text Book on Power System Engineering", Dhanpat Rai & Co. Pvt. Ltd.,*

2. *V.K Mehta and Rohit Mehta (2004), "Principles of Power Systems", S.CHAND & COMPANY LTD., New Delhi.*

REFERENCE BOOKS:

1. *M.V. Deshpande(1991), "Elements of Power Station design and practice", Wheeler Publishing.*
2. *C.L. Wadhawa(1997), "Electrical Power Systems", New age International (P) Limited, Publishers.*
3. *S.N.Singh(2003), "Electrical Power Generation, Transmission and Distribution", PHI.*
4. *PP Wals, P.Fletcher(2004), "Gas turbine performance", Blackwell Publisher.*
5. *B.R.Gupta(2002), "Generation of Electrical Energy", Eurasia Publishing House (pvt.) Ltd.New Delhi.*

Note: The question paper shall consist of **EIGHT** questions, **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students will be able realize the various types of power generation and different distribution systems and economic aspects.

ELECTRICAL MEASUREMENTS (EM)
(For II B. Tech EEE - I Semester)

Scheme : 2010 | Internal Assessment : 30
Contact Periods : (3L+1T) / Week | End Exam Marks : 70
Credits : 4 | End Exam Duration : 3 hrs

Course Objectives:

- To provide a basic understanding of electrical measurements.
- To give students enough applications and measurements of circuit components.

Unit – I

Units Standards & Errors: S.I. units, Absolute standards (International, Primary, Secondary & Working Standards), True Value, Errors (Gross, Systematic, Random); Static Characteristic of Instruments (Accuracy, Precision, Sensitivity, Resolution & threshold).

Measuring System Fundamentals: Classification of Instruments (Absolute & Secondary Instruments; Indicating, Recording & Integrating instruments; Based upon Principle of operation), Three forces in Electromechanical indicating instrument (Deflecting, controlling & damping forces), Comparison between gravity & spring controls; Comparison of damping methods & their suitability, bearing supports, pivot-less supports (Simple & taut-band).

Unit – II

Measuring Instruments: Construction, operating principle, Torque equation, Shape of scale, use as Ammeter or as Voltmeter (Extension of Range), Use on AC/DC or both, Advantages & disadvantages, Errors (Both on AC/DC) of PMMC types, Electrodynamic Type, Moving iron type (attraction, repulsion & combined types), Hot wire type & Induction type, Electrostatic type Instruments.

Unit – III

Instrument transformers: CT and PT – Ratio and phase angle errors – design considerations Type of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters – Frequency meters – resonance type and Weston type – synchroscopes.

Unit – IV

Measurement of Power: Single phase dynamometer wattmeter, LPF and UPF, Double element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Unit – V

Measurement of Energy: Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter, maximum demand meter.

Unit – VI

Potentiometers: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage.

A.C. Potentiometers: polar and coordinate types standardization – applications.

Unit – VII

Resistance Measurements: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's bridge , Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Unit – VIII

A.C. Bridges: Measurement of inductance, Quality Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge. Measurement of capacitance and loss angle - Desauty bridge. Wien's bridge – Schering Bridge.

TEXT BOOKS:

1. *E.W. Golding and F.C. Widdis (2009), "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing.*
2. *A.K.Sawhney (2010), "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications.*

REFERENCE BOOKS:

1. *Buckingham and Price , "Electrical Measurements", Prentice – Hall*
2. *Harris, "Electrical Measurements"*
3. *Reissland, M.U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited, Publishers*.

Note: The question paper shall consist of **EIGHT** questions , **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students will be able to distinguish measuring meters based on the principle.
- To learn the different types of analog meters for measuring electrical quantities.

ELECTRICAL MACHINES – I (EMC 1)
(For II B. Tech EEE - I Semester)

Scheme: 2010 — Internal Assessment : 30
Contact Periods : (4L+1T)/Week — End Exam Marks : 70
Credits: 5 — End Exam Duration : 3 hrs

Course Objectives:

- To understand the basic concepts of electrical machines viz., dc generators, dc motors and their characteristics and applications.

Unit – I

Electro mechanical Energy conversion : Laws of Magnetic Circuit, Magnetic Circuit Calculations, Comparisons between magnetic circuits and electric circuits, Forces and Torque in Magnetic field Systems, Energy balance, Energy and Force in singly excited magnetic field system, Determination of Magnetic force and Torque from Co-energy, multiply excited Magnetic field Systems, numerical problems.

Unit – II

DC Generators - Construction and Operation: Principle of Operation, action of commutator, constructional features, armature windings-simplex lap and wave windings, use of laminated armature, EMF equation, numerical problems.

Unit – III

DC Generators – Armature Reaction and Commutation : Armature reaction and its effects – cross magnetizing and De magnetizing AT/pole, Methods of improving armature reaction, commutation – reactance voltage – methods of improving Commutation, numerical problems.

Unit – IV

Types of DC Generators: Methods of excitation – separately excited and self excited generators, build up of EMF and causes for failure, open circuit characteristics – critical field resistance and critical speed, numerical problems.

Unit – V

Load Characteristics: Load characteristics of separately excited and self excited generators, parallel operation DC generators – use of equalizer bar – load sharing, numerical problems.

Unit – VI

DC Motors: Principle of operation, back emf, torque equation, characteristics of separately excited and self excited motors, various applications of DC motors, numerical problems.

Unit – VII

Speed Control of DC Motors: Speed control of DC motors using armature control, flux control and Ward-Leonard control, Braking of dc motors – dynamic, plugging and regenerative.

Motor starters – 3-point and 4-point starters - protective devices – calculation of starter steps, numerical problems.

Unit – VIII

Testing of DC Machines: Losses–constant and variable losses, efficiency – condition for maximum efficiency, direct (brake test), indirect (Swinburne's test) and regenerative testing (Hopkinson's test), retardation test, separation of stray losses test, Field's test, numerical problems.

TEXT BOOKS:

1. *P.S. Bimbhra, (2009) "Electrical machinery", 7th Edition, Khanna Publishers.*
2. *I.J. Nagrath & D.P. Kothari, (2004), "Electric Machines", 3rd Edition, Tata McGrawhill Publishers.*
3. *A.E. Fitzgerald, C. Kingsley and S. Umans (2003) "Electric Machinery", 6th Edition, Tata McGraw-Hill Companies.*
4. *P.S. Bimbhra, (2002), "Generalized Theory of Electrical machines", 5th Edition, Khanna Publishers.*

REFERENCE BOOKS:

1. *H. Cotton, (2003) "Electrical Technology", 7th Edition, CBS Publishers.*
2. *Mukherjee and Chakravarthy, (2001), "Electrical Machines", 2nd Edition, Dhanpat Rai Publishers.*
3. *Clayton, (2004) "The Performance and Design of Direct Current machines", 3rd Edition, CBS Publishers.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students will be able to understand the concepts of dc electrical machines and their principle of electromagnetism.
- To realize dc machines characteristics and their applications.

Soft Skills (SS)

(Common for all branches of II B.Tech I - Semester)

Scheme : 2010 Internal Assessment : 100

Contact Periods : (1L +2T)/week

Credits : 2

Course Objectives:

- To be assertive in all walks of life, Confident and effective public speaker.
- To improve creativity, Solve problems and take effective decisions.

Self Awareness

Importance of Self Awareness – Johari Window in Self Awareness – four quadrants of Johari Window - Open or Arena Quadrant – Blind Spot quadrant – Hidden or Facade Quadrant – Unknown Quadrant.

Goal Setting

Importance of Goal Setting - Difference between Goals and Dreams – Importance of writing Goals – S.M.A.R.T Goals – Intermediate or Short term Goals – Medium Term Goals – Long Term Goals – How to achieve Goals.

Time Management

Importance of Time – what's your style – A few Myths – Prioritize – Procrastination – the thief of time – carving the cock – How to delegate effectively – the art of anticipating – learning to say NO – Plugging time leaks power - Tools for Time Management – Scheduling.

Inter Personal Behavioral Styles

Importance of Interpersonal Skills – Identifying Yourself - Characteristics of Socializer, Relater, Director, Thinker – Identifying others - Communication with others – Adapting yourself to others

Strokes

Importance of Strokes – Art of giving Strokes – your style – conditional and unconditional Strokes – Positive and Negative Strokes – Giving Strokes – Taking Strokes – Asking for Strokes – Refuse to give Strokes.

Assertiveness

Understanding Assertiveness – Three styles Passive, Assertive, Aggressive – Importance of Self Awareness – Self Confidence – Ability to say NO – Assertive Communication – Body Language – Behavior – Benefits of being Assertive

Team Roles

Importance of teams in Organizations – Your style – three different types Cerebral, Action, People – 8 roles Coordinator, Finisher, Innovator, Shaper, Team Worker, Resource Investigator, Organizer, Evaluator - the role of shaper.

Presentation Skills

Importance of Presentation Skills –Knowledge of the Audience - Body Language - the impact of Voice – overcoming stage fear / Nervousness - Stage Etiquettes - Importance of Content – Introduction, Body, Conclusion –Creating an Impact.

Creativity

Importance of creativity – What is creativity – out of the Box thinking - Lateral Thinking – Critical thinking –Blocks in creativity - Being Creative – Tossing Ideas.

Problem Solving and Decision Making

Problem Solving as skill - Out of the Box thinking – Thinking Styles – Steps in Problem Solving - Steps in Decision Making – Types of Decisions.

REFERENCE BOOKS:

1. *Dr. Stephen R. Covey, Simon and Schuster (1992), "The 7 Habits of Highly Effective People", Pocket Books Publishers, London.*
2. *Marc Mancini, (2005), " Time Management", TMH Publishers, New Delhi.*
3. *Infosys Campus Connect Portal – http://campusconnect.infosys.com*
4. *Stephen R. Covey, A.Roger Merrill and Rebecca R. Merrill (2002), "First Things First", Pocket Books Publishers, London.*
5. *Norman Vincent Peale (1990), "The Power of Positive Living", Ballantine Books, New York.*
6. *Napoleon Hill and W. Clement Stone (1987), "Success Through a Positive Mental Attitude", Pocket Books Publishers, New York.*
7. *Stuart R. Levine, CEO & Michael. CROM (1993), "The Leader in You", Dale Carnegie & Associates Inc. Pocket Books, New York.*
8. *Shiv Khera (2006), "You Can Win", MacMillan India Publishers, New Delhi.*

Course Outcomes:

- Ability to bring the best out of self and others and achieve Success in co-curricular, extracurricular and competitive events.
- Ability to find solutions at individual, group and class level in all areas of academic life.

ELECTRICAL MACHINES – 1 LAB (EMC1 (P))
(For II B. Tech EEE - I Semester)

Scheme: 2010 — Internal assessment : 30
Contact Periods: 3P/week — End Exam Marks : 70
Credits: 2 — End Exam duration : 3 hrs

Course Objectives:

- To review various types of dc machines and their characteristics, performances and correlate them with the known theoretical background.

LIST OF EXPERIMENTS

1. Open circuit characteristic (OCC) of DC shunt generator
2. Load test on DC shunt generator
3. Brake test on DC compound motor
4. Swinburne's test on DC machine
5. Brake test on DC shunt motor.
6. Hopkinson's test.
7. Field's test.
8. Speed control of DC shunt motor.
9. Separation of losses of DC shunt motor.
10. Load test on DC compound generator.

Note : A minimum of **eight** experiments should be conducted

Course Outcomes:

- Students will be able to analyze the performance characteristics of dc machines under no load to full load and witness the practical performance and can analyze them for various application purposes.

ELECTRICAL MEASUREMENTS LAB (EM (P))
(For II B. Tech EEE - I Semester)

Scheme : 2010 — Internal assessment : 30
Contact Periods : 3P/week — End Exam Marks : 70

Credits : 2 End Exam duration : 3 hrs

Course Objectives:

- To provide a basic understanding of electrical measurements.
- To give students enough applications and measurements of circuit components.

LIST OF EXPERIMENTS

1. Wheat stone bridge & Kelvin's Double bridge
2. Maxwell's Bridge, Anderson Bridge
3. De-Sauty bridge, Schering bridge
4. Calibration of Single phase energy meter
5. Measurement of Real and Reactive Power
6. Measurement of Power using 3-voltmeter and 3-ammeter methods
7. Extension of range of Ammeter and Voltmeter
8. C.T.Testing by Silsbee's method-measurement of % ratio error and phase angle of given C.T.by comparison
9. Calibration of Energy meter by Phantom load testing
10. Calibration of Power factor meter

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Students are able to know the different electrical meters calibrations. They are able to find various electrical parameters using bridges and they can know the concepts of real and reactive power.

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2010-11)

II B.Tech (EEE) – II Semester

Scheme: 2010

S.No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	**Theory**									
1	Managerial Economics & Principles of Accountancy	MEPA	4	4	–	–	3	70	30	100
2	Electrical Circuits –II	EC2	5	4	1	–	3	70	30	100
3	Electrical Machines –II	EMC2	5	4	1	–	3	70	30	100
4	Electro Magnetic Fields	EMF	4	3	1	–	3	70	30	100
5	Power Systems – II	PS 2	5	4	1	–	3	70	30	100
6	Analog Circuits	AC	5	4	1	–	3	70	30	100
7	Aptitude & Reasoning Skills	ARS	2	1	2	–	–	–	100	100
II	**Practical**									
8	Electrical Circuits Lab	EC(P)	2	–	–	3	3	70	30	100
9	Electronics Engineering – I Lab	LE1(P)	2	–	–	3	3	70	30	100
	Total		**34**	**24**	**7**	**6**		**560**	**340**	**900**

MANAGERIAL ECONOMICS & PRINCIPLES OF ACCOUNTANCY (MEPA)
(Common to II B. Tech II Semester EEE & ECE)

Scheme : 20010 | Internal Assessment : 30
Contact Periods: (4L)/ week | End Exam Marks : 70
Credits : 4 | End Exam Duration : 3hrs

Course Objectives:

- To enable the students to know the basic concepts of accountancy, budget, cost analysis and theoretical foundation of management science.
- To facilitate the students to gain the knowledge regarding management and organization behavior, production etc.

Unit – I

Introduction to Managerial Economics: Definition – Nature and Scope of Managerial Economics – Demand Analysis – Types of Demand – Demand Determinants – Law of Demand – Its assumptions and exceptions.

Unit – II

Elasticity of Demand: Definition –Types – Price – Income – Cross Elasticities of demand – Practical Significance of price elasticity of demand – Measurement of price elasticity of demand – Demand forecasting – Importance – Factors – Methods of Demand Forecasting.

Unit – III

Theory of production and cost analysis: Meaning of production function – Isoquants – Isocosts – Practical Importance – The law of diminishing Marginal Returns – Internal and External Economies of scale.

Cost Analysis – Cost concepts – Fixed and Variable Costs – Cost out put relation ship – Break Even Analysis – Importance – Limitations and Managerial uses of Break Even Analysis.

Unit – IV

Market Structures: Types of Competitions – Features of Perfect Competition – Monopoly – Monopolistic Competition – Price output determination in case of perfect competition and Monopoly.

Unit – V

Capital and its Significance: Types of Capital – Estimation of fixed and working capital requirements – Methods and sources of raising fixed and working capital

CAPITAL BUDGETING – Importance – Methods – Pay Back Nethod – Accounting Rate of Return Method (ARR) and Net Present Value Method (NPC) – (Simple Problems only)

Unit – VI

Business Environment: Types of Business Organizations – Formation and evaluation of sole trader – Partnership firm – Partnership Deed – Joint Stock Companies – Features – Private and Public Limited Companies formation – Merits – Demerits – Differences – Prospectus.

Features of an Ideal Business Unit

Unit – VII

Principles of Accountancy: Introduction to Accountancy – Double Entry System of Book Keeping – Meaning – Scope – Advantages – Journal Entries – Ledger – Subsidiary Books – Preparation of Trial Balance.

Unit – VIII

Preparation of Final Accounts: Trading Account – Profit & Loss Account – Balance Sheet with adjustments – (Final Accounts problems should be given)

TEXT BOOKS:

1. *Varshiney and Maheswari, "Managerial Economics", Sultan Chand & Co, New Delhi*
2. *Y.K Bhushan, "Business Organization & Management", S Chand & Co., New Delhi.*
3. *S.P Jain and K.L Narang, "Financial Accounting" - B.com First Year Andhra Pradesh Universities, Kalyani Publishers, New Delhi.*

REFERENCE BOOKS:

1. *Shukla & Grewal, "Advanced Accountancy", S.Chand & Co., New Delhi*
2. *M.C Shukla, "Business Organization and Management", S.Chand & Co., New Delhi.*

Note: The question paper shall consists of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students are able to think and analyze the critical problems in accountancy and production management.
- Students can enhance their leadership qualities and they learn to run an organization and entrepreneur.

ELECTRICAL CIRCUITS – II (EC2)
(For II B. Tech EEE – II Semester)

Scheme: 2010 Internal assessment : 30
Contact Periods: (4L +1T)/week End Exam Marks : 70
Credits: 5 End Exam
Duration: 3 hrs

Course Objectives:

- To make the students understand the concepts of poly phase circuits, transient analysis, various network parameters and their applications.
- To enable the students digests the concept of network topology and network synthesis.

Unit – I

Polyphase Circuits: Generation of three Phase voltages ,currents and power, phase sequence, Relation between Line & Phase quantities in Star and Delta Connection, Analysis of three Phase balanced and unbalanced circuits with vector diagram.

Unit – II

Locus Diagrams: Current locus diagrams of series & parallel circuits – their applications.

Unit – III

Network Topology: Network graph, concept of tree, branch, links, incident matrix, tieset, cutset and simple problems.

Dual Networks: Principle of Duality and Construction of Dual Networks.

Unit – IV

Laplace Transform: Initial value and Final Value theorem, Partial Fraction Expansion, Laplace Transform of Step, ramp, Impulse functions & Periodic and Non-Periodic Wave Form Signals. Transformation methods in network analysis.

Unit – V

Initial Conditions: Initial conditions in the network & their representation, evaluation of initial conditions.

Transients: Transient response of RL, RC & RLC circuits for DC & AC excitations.

Unit – VI

Network Parameters: Two port network parameters, Impedance parameters, admittance parameters, transmission parameters, hybrid, Inverse hybrid parameters, relation between parameter sets for a given T & π networks (simple problems).

Unit – VII

Network Functions: poles & zeros of network function, significance of poles and zeros (Theoretical concept only), Routh Hurwitz criteria for network stability.

Unit – VIII

Elements of network synthesis: Positive real function and Hurwitz polynomial, properties of RL, RC &RLC impedance and admittance, synthesis of RL, RC & LC networks using Foster and Cauer forms.

TEXT BOOKS:

1. *Joseph Edminister (1983) , "Electric Circuits", 2nd Edition, Schaum's Series , TMH*
2. *Ajith Chakravarthy (2006), "Circuit Theory", 5th Edition, Danpat Rai & Sons*
3. *R.P.Punagin , (1994) "Electrical Circuit Analysis", Interline Publishers, Bangalore.*
4. *Sivanaga Raju, G. Kishor and C. Srinivasa Rao (2010) , "Electrical Circuit Analysis", Cengage Learning*

REFERENCE BOOKS:

1. *Vanvalken Berg (2004) ,"Network Analysis" 3rd Edition, PHI*
2. *Sudhakar & Shyam Mohan (2007), "Circuits & Network", 5th Edition, TMH*
3. *Roy Choudary (2007), "Networks & Systems" , New Age .*
4. *R.L.Boylstad, (1994) "Introductory Circuit Analysis" , McMillan Publishers, 7th Edition.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students are able to analyze the poly-phase circuits and can understand the applications of RL, RC, and RLC circuits for DC and AC excitations.
- It enables the students to understand the concept of two port networks.

ELECTRICAL MACHINES – II (EMC 2)
(For II B. Tech EEE - II Semester)

Scheme: 2010 — Internal Assessment : 30
Contact Periods: (4L+1T)/Week — End Exam Marks : 70
Credits: 5 — End Exam Duration:3 Hrs

Course Objectives:

- To make the students to understand the knowledge of Transformers, their construction principle of operation, analyze and their applications.
- To enable the students to have overall view broadly regarding induction motors, their construction, principle and applications.

Unit – I

Single-Phase Transformers – Construction & operation: Single phase transformers – types - constructional details, ideal transformer, EMF equation, operation on no-load and load, phasor diagrams, numerical problems

Unit – II

Single-Phase Transformers – Performance: Equivalent circuit, Losses and efficiency, Per unit system, Regulation, All-day efficiency, Effect of variations of frequency & supply voltage on Iron losses, numerical problems

Unit – III

Testing of Single-Phase Transformers & Autotransformer: Open circuit and short circuit tests, Sumpner's test, Predetermination of efficiency and regulation, separation of losses test, parallel operation with equal and unequal voltage ratios, autotransformers-equivalent circuit- comparison with two-winding transformers-numerical problems.

Unit – IV

Polyphase Transformers: Polyphase connections, third harmonics in phase voltages, three-winding transformers, tertiary windings, transients in switching, off-load and on-load tap changing transformers, Scott connection, numerical problems.

Unit – V

Three-phase Induction motors: Construction, rotating magnetic field, principle of operation, rotor EMF and rotor frequency, rotor reactance, rotor current and power factor at standstill and during operation, phasor diagram, numerical problems.

Unit – VI

Characteristics of Induction motors: Rotor input, rotor copper loss and mechanical power developed, power flow diagram, torque equation-deductions from torque equation-expressions for maximum torque and starting torque, torque slip characteristics, crawling and cogging, double-cage and deep-bar rotors, numerical problems.

Unit – VII

Circle diagram of Induction motors: No-load and blocked-rotor tests, equivalent circuit & Circle diagram & predetermination of performance, types of starters-direct online starting, stator reactor starting, autotransformer starting, star-delta starting, rotor resistance starter and starting current and starting torque calculations, numerical problems.

Unit – VIII

Speed control of Induction motors: Speed control – change of frequency, change of poles-methods of consequent poles–cascade connections, rotor resistance method, injection of an emf into rotor circuit (qualitative treatment only), induction generator (qualitative treatment only), numerical problems.

TEXT BOOKS:

1. *P.S. Bimbhra, (2009) "Electrical machinery", 7th Edition, Khanna Publishers.*
2. *I.J. Nagrath & D.P. Kothari, (2004), "Electric Machines", 3rd Edition, Tata McGrawhill Publishers.*
3. *P.S. Bimbhra, (2002), "Generalized Theory of Electrical machines", 5th Edition, Khanna Publishers.*

4. *M.G.Say, (2002), "The Performance and Design of Alternating Current Machines", 3rd Edition, CBS Publishers.*

REFERENCE BOOKS:

1. *Langsdorf, (2002) "Theory of Alternating Current Machinery", TMH Publishers,2nd edition.*
2. *A.E. Fitzgerald, C. Kingsley and S. Umans (2003) "Electric Machinery", 6th Edition, Tata McGraw-Hill Companies.*

Note : The question paper shall consist of **EIGHT** units with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes: Students are able to deal with induction motor analysis and applications, 1-phase transformers analysis they can analyze simple circuits and systems.

ELECTROMAGNETIC FIELDS (EMF)
(For II B. Tech EEE – II Semester)

Scheme : 2010 — Internal assessment : 30
Contact Periods : (3L +1T)/week — End Exam Marks : 70
Credits : 4 — End Exam Duration : 3 hrs

Course Objectives:

- To introduce the basic concept of electromagnetic and electrostatic fields.
- To verify various theorems of field theory.

Unit – I

Electrostatics: Electrostatic Fields –Coulomb's Law –Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function –Potential gradient –Guass's law –Application of Guass's Law–Maxwell's first law,div(D) = ,

Unit – II

Conductors and Dipole: Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field – Behavior of conductors in an electric field – Conductors and Insulators.

Unit – III

Dielectric & Capacitance: Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical capacitors – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

Unit – IV

Magneto Statics: Static magnetic fields – Biot-Savart's law ,Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0.

Unit – V

Ampere's circuital law and its applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc, Field due to a circular loop.

Unit – VI

Force in Magnetic fields: Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field

Unit – VII

Magnetic Potential: Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson's equations.

Self and Mutual inductance – Neumans's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

Unit – VIII

Time Varying Fields: Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl(E) = - Statically and Dynamically induced EMFs – Simple problems

-Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

TEXT BOOKS:

1. *William H. Hayt & John. A. Buck (2006), "Engineering Electromagnetics", Mc. Graw-Hill Companies, 7th Editon.*
2. *S.Sivanagaraju , C.Srinivasa Rao (2008), "Electromagnetic Fields" ,New Age publishers, India.*
3. *K.A. Gangadhar (2003), "Field Theory", 15th Edition, Khanna Publications.*

REFERENCE BOOKS:

1. *Umesh Sinha (1995), "Electromagnetic theory", 6th Editin, Satya publications.*
2. *Joseph Edminister (2004), "Electromagnetic", 2nd Edition, Schaum's outline series TMH.*
3. *J.D.Kraus (2003), "Electromagnetics with Applications",5th Edition, Mc Graw-Hill Inc. 5th edition .*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes: Students can understand and analyze the circuits and magnetic field.

- Students can understand the concept of magneto statics and can analyze various ampere's laws and time varying fields

POWER SYSTEMS – II (PS2)
(For II B. Tech EEE – II SEMESTER)

Scheme : 2010 — Internal assessment : 30
Contact Periods : (4L+1T)/Week — End Exam Marks : 70
Credits : 5 — End Exam Duration :3 hrs

Course Objectives:

- To introduce the classification of transmission lines their electrical and mechanical design concepts like calculation of inductance, capacitance, insulators, sag, cables etc.

Unit – I

Transmission Line Parameters: Electrical design of Overhead Transmission Lines – Calculation of Line constants of Single phase, 3-phase system of symmetrical, unsymmetrical and transposed configurations – Calculation of Line constants of stranded conductor, double circuit three phase system using GMD and GMR concepts

Unit – II

Performance of Short and Medium Length Transmission Lines: Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-π and A, B, C, D Constants for symmetrical networks, Numerical Problems.

Solutions for estimating regulation and efficiency of all types of lines. – Numerical Problems.

Unit – III

Performance of Long Transmission Lines: Long Transmission Line-Rigorous Solution, evaluation of A, B, C, D Constants, Surge Impedance and SIL of Long Lines(numerical problems).

Unit – IV

Power System Transients: Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction (Numerical Problems).

Unit – V

Various Factors Governing the Performance of Transmission line: Skin and Proximity effects - - Ferranti effect - Charging Current - Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss

Unit – VI

Overhead Line Insulators: Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency.

Unit – VII

Sag and Tension Calculations: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart

Unit – VIII

Underground Cables: Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems.

Capacitance of Single and 3-Core belted cables, Numerical Problems.

Grading of Cables - Capacitance grading,Inter-sheath grading, Numerical Problems.

TEXT BOOKS:

1. *M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy(1999), "A Text Book on Power System Engineering", Dhanpat Rai & Co Pvt. Ltd.*
2. *C.L.Wadhwa(1998), "Electrical power systems", New Age International (P) Limited, Publishers,.*

REFERENCE BOOKS:

1. *John J Grainger William D Stevenson(2004), "Power system Analysis", TMC Companies, 4th edition*
2. *B.R.Gupta(1998), "Power System Analysis and Design", Wheeler Publishing.*
3. *Hadi Saadat(2002), "Power System Analysis", TMH Edition..*
4. *I.J.Nagaraj and D.P.Kothari(2004), "Modern Power System Analysis", Tata McGraw Hill, 2nd Edition.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer **FIVE** questions.

Course Outcomes:

- Students can get the knowledge regarding the electrical and mechanical design of transmission lines.
- They can classify and analyze the transmission lines.

ANALOG CIRCUITS (AC)
(Common to II B. Tech. EEE & ECE – II Semester)

Scheme : 2010 Internal Assessment : 30

Contact Periods: (4L+1T) / Week End Exam Marks : 70
Credits : 5 End Exam Duration : 3 hrs

Course Objectives:

- To gain the knowledge of single stage and multistage transistor amplifiers, FET, feedback amplifiers.
- To know the design concepts of various amplifiers.

Unit – I

Single Stage Amplifiers: Transistor as an amplifier, Transistor Low frequency hybrid Model, Analysis of a transistor amplifier circuit using h-Parameters, Comparison of CB, CC and CE amplifier configurations, Emitter Follower, Linear analysis of transistor amplifier circuits, Miller's Theorem and its Dual.

Unit – II

Multistage Transistor Amplifiers: Types of coupling – RC coupled, Direct coupled, Analysis of two cascaded amplifier stages, Approximate CE, CB and CC models, CE amplifier with emitter resistance, Darlington, Bootstrap and Cascode amplifiers, Frequency response of an amplifier at Low and High frequencies, Bandwidth of cascaded amplifier stages.

Unit – III

Transistor at High Frequencies: Hybrid-π model, Hybrid-π conductances, and capacitances, CE short circuit current gain, Parameters f_β and f_T, Current gain with resistive load, Single stage CE transistor amplifier frequency response, Gain-bandwidth product (GBW).

Unit – IV

FET Amplifiers: FET small signal analysis, Low frequency CS and CD amplifiers, CS and CD amplifiers at high frequencies.

Unit – V

Feedback Amplifiers: Classification of amplifiers, Concept of feedback, Transfer gain with feedback, General characteristics of negative feedback amplifiers- Gain, Bandwidth, Input resistance, Output resistance & Noise. Method of analysis of feedback amplifier, Analysis of feedback (Voltage & Current series, Voltage & Current shunt) amplifiers.

Unit – VI

Oscillators: Barkhausen criterion, RC Phase shift oscillator using FET & BJT, General form of LC oscillator circuit, Hartley and Colpitts oscillators, Wien-bridge oscillator and Crystal oscillator its significance.

Unit – VII

Large Signal Amplifiers: Classes of operation, Class A amplifiers (Series-fed, Ttransformer coupled, Pushpull), Class B amplifiers (Pushpull, Complementary-symmetry), Crossover distortion and Class AB operation, Class C amplifiers and efficiency.

Unit – VIII

Differential Amplifiers: Ideal differential amplifier, CMRR, Emitter-coupled differential amplifier, Differential amplifier supplied with constant current, Practical considerations, Transfer characteristics of differential amplifiers.

Tuned Amplifiers: Need of tuned amplifiers, Analysis of single stage capacitive coupled tuned amplifier.

TEXTBOOKS:

1. *Millman and Halkias (2010), "Integrated Electronics", 2nd edition, TMH.*
2. *Allen Mottershed(2006), "Electronic Devices and Circuits", 28th edition, PHI.*
3. *G. K. Mittal (2006), "Electronic Devices and Circuits", 23rd edition, Khanna pub.*

REFERENCE BOOKS:

1. *Bogart Theodore(2008), "Electronic Devices and Circuits", 6th edition, PE.*
2. *Millman and Grabel(2003), "Microelectronic", 2nd edition, TMH.*
3. *Henry Zanger(1984), "Semiconductor Devices and Circuits", Johnwiley.*

Note: The question paper shall consist of **EIGHT** questions. **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students gain the knowledge regarding amplifiers and they can design and implement the applications of various amplifiers.

Aptitude and Reasoning Skills (ARS)

(Common for all branches of II B.Tech II - Semester)

Scheme : 2010 Sessional Exam Marks : 100
Contact Periods : (1L +2T)/week
Credits : 2

Course Objectives:

- To equip students with problem solving and decision making skills and enhance skill of analysis and reasoning.
- To enrich students with out of box thinking and better approaches to problem solving and logical thinking.

Quantitative Aptitude

- Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Proportions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, quadratic Equations, Logarithms

- HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and Systems, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker's Discounts

- Data Interpretation – Tabulation – Bar Graphs – Pie Charts – Line Graphs.

Reasoning

Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

REFERENCE BOOKS :

1. *Arun Sharma (2003), "How to Prepare for Quantitative Aptitude", TMH Publishers, New Delhi.*
2. *R.S. Aggarwal (2005), "Quantitative Aptitude, S.Chand Publishers", New Delhi.*
3. *Sharon Weiner-Green, Ira K.Wolf (2006), "Barron's GRE", Galgotia Publications, New Delhi.*
4. *R.S Aggarwal (1998), "Verbal and Non-Verbal Reasoning", S.Chand Publishers, New Delhi.*
5. *Shakuntala Devi (2005), "Puzzles to Puzzle You", Orient Paper Backs Publishers, New Delhi.*
6. *Shakuntala Devi (2006), "More Puzzles", Orient Paper Backs Publishers, New Delhi.*
7. *Ravi Narula (2005), "Brain Teasers", Jaico Publishing House, New Delhi.*
8. *George J Summers (2005), "Puzzles and Teasers", Jaico Publishing House, Mumbai*

Course Outcomes:

- Students can improve critical thinking, problem solving capacity and leadership qualities.
- Students learn how to run an organization or entrepreneurships and basically they can be fit in a team.

ELECTRICAL CIRCUITS (EC(P))
(For II B. Tech EEE - II Semester)

Scheme : 2010 Internal assessment : 30
Contact Periods : 3P/week End Exam Marks : 70
Credits : 2 End Exam duration : 3 hrs

Course Objectives:

- To verify the network theorems to have a proper understanding reasoning circuits.
- To determine the impedance and admittance parameters.

LIST OF EXPERIMENTS

1. Verification of KCL & KVL through (a) experiment (b) simulation
2. Verification of Maximum Power Transfer Theorem through (a) experiment (b) simulation
3. Verification of superposition and Reciprocity theorem through (a) experiment (b) simulation
4. Verification of Thevenin's theorem through (a) experiment (b) simulation
5. Verification of Norton's theorem through (a) experiment (b) simulation
6. Determination of Self Inductance, Mutual Inductance and Co-efficient of Coupling of an air-core transformer
7. Series and Parallel Resonance
8. Determination of Impedance and Admittance Parameters
9. Determination of transmission line Parameters
10. Locus diagrams on RL and RC circuits

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Student can understand and apply the network theorems to the electrical circuit applications.

- Students can analyze the transmission lines with the help of parameters.

ELECTRONICS ENGINEERING – I LAB (LE1(P))
(For II B. Tech EEE - II Semester)

Scheme : 2010 | Sessional Marks : 30
Contact Periods: 3P/Week | End Exam Marks: 70
Credits: 2 | End Exam: 3 Hours

Course Objectives:

- To study the basic concepts of CRO, transistors, amplifiers, SCR and their characteristics.

LIST OF EXPERIMENTS

1. Study of Electronic equipment - CRO, CDS, and FG etc.
2. Semiconductor Diode Characteristics (p-n diode and Zener diode).
3. Half Wave and full-wave Rectifiers with and without filters.
4. Transistor Characteristics – CE & CB Configurations.
5. FET Characteristics.
6. CE Amplifier.
7. CC Amplifier.
8. UJT Relaxation Oscillator.
9. SCR Characteristics.
10. LDR Characteristics.

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Students are able to analyze and apply the concepts of transistors and amplifier for various real time applications.

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2010 –11)

S. No.	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examination Total Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	**Theory**									
1	Electrical Machines – III	EMC3	5	4	1	–	3	70	30	100
2	Power System Analysis	PSA	5	4	1	–	3	70	30	100
3	Power Electronics – I	PEL1	5	4	1	–	3	70	30	100
4	Linear Control Systems	LCS	5	4	1	–	3	70	30	100
5	Pulse & Digital Circuits	PDC	4	3	1	–	3	70	30	100
6	Optimization Theory	OT	4	3	1	–	3	70	30	100
II	**Practical**									
7	Electrical Machines – II Lab	EMC2(P)	2	–	–	3	3	70	30	100
8	Electronics Engineering – II Lab	LE2(P)	2	–	–	3	3	70	30	100
9	Control System Lab	CS(P)	2	–	–	3	3	70	30	100
	Total		**34**	**22**	**6**	**9**		**630**	**270**	**900**

II B. Tech (EEE) – I Semester **Scheme: 2010**

ELECTRICAL MACHINES – III (EMC3)
(For III B. Tech EEE – I Semester)

Scheme: 2010 | Internal Assessment : 30
Contact Periods: (4L+1T)/Week | End Exam Marks : 70
Credits: 5 | End Exam Duration : 3 Hrs

Course Objectives:

- To expose the students to the concepts of various types of electrical machines and applications of Electrical machines.
- To introduce the basic concepts, characteristics and applications of synchronous machines, single phase induction motor.

Unit – I

Alternators – Construction & Principle of operation: Alternators **- c**onstructional features, types, Armature windings – integral slot and fractional slot windings, Distributed, concentrated and chorded windings, distribution, pitch and windings factors, EMF equation, numerical problems.

Unit – II

Characteristics of Alternators: Harmonics in generated emf – slot harmonics and suppression of harmonics, Armature reaction, leakage reactance, synchronous reactance and impedance, experimental determination of synchronous reactance, phasor diagrams, load characteristics, numerical problems.

Unit – III

Regulation of Alternators: Regulation of alternator by synchronous impedance method, M.M.F. method and Z.P.F method, two reaction analysis, experimental determination of X_d and X_q, phasor diagrams, regulation of salient pole alternators, numerical problems.

Unit – IV

Parallel operation of Alternators: Synchronizing alternators with infinite bus bars, synchronizing power, parallel operation and load sharing, effect of change of excitation and mechanical power input, transient & sub-transient reactances and time constants, short circuit current waveforms, numerical problems.

Unit – V

Synchronous motors & principal of operation: Synchronous motor-theory of operation, phasor diagram, variation of current and power factor with excitation, synchronous condenser, mathematical analysis for power developed, numerical problems.

Unit – VI

Power circles of Synchronous Motors: Excitation and power circles, hunting and its suppression, methods of starting, synchronous induction motor, numerical problems.

Unit – VII

Single phase Induction motors: Single phase induction motor-constructional features, double revolving field theory, equivalent circuit, split-phase induction motors, shaded pole induction motor, numerical problems

Unit – VIII

Special motors: Principle, performance and applications of AC series motor, stepper motor, switched reluctance motor, Permanent magnet DC motor, Hysteresis motor.

TEXT BOOKS:

1. *P.S. Bimbhra, (2009) "Electrical machinery", 7th Edition, Khanna Publishers.*
2. *I.J. Nagrath & D.P. Kothari, (2004), "Electric Machines", 3rd Edition, Tata McGrawhill Publishers.*
3. *P.S. Bimbhra, (2002), "Generalized Theory of Electrical machines", 5th Edition, Khanna Publishers.*
4. *M.G.Say, (2002), "The Performance and Design of Alternating Current Machines", 3rd Edition, CBS Publishers.*
5. *E.O.Taylor, (1997), "The Performance and Design of AC commutator Machines", 3rd Edition, CBS Publishers.*

REFERENCE BOOKS:

1. *Langsdorf, (2002) "Theory of Alternating Current Machinery", Tata McGraw-Hill Companies, 2nd edition.*
2. *A.E. Fitzgerald, C. Kingsley and S. Umans (2003) "Electric Machinery", 6th Edition, Tata McGraw-Hill Companies.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- To impart knowledge on Constructional details, principle of operation, Performance of ac Machines

- Constructional details, principle of operation of Special Machines.
- Analyze the performance of different types of synchronous machines, single phase induction motors and applications of them.

POWER SYSTEM ANALYSIS (PSA)
(For III B. Tech EEE – I Semester)

Scheme : 2010 | Internal assessment : 30
Contact Periods : (4L+1T)/Week | End Exam Marks : 70
Credits : 5 | End Exam Duration : 3 hrs

Course Objectives:

- To become familiar with short circuit, load flow, calculation procedures.
- To examine the need of various analysis like fault analysis, short circuit analysis stability analysis, steady state and transient analysis.

Unit - I

Power System Network Matrices-1: Graph Theory: Definitions, Incidence Matrices, Y_{bus} formation by Singular Transformation Methods, Numerical Problems.

Unit – II

Power System Network Matrices-2: Formation of Z_{Bus}: Concept of primitive network, Partial network, Addition of a branch from a primitive network to the partial network, Addition of a link to the partial network, Algorithm for the Modification of Z_{Bus}, and simple problems (maximum 3-Buses).

Unit – III

Power flow Studies-1: Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

Unit – IV

Power flow Studies-2: Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart.
Decoupled and Fast Decoupled Methods.- Comparison of Different Methods – DC load Flow

Unit – V

Short Circuit Analysis-I: Per-Unit System of Representation. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems.
Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

Unit – VI

Short Circuit Analysis-II: Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances.
Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.
Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

Unit –VII

Power System Steady State Stability Analysis: Elementary concepts of Steady State, Dynamic and Transient Stabilities. Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

Unit –VIII

Power System Transient State Stability Analysis: Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation.- Solution of Swing Equation: Point-by-Point Method. Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

TEXT BOOKS:

1. *M.A.Pai (1979), "Computer Techniques in Power System Analysis", TMH Publications.*
2. *I.J.Nagrath & D.P.Kothari (2003), "Modern Power system Analysis", Tata McGraw-Hill Publishing company, 3rd edition*
3. *C.L. Wadhwa (2006), "Electrical Power Systems", New Age International (P) Ltd.*
4. *L.P. Singh (2006), " Advanced Power System Analysis and Dynamics", New Age International (P) Ltd.*
5. *P.S.R. Murthy(2004), "Modeling of Power System Components", B.S Publications.*
6. *Stagg & E.L. – Abiad, "Computer Methods in Power System Analysis", International Student Edition.*
7. *S.S.Wadhera (2002), "Power system analysis & stability",Khanna Publishers.*

REFERENCE BOOKS:

1. *Grainger and Stevenson (2008),*" *Power System Analysis", Tata McGraw Hill.*

2. A.R.Bergen (2001), "Power System Analysis", 2nd edition, Prentice Hall, Inc.

3. Hadi Saadat (2009), "Power System Analysis", TMH Edition.

4. B.R. Gupta (2003), "Power System Analysis & Design", 3rd edition, Wheeler Publications

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Able to design a power system network for steady state, dynamic and transient conditions.
- Analyze the system performance during unbalanced fault conditions, and also calculate the corresponding fault current.

POWER ELECTRONICS – I (PEL1)

(For III B. Tech EEE – I Semester)

Scheme: 2010 — Internal Assessment : 30

Contact Periods: (4L+1T)/Week — End Exam Marks : 70

Credits: 5 — End Exam Duration : 3 Hrs

Course Objectives:

- The course is intended for students who may want to further their knowledge on the analysis, control, efficiency analysis and switching techniques of power electronic converter circuits.
- To Learn the Static and Dynamic characteristics of Power Semiconductor Devices.

Unit – I

Power Semiconductor Devices: Introduction, advantages and applications of power electronics, Classification of Semiconductor Devices, Basic theory of operation and characteristics of Power diodes, Power BJT, Power MOSFET, IGBT, TRIAC, Basic theory of operation of SCR-static characteristics-Salient points.

Unit – II

Silicon Controlled Rectifier (SCR): Two-transistor analogy, dynamic and gate characteristics of SCR, turn on and turn off time, turn-on methods, series and parallel connections of SCRs, ratings of SCRs, Protection of SCRs - Snubber circuit details, simple problems**.**

Unit – III

Thyristor Firing Circuits: Principle and features of firing circuits, simple R and RC triggering circuits, UJT pulse firing circuit, role of pulse transformer in firing circuits, simple problems.

Unit – IV

Thyristor Commutation Techniques: Line commutation, load commutation, forced commutation and external pulse commutation, simple problems.

Unit – V

1-Phase Controlled Rectifiers: principle of phase control technique, 1-phase half controlled and fully controlled rectifiers – Bridge and mid-point configurations with R- and R-L loads with and without freewheeling diode, derivations of rms and average values – active and reactive power inputs, input power factor-simple problems.

Unit – VI

3-Phase Controlled Rectifiers: 3-phase half controlled and fully controlled rectifiers – Bridge and mid-point configurations with R- and R-L loads, derivations of rms and average values, simple problems.

Unit – VII

Dual converters: 1-phase and 3-phase dual converters with circulating and non-circulating current operation, four-quadrant operation of load using dual converter, simple problems.

Unit – VIII

Cycloconverter: Basic principle of operation, 1-phase to 1-phase cycloconverters with R and R-L loads, 3-phase to 1-phase, 3-phase to 3-phase cycloconverter circuits (Principle of operation only), output voltage equation.

TEXT BOOKS:

1. *M.D. Singh and K.B. Khanchandani (2002), "Power Electronics", 2nd Edition, Tata McGraw Hill Publishers.*
2. *P.S. Bimbhra (2010), "Power Electronics", 4th Edition, Khanna publishers.*
3. *P.C. Sen, (2010), "Power Electronics", 35th Reprint, Tata McGraw Hill Publishers.*
4. *Ashfaq Ahmed, (2003), "Power Electronics for Technology" First Indian Reprint, Pearson Education Publishers.*

REFERENCE BOOKS:

1. *Vedam Subrahmanyam (1996), "Power Electronics", New age international publishers.*

2. *J.Vithayathil (2010), "Power Eletronics: Priciples and Applications", 2nd Edition reprint, Tata McGraw Hill Publishers.*
3. *M.H. Rasheed (2004), "Power Electronics Circuits Devices and applications", 3rd Edition, PHI publishers.*
4. *G.K.Dubey, S.R.Doradra, A.Joshi, and R.M.K Sinha, (2009) "Thyristorised power controllers", 1st edition reprint, New Age International (p) Ltd. Publishers.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe the basic Power Electronic devices.
- Learn the concepts of commutation technique.
- Explain operation of power electronic converters.

LINEAR CONTROL SYSTEMS (LCS)
(Common to III B. Tech. EEE & ECE – I Semester)

Scheme : 2010 | Internal assessment : 30
Contact Periods : (4L +1T)/week | End Exam Marks : 70
Credits : 5 | End Exam duration : 3 hrs

Course Objectives:

- To help the students understand concept of open loop and closed loop system.
- To study the concept of time response and frequency response of the system and the basics of stability analysis and state variable analysis.

Unit – I

Equations and Models of Linear Systems: Basic elements and types of servomechanism, open-loop and closed-loop systems, control system components, servomotor, tachometer, synchros, position control systems, equations of electrical and mechanical systems, transfer functions and impulse response.

Unit – II

Block Diagrams: block diagram representation and manipulation, signal flow graphs-mason's gain formula to determine overall system gain.

Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback, regenerative feedback.

Unit – III

Time Response: Types of input, transient response of second order system for step input, time-response specifications, steady state error and error constants, proportional, derivative and integral controls.

Unit – IV

Concept of Stability: Stability of systems-Routh Hurwitz criterion, Relative stability.

Root Locus: Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques.

Unit – V

Frequency Response: Co-relation between time and frequency response, frequency domain specifications, resonant peak (Mp) and resonant frequency(Wp) for a second order system, relative stability-gain margin(GM) and phase margin (PM),

Unit – VI

Frequency Plots: Bode plots, , Polar plots, Nyquist criterion for open loop stable system, M and N circles,

Unit – VII

Compensation (Without Design): The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators.

Unit – VIII

State Variable Analysis: Introduction, concepts of state, state variables, state transition matrix, and state model, state model of linear systems, state-space representation using phase variable and physical variables, solution of state equations. Concept of Controllability and Observability.

TEXT BOOKS:

1. *Nagrath and Gopal (2003), "Control systems Engineering", New Age International Publications.*

2. *B.C.Kuo (2003), "Automatic Control Systems", Oxford.*
3. *K. Ogata (2003), "Modern control Engineering", Pearson*
4. *Naresh - K.Sinha (1998), "Control Systems", New Age International Publishers.*
5. *B.S.Manke (1996), "Linear Control Systems".*

REFERENCE BOOKS:

1. *Madan Gopal (2003), "Control Systems", TMH.*
2. *Dorf, Bishop (1998), "Modern Conrtol systems", Addison Wesley*
3. *(Shaum's out line series) (1986), "Feedback control systems", TMH*
4. *R.C.Shukla, "Control Systems", Dhanpat Rai.*
5. *Ashok Kumar, "Control Systems", TMH.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Represent the mathematical model of a system
- Determine the response of different order systems for various step inputs
- Analyze the stability of the system.

PULSE AND DIGITAL CIRCUITS (PDC)
(For III B. Tech EEE – I Semester)

Scheme : 2010 | Internal Assessment : 30
Contact Periods : (3L+1T) / Week | End Exam Marks : 70
Credits : 4 | End Exam Duration : 3 hrs

Course Objectives:

- To make them familiar with the implementation of combinational logic functions and to understand the working of counters and flip flops
- To provide the student with an understanding of the switching characteristics of diode and transistor.

Unit – I

Linear Wave Shaping: High pass, Low pass RC circuits and their response for sinusoidal, Step, pulse, Square and ramp inputs, RC network as differentiator and integrator.

Unit – II

Non Linear Wave Shaping: Diode clippers, clipping at two independent levels, Transfer characteristics of clippers, Clamping operation, Clamping circuits using diode with different inputs, Clamping circuit theorem.

Unit – III

Switching Characteristics of Diode and Transistor: Diode as a switch, Piecewise linear diode characteristics, Transistor as a switch, Saturation parameters of Transistor and their variation with temperature, Transistor switching times, Design of transistor switch.

Unit – IV

Multivibrators: Introduction to Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

Unit – V

Number Systems: Binary, Octal, Decimal, Hexadecimal systems, Conversion of number systems, Weighted and non-weighted codes, Digital Data Representation: Fixed - signed magnitude, 1's complement, 2's complement, Floating point – biased exponent, Binary arithmetic, Hamming code, Error detection and correction.

Unit – VI

Logic Gates and Simplification of Boolean Expressions: OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR gates, Boolean theorems, Switching functions: types, sum of products, Product of sum, Canonical forms, Minimization of Boolean functions using K-maps and tabulation methods.

Unit – VII

Combinational Circuits: Binary adders and Subtractors using signed magnitude, 1's complement, 2's complement, Carry look-ahead adders (fast adders), BCD adders and Subtractors, decoders, encoders, multiplexers, de-multiplexers, parity generator and checker, code conversion circuits, magnitude comparator.

Unit – VIII

Sequential Circuits: Finite state model of sequential circuits, Flip-flops, shift registers, Ring and Johnson counters, Asynchronous and Synchronous counters, design of non-binary counters.

TEXT BOOKS:

1. *Milliman and Taub (2005), "Pulse, Digital and Switching Waveforms", McGra-Hill.*

2. *M. Moris Mano, Charles R.Kime (2003), "Digital Logic and Computer Design Fundamentals", 2nd Edition, Pearson Ed.*

3. *Zvi Kohavi (2004), "Switching and Finite Automata Theory", 2nd edition TMH.*

4. *R.P.Jain (2007), "Modern Digital Electronics", 3rd Edition, TMH.*

REFERENCE BOOKS:

1. *Milliman and Taub (2005), "Pulse, Digital and Switching Waveforms", McGra-Hill.*

2. *M. Moris Mano, Charles R.Kime (2003), "Digital Logic and Computer Design Fundamentals", 2nd Edition, Pearson Ed.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question from each unit. The student shall answer **FIVE** questions.

Course Outcomes:

- Knowledge and understanding. About digital terminologies.
- To know about basic knowledge about logic technologies and families.
- To design the electronic circuits for signal conversion.

OPTIMIZATION THEORY (OT)

(For III B. Tech EEE – I Semester)

Scheme : 2010
Contact Periods : (3L +1T)/week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To understand the concepts of Classical optimization
- To provide adequate knowledge in linear & non linear programming.
- To learn Gradient methods.

Unit – I

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

Unit – II

Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

Unit – III

Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations by Pivotal reduction– motivation to the simplex method – simplex algorithm.

Unit – IV

Non-Linear Programming: One Dimensional Search Methods-Fibonacci method, Golden Search method, Interpolation method, Quadratic and cubic interpolation methods, Direct root methods.

Unit –V

Unconstrained Optimization: Direct search method, Univariate search and pattern search methods, Powell's method

Unit – VI

Constrained Nonlinear Programming: Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.

Unit – VII

Gradient Methods: Steepest descent, conjugate gradient and quasi-newton method, Hooke-Jeeves method.

Unit – VIII

Dynamic Programming: Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

TEXT BOOKS:

1. S.S.Rao (1998), "Engineering optimization: Theory and practice", New Age International (P) Limited, 3rd edition.

2. H.S. Kasene & K.D. Kumar (2002), "Introductory Operations Research", Springer (India), Pvt.LTd.

REFERENCE BOOKS:

1 K.V. Mital and C. Mohan (1996), "Optimization Methods in Operations Research and systems Analysis", New Age International (P) Limited, Publishers, 3rd edition.

2. Dr. S.D.Sharma (2002), "Operations Research".

3. H.A. Taha (2004), "Operations Research : An Introduction", PHI Pvt. Ltd., 6th edition

4. G. Hadley (1996) , "Linear Programming". Narsa Publishing House.

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe concepts of classical optimization
- Analyze linear & non linear programming method.
- Apply gradient methods.

ELECTRICAL MACHINES – II LAB (EMC2 (P))
(For III B. Tech EEE - I Semester)

Scheme : 2010 Internal assessment : 30

Contact Periods : 3P/week End Exam Marks : 70

Credits : 2 End Exam duration : 3 hrs

Course Objectives:

- The objective of the laboratory is to provide the students a chance to put the theory in to practice.
- To expose the students to the operation of Transformers, synchronous machines and induction motors and give them experimental skills.

LIST OF EXPERIMENTS

1. OC, SC and Load tests on 1-phase transformer
2. Sumpner's test on two identical single phase transformers.
3. Scott connection (3phase to 2phase conversion).
4. Polyphase connection of transformers
5. Separation of losses of single phase transformer.
6. No – load test and Rotor blocked tests on single phase induction motor.
7. No – load test and Rotor blocked tests on three phase squirrel-cage induction motor
8. Brake test on three phase squirrel-cage induction motor.
9. Regulation of alternator using synchronous impedance and ZPF methods.

10. Synchronization of alternator and V & $\wedge$ curves of synchronous motor.

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- The student will Analyze the characteristics of AC machines
- Understand the concept of efficiency, load characteristics load Test.

ELECTRONICS ENGINEERING – II LAB (LE2(P))
(For III B. Tech EEE - I Semester)

Scheme : 2010 | Internal assessment : 30
Contact Periods : 3P/week | End Exam Marks : 70
Credits : 2 | End Exam duration : 3 hrs

Course Objectives:

- The objective of this laboratory is to study the characteristics of amplifier, multivibrator & oscillator.

LIST OF EXPERIMENTS

1. Two Stage RC Coupled Amplifier.
2. Booststrap Amplifier and Darlington Amplifier.
3. FET Amplifier.
4. Voltage Series and Current Series Feedback Amplifiers.
5. Differential Amplifier.
6. RC Phase Shift Oscillator.
7. Integrator and Differentiator.
8. Clipper and Clamper.
9. Astable Multivibrator.
10. Universal Gates, Half adder and Full Adder

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Understand the concept of amplifier, multivibrator & oscillator.

CONTOROL SYSTEMS LAB (CS (P))

(For III B. Tech EEE - I Semester)

Scheme : 2010 | Internal assessment : 30
Contact Periods : 3P/week | End Exam Marks : 70
Credits : 2 | End Exam duration : 3 hrs

Course Objectives:

- To help the students understand and practice the modeling, simulation, and implementation of a physical dynamical system by a linear time invariant ordinary differential equation
- To highlight the electrical modeling of a second order system and analyze the under-damped, over-damped and critically damped cases.

LIST OF EXPERIMENTS

1. A.C.Servo Motor, Synchros and Potentiometer

2. D.C.Servo Motor
3. Linear System Simulator
4. PID controller
5. Compensation Design
6. Stepper Motor
7. Root Locus plot, Bode plot from MATLAB
8. Nyquist plot, Polar plot from MATLAB
9. Programmable Logic Array.
10. Speed Control of DC Motor using PLC

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- From the time response or frequency response obtain a mathematical model of the system.
- Students will demonstrate the ability to apply what they have learned theoretically in the field of control engineering.

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination
(Effective from 2010-11)

III B.Tech (EEE) - II Semester **Scheme: 2010**

S. No.	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	**Theory**									
1	Switchgear & Protection	SGP	4	3	1	–	3	70	30	100
2	Power Electronics –II	PEL2	5	4	1	–	3	70	30	100
3	Instrumentation	INS	4	3	1	–	3	70	30	100
4	Microprocessors &Applications	MPA	5	4	1	–	3	70	30	100
5	Integrated Circuits& Applications	ICA	5	4	1	_	3	70	30	100
6	Introduction to Information Systems	IIS	5	4	1	_	3	70	30	100
7	Open Elective – I		2	2	_	_	_	_	100	100
II	**Practical**									
8	Power Electronics Lab	PE(P)	2	-	-	3	3	70	30	100
9	Power Systems Lab	PS(P)	2	–	–	3	3	70	30	100
10	Introduction to Information Systems Lab	IIS(P)	2	–	–	3	3	70	30	100
	Total		**36**	**24**	**6**	**9**		**630**	**370**	**1000**

SWITCH GEAR AND PROTECTION (SGP)

(For III B. Tech EEE – II Semester)

Scheme : 2010 | Internal assessment : 30

Contact Periods : (3L+1T)/Week | End Exam Marks :70

Credits : 4 | End Exam Duration : 3 hrs

Course Objectives:

- Teach students theory and applications of the main components used in power system protection.
- Teach students the theory, construction, and applications of main types circuit Breakers.

Unit – I

Circuit Breakers-1: Elementary principles of arc interruption, Restriking Voltage and Recovery voltages- Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications, Numerical Problems. – Auto reclosures.

Unit – II

Circuit Breakers-2: Description and Operation of following types of circuit breakers: Oil Circuit breakers, Air Circuit Breakers, Vacuum and SF_6 circuit breakers, advantages and disadvantages.

Unit – III

Electromagnetic and Static Relays: Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays.

Relays Classification: Over current, under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays.

Distance relays: Universal torque equation, Impedance, Reactance, Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison.

Static Relays: Static Relays –advantages and disadvantages.

Unit – IV

Generator Protection: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected.

Unit – V

Transformer Protection: Protection of transformers: Percentage Differential Protection, Numerical Problem, Buchholtz relay Protection.

Unit –VI

Feeder and Bus-Bar Protection: Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay.

Protection of Bus bars – Differential protection.

Unit – VII

Neutral Grounding: Grounded and Ungrounded Neutral Systems.- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

Unit – VIII

Protection against over voltages: Causes for over voltages in power systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

TEXT BOOKS:

1. *Sunil S Rao (1995), "Switchgear and Protection", Khanna Publlishers*
2. *Badari Ram (2005) , D.N Viswakarma, "Power System Protection and Switchgear", TMH Publications*

REFERENCE BOOKS:

1. *Paithankar and S.R.Bhide (2003), "Fundamentals of Power System Protection", PHI.,*
2. *C R Mason (1991), "Art & Science of Protective Relaying", Wiley Eastern Ltd.*
3. *C.L.Wadhwa (2010), "Electrical Power Systems", 3th edition New Age international (P) Limited, Publishers,*
4. *B.L.Soni, Gupta, Bhatnagar, Chakrabarthy (2006), "A Text book on Power System Engineering", Dhanpat Rai & Co.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students are knowledgeable in the field of power system protection, and circuit breakers.
- Students are knowledgeable in the field of over- voltage protection.

POWER ELECTRONICS – II (PEL2)
(For III B. Tech EEE – II Semester)

Scheme: 2010 — Internal Assessment : 30
Contact Periods: (4L+1T)/Week — End Exam Marks : 70
Credits: 5 — End Exam Duration : 3 Hrs

Course Objectives:

- To understand the principles of operation of inverters & choppers.
- To study SMPS & UPS supplies.

Unit – I

Single-Phase Inverters: Classification of single-phase inverters, basic series and basic parallel inverters, single-phase half and full-bridge inverters with R and R-L Loads, simple problems.

Unit – II

Control of Single-Phase Inverters: voltage control of 1-phase voltage source inverters (VSI)-Pulse width modulation techniques for single-phase VSI, principle and operation of 1-phase current source inverters (CSI), simple problems.

Unit – III

Three-phase inverters: principle and operation of 3-phase VSI with 180^{o} and 120^{o} modes of operations, comparison of two conducting modes, voltage control of three-phase VSI using PWM techniques, Harmonic reduction by PWM methods, principle and operation of three-phase CSI, comparison of VSI and CSI, simple problems.

Unit – IV

DC Choppers: Principle of operation of choppers, control strategies- time ratio control and current limit control, step up chopper, multi quadrant (two and four quadrant) choppers, time domain analysis of step down chopper, simple problems.

Unit – V

Switched Mode Power Supplies: The basic configuration of flyback, pushpull, half bridge and full-bridge SMPS (Principle of Operation only).

Uninterruptable Power Supplies: The basic operation of Uninterruptable Power Supplies (UPS) (Theoretical aspects only)

Unit – VI

AC Voltage controllers : 1-phase AC regulators with R and RL loads, 3-phase AC voltage regulators with R-load, derivation of rms load voltage, current and power factor, wave forms, simple problems.

Unit – VII

Speed Control of Electric motors: Closed loop speed control of DC motors using phase controlled rectifiers and choppers, speed control of induction motors using ac voltage controllers and voltage source inverters, slip power recovery schemes – Static Kramer and Static Scherbius drive systems (Qualitative treatment only) (Block diagram approach only).

Unit – VIII

Applications of Power Electronics: Static excitation system for alternators, static circuit breaker, over voltage protection, simple battery charger, automatic battery charger, SCR current limiting circuit breaker, fan regulator using TRIAC.

TEXT BOOKS:

1. *M.D. Singh and K.B. Khanchandani (2002), "Power Electronics", 2nd Edition, Tata McGraw Hill Publishers.*
2. *P.S. Bimbhra (2010), "Power Electronics", 4th Edition, Khanna publishers.*
3. *P.C. Sen, (2010), "Power Electronics", 35th Reprint, Tata McGraw Hill Publishers.*
4. *Ashfaq Ahmed, (2003), "Power Electronics for Technology" First Indian Reprint, Pearson Education Publishers.*
5. *Harish C Rai (1993), "Industrial and Power Electronics" 5th Edition, Galgotia Publishers.*

REFERENCE BOOKS:

1. *Vedam Subrahmanyam (1996), "Power Electronics", New age international publishers.J.Vithayathil (2010), "Power Eletronics: Priciples and Applications", 2nd Edition reprint, Tata McGraw Hill Publishers.*
2. *M.H. Rasheed (2004), "Power Electronics Circuits Devices and applications", 3rd Edition, PHI publishers.*
3. *G.K.Dubey, S.R.Doradra, A.Joshi, and R.M.K Sinha, (2009) "Thyristorised power controllers", 1st edition reprint, New Age International (p) Ltd. Publishers.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe the single phase & three phase inverters.
- To study the various applications of power electronic controllers.

INSTRUMENTATION (INS)
(For III B.Tech EEE – II Semester)

Scheme : 2010	Internal assessment : 30
Contact Periods : (3L +1T)/week	End Exam Marks : 70
Credits : 4	End Exam duration : 3 hrs

Course Objectives:

- This subject is essential in monitoring and analysis of any physical system and its control.
- It deals with different types of transducers, digital voltmeters and oscilloscopes.

Unit - I

Measurement Instrumentation and Calibration: Classification of transducers, Performance characteristics-Static &Dynamic, Calibration and standards.

Unit - II

Dynamics of Instrument Systems: General performance of Systems – Electromechanical Systems – Fluidic systems-Liquid Manometer System, Pneumatic System, A Flapper Nozzle system.

Unit – III

Study of CRO-Measurement of Frequency-Lissajous method, spot wheel method, gear wheel method, Measurement of Phase - analog storage oscilloscopes-Digital storage oscilloscopes- sampling oscilloscope- Problems.

Unit – IV

Digital Voltmeters- Ramp-Type, Integrating,Continuous-Balance, Successive-approximation – Digital frequency meter – Digital phase angle meter – wave analyzers-Basic wave analyzer-Frequency Selective wave analyzer, Heterodyne wave analyzer, Harmonic Distortion wave analyzer -Spectrum analyzer, Vector impedance meter, Q-meter, peak reading and RMS Voltmeters.

Unit – V

Advantages of Electrical Transducers –Resistor, Inductor, & Capacitor transducers – Strain Gauge – Gauge Factor – types - Measurement of Strain – Gauge sensitivity.

Unit – VI

Thermistor– Thermocouples – LVDT, Synchros, Piezoelectric Transducers, Photovoltaic, Photo conductive cells – Photo Diodes & transistors.

Unit – VII

Temperature compensation – load cell – Vacuum Gauges-Thermocouple, Pirani, Ionization Type – Torque measurement-Strain guage torque meters, Inductive Torque transducers, Digital methods, Magnetostrictive transducers – Angular Velocity using Tachometers and digital methods.

Unit – VIII

LVDT type accelerometer – Flow measurement using electromagnetic – hot-wire anemometer and ultrasonic types – capacitance method for liquid level measurement.

TEXT BOOKS:

1. *DVS Murthy (1995), "Transducers & Instrumentation", PHI.*
2. *C.S.Rangan,G.R.Sarma and Mani (2002), "Instrumentation: Devices & systems", TMH.*
3. *A.D.Helfrick & W.D.Cooper (1992), "Modern Electronic Instrumentation & Measurement Techniques", PHI.*

REFERENCE BOOKS:

1. *D.O.Doeblin (1990), "Measurement Systems,Applications & Design", TMH.*
2. *A.K.Sawhney (2004), "Electrical & Electronics Measurements & Instrumentation, Danpat Rai & Sons.*
3. *C.Johnson (1982), "Process Control Instrumentation Technology", PHI*
4. *A.S. Morris (2003), "Principles of Measurement & Instrumentation", PHI.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Apply creativity to the solution of the problems in case studies and design assignments related to microprocessor based instrumentation and control.

MICROPROCESSORS & APPLICATIONS (MPA)
(For III B.Tech EEE - II Semester)

Scheme: 2010 | Internal Assessment : 30
Contact Periods : (4L+1T) / Week | End Exam Marks : 70
Credits : 5 | End Exam Duration : 3 hrs

Course Objectives:

- To study the basics microprocessors and to understand the architecture and instruction set of 8085,8056 micro processor.
- To analyze the interfacing with the external device using 8255.

Unit – I

Introduction of 8 bit Microprocessor 8085: Architecture and Organization of 8085 Microprocessor, Instruction set, Addressing modes, Instruction cycle, Fetch and Execute cycles.

Unit – II

Introduction of 16 bit Microprocessor 8086: 8086 CPU architecture, Segmented memory, Addressing modes.

Unit – III

8086 Instruction set: Instruction set, Maximum mode and Minimum mode in 8086.

Unit – IV

Introduction to Assembly Language Programming: Assembler directives, Assembly language programming using MASM / TASM.

Unit – V

Programming on 8086: Simple programs on Arithmetic Sorting, Searching, Code conversions, String manipulations etc. Procedures & Macros. Using DOS Int 21h Calls.

Unit – VI

Memory Interfacing: Read/ Write timing, SRAM and ROM Interface requirements, Interfacing of Static memory and Dynamic memory.

Unit – VII

I/O Interfacing: 8255(Programmable Peripheral Interface), 8255 applications –Stepper Motor interfacing, DAC and ADC interfacing.

Unit – VIII

Peripheral Interfacing: 8254(Programmable Timer / Counter), 8251(USART), 8257 (DMA Controller), 8259 (Programmable Interrupt Controller), Co-processor 8087 – architectures.

TEXT BOOKS:

1. *Gaonkar Ramesh(2010), "Microprocessors Architecture, Programming & Applications with 8085/8080A", 5th Edition, Penram International publication Ltd,.*
2. *Douglas V. Hall(2006), "Microprocessors and Interfacing Programming and Hardware", 2nd Edition,Tata McGraw Hill Education Private Ltd.*
3. *A K Ray, K M Bhurchandi (2010),"Advanced Microprocessors and Peripherals", 2nd Edition, Tata McGraw Hill Education Private Ltd,.*

REFERENCE BOOKS:

1. *John Uffenbeck (2006), "The 8086/8088 Family: Design, Programming, and Interfacing", 3rd Edition, Pearson Ed.*
2. *Walter A. Triebel, Avtar Singh (2009), "The 8088 and 8086 Microprocessors", 4th Edition, Pearson Ed,.*
3. *Barry B. Brey (2009), "The Intel Microprocessors-Architecture, Programming and Interfacing", 8th Edition, Princeton Hall India.*

Note: The question paper shall consist of **EIGHT** questions, **ONE** from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe the architecture of a 8085 8086 micro processor.
- Describe the addressing modes of microprocessors and interface the processor to external devices.

INTEGRATED CIRCUITS AND APPLICATIONS (ICA)

(Common to III B. Tech ECE & EEE – I Semester)

Scheme : 2010 — Internal Assessment : 30
Contact Periods: (4L+1T) / Week — End Exam Marks : 70
Credits : 5 — End Exam Duration : 3 hrs

Course Objectives:

- To familiarize the student with the analysis and design of basic Op-Amp amplifier circuits, feedback amplifiers, wave shaping and multi vibrator circuits
- Design a basic op amp comparator,an op amp window comparator, A/D and D/A converters.

Unit – I

Op-Amp Fundamentals: Differential amplifier concept, op-amp ideal characteristics, practical inverting and non-inverting op-amp, study of typical IC op-amp and its different stages, features of 741 op-amp, dc characteristics: i/p bias current, i/p offset current, offset voltages, offset balance, thermal drift, ac characteristics: frequency response, stability of op-amp, frequency compensation, slew rate, op-amp parameters.

Unit – II

Op-amp Applications-I: Summing amplifier, difference amplifier, Current to voltage and voltage to current converters, Instrumentation amplifier, clippers and clampers, precision AC to DC converters, integrator, differentiator, Log & antilog amplifier.

Unit – III

Op-amp Applications-II

Comparators and active filters: Comparators, window detector, schmitt trigger, pulse, square and triangle wave generators, sample and hold circuits. Active filters (Butterworth filters up to second order only).

Unit – IV

Timers & Waveform Generators Note: The question paper shall consist of **FIVE** units with **TWO** questions in each unit. The student shall answer **ONE** question in each unit.

555 Timer: astable and monostable modes, applications, waveform generators: IC 566 and IC 8038.

Unit – V

Phase Locked Loops: Principle of operation, Lock and capture ranges, detailed study of different blocks of PLL, IC 565 PLL, applications of PLL.

Unit – VI

IC Regulators: General form of series Regulators, fixed voltage regulator, IC 723 voltage regulator, switching regulators – step up, step down and inverting modes (IC UA 78S40)

Unit – VII

D/A and A/D Converters: DACs : Weighted resistor, R-2R ladder type and inverted R-2R ladder, DAC IC 1408L, ADCs: Parallel comparator, counter, successive approximation and dual slope types, ADC 0801, AD 574 (12 bit ADC), specifications of converters.

Unit – VIII

Logic Families: Specifications of logic gates, DTL, HTL, TTL, RTL, DCTL, ECL, MOS and CMOS circuits, CMOS bilateral switch, comparison of logic families, TTL driving CMOS and CMOS driving TTL.

TEXT BOOKS:

1. Roy Choudhury & Shail B.Jain (2010), "Linear Integrated Circuits",4^{th} edition, New Age Int. Pub.

2. Ramakanth A. Gayakwad (2003), "Op-Amps & Linear ICs", 4^{th} edition,PHI.

3. Moris Mano (2008), "Digital Logic and Computer Design", PHI.

REFERENCE BOOKS:

1. Sergio Franco, "Design with Operational Amplifier and Analog Integrated Circuits", TMH.

2. Anand Kumar, "Pulse and digital Circuits", PHI

3. Ronald J.Tocci, Neil S Widmor, "Digital Systems Principles and Applications", Pearson Ed.

Note: The question paper shall consist of **EIGHT** questions , **ONE** question from each unit.
The student shall answer any **FIVE** questions.

Course Outcomes:

- Analyze the different types of Op-Amp, operation and its characteristics
- Design and analyze the comparators and active filters.

INTRODUCTION TO INFORMATION SYSTEMS (IIS)

(Common to III B. Tech EEE, ECE – II Semester)

Scheme : 2010 — Internal Assessment : 30
Contact Periods: (4L+1T)/week — End Exam Marks : 70
Credits: 5 — End Exam Duration : 3hrs

Course Objectives:

- Students will learn the fundamentals of computer organization, how operating systems are implemented, assemblers, compilers, loaders, linkers, interpreters, complete software development life cycle.
- To interpret an entity relationship diagram (ERD) to express requirements and demonstrate skills to model data requirements and create data models into normalized designs, concurrency control and database locking techniques.

Unit – I

Fundamentals of Computers & Computer Architecture: Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance Memory, Input/output devices, BUS, addressing modes

Unit – II

System Software: Assemblers, Loaders and linkers, Compilers and interpreters.

Operating System : Introduction , Process Management, CPU scheduling, Memory Management Schemes , Page replacement algorithms.

Unit – III

Software engineering: Introduction to software engineering, Life cycle of a Software Project, Software Development Models.

Testing, Debugging and Code Reviews: Unit Testing, Debugging, Debugging using the IDE, Code Review.

Unit – IV

Coding Standards and Best Practices: Introduction to C Programming, Basics of C Language, Data Types in C, Steps in creating Courses, Functions, arrays, pointers, structures.

Importance of Adhering to standards and best practices.

Sorting and Searching Techniques: Searching Algorithms – Linear Search, Binary Search, Sorting Algorithms – Bubble Sort, Selecting Sort and Insertion Sort.

Unit – V

Relational Database Management System: Introduction to DBMS, the database technology, data models. Database Users.

Entity Relationship (E-R) Modeling: Introduction, Notations, Modeling E-R Diagrams, Case Study 1,2 & 3, Merits and Demerits of E-R modeling.

Unit - VI

Structured Query languages (SQL): History of SQL, Data Types, Data Definition Language Statements (DDL), Data Manipulation Language (DML), writing simple queries, Embedded SQL, Online Transaction Processing

Unit – VII

Normalization: Introduction, Need for Normalization, Process Normalization, Types of Normal Forms (1 NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization, case study.

Unit – VIII

Transaction properties and concurrency: Acid properties, issues with concurrency – lost update, inconsistent summary and dirty read.

Data base locking techniques: Shared lock, exclusive lock and intent locks, Backup and Recovery

TEXT BOOKS:

1. *"Campus Connect Foundation Programme – Computer Hardware and System Software Concepts, Programming Fundamentals"- Vol. – 1, INFOSYS.*
2. ***"**Campus Connect Foundation Programme – Relational Database management System, Client Server Concepts, Introduction to Web Technologies" - Vol. – 2, INFOSYS*
3. *"Campus Connect Foundation Programme – Object Oriented Concepts – System Development Methodology, User Interface Design" - Vol. – 3, INFOSYS*
4. *Yashwant Kanetkar (2007), "Let us ''C'' ", bpb Publications 8th ed.,.*

REFERENCE BOOKS:

1. *Andrew S. Tanenbaum (1991), "Structured Computer Organization", PHI, 3rd ed.*
2. *Silberschatz and Galvin (1995), "Operating System Concepts", 4th ed., Addision-Wesley.*
3. *Kernighan, Ritchie (1992),"ANSI C language", PHI.*
4. *Alfred V Aho, John E Hopcroft, Jeffrey D Ullman (1998), "Design and Analysis of Computer Algorithms", Addison Wesley Publishing Co.*
5. *Wilbert O. Galitz (1997), "Essential Guide to User Interface Design", John Wiley.*
6. *Alex Berson (1994), "Client server Architecture", Mc Grew Hill International,*
7. *Henry F Korth, Abraham Silberschatz (1991), "Database System Concept", 2nd ed. McGraw-Hill International editions.*
8. *Brad J Cox, Andrew J.Novobilski (1991), "Object – Oriented Programming – An evolutionary approach", Addison – Wesley.*
9. *Rojer Pressman (2001), "Software Engineering-A Practitioners approach", McGraw Hill, 5th ed.*

Note: The question paper shall consist of **EIGHT** questions , **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Students will learn the concepts of computer organization, operating systems, compiler design including its phases and components and become acquainted with the life cycle of a software project, and its various phases.

- To use SQL to create database objects and able to understand transaction properties, concurrency and data base locking techniques.

POWER ELECTRONICS LAB (PE (P))
(For III B. Tech EEE - II Semester)

Scheme: 2010 Internal assessment: 30
Contact Periods: 3P/week End Exam Marks: 70
Credits: 2 End Exam duration: 3 hrs

Course Objectives:

- The objective of the laboratory is to study power electronic converters practically and gives them experimental skills.

LIST OF EXPERIMENTS

1. Single phase half wave rectifier with R & RL load (Experimental and simulation)
2. Single phase fully controlled rectifier with R & RL load (Experimental and simulation).
3. Single phase half controlled rectifier with R & RL load (Experimental and simulation)
4. Single-phase AC voltage controller using two SCRs with R and RL load (Experimental and simulation)
5. Single phase AC voltage control using TRIAC with UJT firing circuit
6. DC chopper
7. Single phase step down cycloconverter with R & RL load
8. Three-phase AC voltage controller with R load (Experimental and simulation)
9. R and RC triggering circuits
10. Simulation of 1-phase bridge inverter with R load

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Understand the concept of power electronic converters.

POWER SYSTEMS LAB (PS(P))
(For III B. Tech EEE - II Semester)

Scheme : 2010 Internal assessment : 30
Contact Periods : 3P/week End Exam Marks : 70
Credits: 2 End Exam duration : 3 hrs

Course Objectives:

- To allow students to practically verify several concepts and procedures learned in power system modeling and analysis
- The student will study electrical apparatus relays, transformers and BDV of oil.

LIST OF EXPERIMENTS

1. IDMT Over Current Relay
2. Inverse Over Current Relay

3. 220 KV-180KM EHV-AC Long Transmission Line Simulator(Voltage regulation and determination of surge impedance)
4. Study of oil testing kit and determination of dielectric strength
5. Simulation of faults on a 3-phase unloaded alternator
6. Determination of +ve, -ve and zero sequence impedances of 3-phase alternator
7. Determination of +ve, -ve and zero sequence impedances of 3-phase Transformer
8. Simulation of string insulators for the determination of voltage distribution and string efficiency.
9. Measurement of Capacitance of Three Core Cable
10. Measurement of Earth resistance

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

Students will

- Understand how to measure electrical parameters characteristics of a 3 phase transmission Line.
- Know how to carry out a short circuit analysis study for symmetrical and unsymmetrical faults and are able to interpret the results of the analysis.

Introduction to Information Systems Lab (IIS (P))
(Common to III B. Tech EEE, ECE – II Semester)

Scheme : 2010 Internal Assessment : 30
Contact Periods: 3 hrs/week End Exam Marks : 70
Credits: 2 End Exam Duration : 3hrs

Course Objectives:

- To implement different sorting and searching techniques in 'C' language.
- To write simple SQL queries and generate reports for a given database.

LIST OF EXPERIMENTS USING C

1st Week:

1. Programs on Basic Programming constructs (if, switch-case, while, do while, for)

2nd Week:

1. Programs on Arrays
2. Write a program to Implement the Transpose of the matrix.(Modify the same matrix)

3nd Week:

Implementation of Searching Techniques

Linear Search
Binary search

4th Week:

Implementation of Sorting Techniques

Write a program to sort the given list with arrays using the following sorting techniques.

Selection sort
Bubble sort
Insertion sort
Quick sort

An institute wants to automate the process of allocating courses to vendors. Initially automation is considered for 5 vendors.

Assumption: one course could be allotted to many vendors.

Declare and initialize the following **arrays each of size 5:**

- An array to store the Vendor Ids. Initialize it with the following values 101, 102, 103, 104 and 105.
- An array to store the course Id's and initialize it with zeros.
- An array to store the amount (to be paid to the vendor for that course) and initialize it with zeros.

All the three arrays have one to one correspondence.
Consider the following table for the courseid and their corresponding amount details.

Course Id's	**Amount**
1001	25000
1002	35000
1003	20000
1004	15000
1005	20000

Display a menu to implement the following functionalities:

1. **Allocate course**
2. **Deallocate course**
3. **Report**

Implement the following functionality for each of the given options:

1. **Allocate course**

o Accept the VendorId

- Display appropriate error message if the vendor id is invalid(if it is not found in the array of Vendor Ids)
- Display appropriate error message if the vendor is already allotted to a course

<

o Accept the Course Id.

- Display appropriate error message if the course id is invalid(not between 1001 and 1005)

o After validation, update CourseId and the related amount for the corresponding vendor.
o Display a message on successful allocation

2. **Deallocate course**

o Accept the VendorId

- Display appropriate error message if the vendor id is invalid(if it is not found in the array of Vendor Ids)
- Display appropriate error message if the vendor is not allotted with a course

o After validation corresponding CourseId and amount should be set to Zero.
o Display a message on successful deallocation.

3. **Report**

Generate a report in the following format for ONLY those vendors who have been allocated the courses.

Vendor Id	**Course Id**	**Amount**
_____	_____	_____
_____	_____	_____

_____ _____ _____
_____ _____ _____

5th Week:
Basic SQL Queries (DDL, DML and DCL)
6th Week:
Queries using Aggregate functions
Account (BRANCHNAME, ACCNO, BALANCE)
Branch(BRANCHNAME, BRANCHCITY, ASSETS)

1. Find the average account Balance at the each branch.
2. Find the number of depositors at each branch
3. Find the names of all branches that have assets greater than at least one branch located at a particular city.

Sales (SNO, SNAME, AREA, GENDER, SAMOUNT)

1. List out the sales amount and names of the top 3 sales persons
2. List out the names and sales amount whose sales amount crosses the average sales amount of north and south.
3. List out the names and sales amount of those persons whose sales amount is greater than minimum sales amount of company and less than average sales amount of company.
4. List out top 5th sales person name sales amount.

7th Week:
Emp (EMPNO, ENAME, SAL, HIREDATE, DEPTNO, MGRNO)

5. Display all employ names which have the character 'TH' or 'LL' in them
6. List all employees hired between two given dates
7. List all employees by name, number, along with their manager name and number

8th Week:
Create the following tables and insert the data with appropriate constraints.

Table: Politician:Politician Details

Column Name		Description
VoterID	Number(5)	Primary Key
Name	Varchar2(15)	Name of the politician. Mandatory.
Address	Varchar2(50)	Address of the politician
City	Varchar2(20)	Place of Residence
ElectionsLost	Number(2)	Must be 0 or greater than zero

Sample Data:

VoterID	Name	Address	City	ElectionsLost
10001	Mohan	Hyderabad Road	Kurnool	2
10002	Ram	56, Ramapuram	Nandyal	3
10003	Eric	Kondareddy fort area	Kurnool	1
10004	William	Vijayanagar	Allagadda	7

Table: Party: Party Details

Column Name		Description
PartyCode	Number(3)	Primary Key

Name	Varchar2(15)	Name of the political party. Mandatory.
HQ	Varchar2(15)	Place where HQ is located

Sample Data:

PartyCode	Name	HQ
101	Party One	Hyderabad
102	Party Two	Kurnool
103	Party Three	

Table: ElectionResult: Details of Politicians who have won the election

Column Name		Description
Year	Number(4)	Year when elected.
Constituency	Varchar2(20)	Must be 'Kurnool' OR Nandyal' OR 'Allagadda'
PartyCode	Number(3)	Must be existing party code
VoterID	Number(5)	Must be existing Voter-id
Votes	Number(6)	Total number of votes the politician won by.

(Year, Constituency) is the Primary Key

Sample Data :

Year	Constituency	PartyCode	VoterID	Votes
1984	Kurnool	101	10003	12967
1986	Nandyal	102	10004	80876
1986	Kurnool	101	10003	100000
1986	Kurnool	102	10002	7023
1992	Nandyal	103	10001	602
1992	Nandyal	101	10004	6021

Note:

You are supposed to fill in the given records in above tables following these rules:

1. Identify the primary key and foreign key (if applicable) in each table.
2. Take care of the constraints and the relationships among the tables.

Queries

1. List details of all politicians whose name contains atleast one 'a' and stay in 'Bangalore'.

2. List the Party name and the Politicians name who won from the Nandyal constituency in the year 1986.

3. List the Politicians details who have won by maximum number of votes after 1990.

4. List the party name, corresponding HQ, total number of times the party has won respectively.

Course Outcomes:

- An ability to write programs in 'C' language.
- An ability to create database using Structured Query Language.

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination
(Effective from 2010-11)

IV B.Tech (EEE) - I Semester **Scheme: 2010**

S. No.	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examination Total Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	**Theory**									
1	Drives & Static Control	DSC	5	4	1	–	3	70	30	100
2	Power Systems Operation and Control	PSOC	4	3	1	–	3	70	30	100
3	Utilization of Electric Power	UEP	4	3	1	-	3	70	30	100
4	Introduction to Signals and Systems	ISS	5	4	1	–	3	70	30	100
5	Advanced Information Systems	AIS	5	4	1	–	3	70	30	100
6	Professional Elective – I		4	4	-	–	3	70	30	100
II	**Practical**									
7	Drives and Control Lab	DC(P)	2	-	-	3	3	70	30	100
8	Electronics Engineering – III Lab	LE3(P)	2	-	-	3	3	70	30	100
9	Mini Project and Comprehensive Viva	MPCV(P)	3	–	–	4	-	70	30	100
	Total		**34**	**22**	**5**	**10**		**630**	**270**	**900**

DRIVES & STATIC CONTROL (DSC)
(For IV B. Tech EEE - I Semester)

Scheme: 2010 Internal Assessment : 30
Contact Periods: (4L+1T)/Week End Exam Marks : 70
Credits: 5 End Exam Duration : 3 Hrs

Course Objectives:

- Introduction to different types of drives and applications in various industries.
- To acquire the knowledge of different speed control methods in a.c motors using thyristors based control schemes.

Unit – I

Introduction: Concept and classification of electrical drives, Advantages of electrical drives, Dynamics of electrical drives: Different types of loads, four quadrant operation of drive, transient and steady state stability of electric drive, Review of speed torque characteristics of d.c. and a.c. motors, conventional speed control methods, braking methods

Unit – II

Control of DC motors by Single phase Converters: Single Phase semi and fully controlled converters connected to DC separately excited and DC series motors under continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed dc motors, closed loop operation (block diagram only), simple problems.

Unit - III

Control of DC motors by Three-phase Converters: Three-phase semi and fully controlled converters connected to dc separately excited and dc series motors under continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics, dual converter fed dc motors, simple problems.

Unit - IV

Control of DC motors by Choppers: Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors under continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics-time domain analysis of step-down chopper fed DC motor drive – Problems on Chopper fed dc Motors – Closed Loop operation (Block Diagram Only), simple problems.

Unit – V

Control of Induction Motor-I: Variable voltage control of induction motor through the AC voltage controllers - speed torque characteristics. Variable frequency constant voltage and basic principle of v/f control of Induction motor – speed torque characteristics, simple problems.

Unit – VI

Control of Induction Motor-II: V/f control of induction motor by VSI, CSI and cycloconverters, PWM control, Comparison of VSI and CSI operations – Speed torque characteristics, simple problems, closed loop operation of v/f controlled induction motor drives (Block Diagram Only)

Unit – VII

Control of Induction motor from Rotor side: Static rotor resistance control, Slip power recovery schemes–Static Scherbius drive, Static Kramer Drive, their performance and speed torque characteristics–advantages applications, simple problems, variable speed constant frequency systems (theoretical aspects only).

Unit – VIII

Control of Synchronous Motors: Separate control & self control of synchronous motors, Operation of self controlled synchronous motors by load commutated inverter, operation and waveforms, advantages and simple problems, variable frequency control through VSI and cycloconverter, closed loop control operation of synchronous motor drives (Block Diagram Only).

TEXT BOOKS:

1. *G.K. Dubey (1989), "Power Semiconductor controlled drives", Prentice-Hall, Englewood Cliffs, Publishers.*
2. *Vedam Subrahmanayam (2008), "Electrical drives concepts and applications", Tata McGraw Hill publishers.*
3. *G.K. Dubey (2001), "Fundamentals of Electrical drives" 2nd Edition, Narosa Publishers.*
4. *S.B. Dewan, G.R. Slemon and A. Starughen, (2009) "Power Semiconductor Drives" Wiley India Pvt. Ltd. Publishers.*
5. *P.C.Sen (1981), "Thyristor dc drives", Wiley Interscience publications.*

REFERENCE BOOKS :

1. *B.K.Bose (2003), "Modern Power electronics and ac drives", Pearson Education Publishers.*
2. *Vedam Subrahmanyam, (2008)"Thyristor control of electric drives", Tata McGraw Hill publishers.*
3. *S.K. Pillai (2005), "A course in Electrical drives", New Age International Publishers.*
4. *W. Leonard (2003), "Control of Electrical Drives", 3rd Edition, Springer Publishers.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Be able to understand the principle of electrical drives and identify the applications.
- Be able to select suitable converters and their controls for drive applications.

POWER SYSTEM OPERATION AND CONTROL (PSOC)

(For IV B. Tech EEE - I Semester)

Scheme : 2010 — Internal assessment : 30
Contact Periods : (3L+1T)/Week — End Exam Marks : 70
Credits : 4 — End Exam Duration : 3 hrs

Course Objectives:

- Define automatic generation control scheme on a power system and analyze generation control on a power system using simulation tools
- Define contingency analysis on a power system and perform contingency studies using a power flow analysis program.

Unit – I

Economic Operation of Power Systems-1: Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.

Unit – II

Economic Operation of Power Systems-2: Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

Unit – III

Hydrothermal Scheduling: Advantages of combined working of different power plants, Short term hydrothermal scheduling problem, Numerical problems.

Unit –IV

Modelling of Turbine, Generator and Automatic Controllers: Necessity of keeping frequency constant, Nature of control problems, Automatic Voltage and frequency control. Basic concepts of governing mechanism: speed governing system model, turbine model, generator load model, Definitions of Control area – Single area control – Block diagram representation of an isolated power system

Unit – V

Single Area Load Frequency Control: Analysis of Load Frequency Control of an Isolated Power System – Steady state analysis – Dynamic response – Controlled and Uncontrolled case – Integral Control of Single area system -

Unit – VI

Two-Area Load Frequency Control: Load frequency control of two-area system – uncontrolled case and controlled case, tie-line bias control

Unit-VII

Reactive Power Control: Overview of Reactive Power control – Reactive Power compensation in transmission systems – advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation.

Unit – VIII

Security of power systems – states of power systems – normal – steady state – abnormal emergency states – contingencies and their ranking – introduction to preventive controls.

TEXT BOOKS:

1. *C.L.Wadhwa (2010), "Electrical Power Systems", 6th Edition , Newage International.*
2. *I.J.Nagrath & D.P.Kothari (2003), "Modern Power System Analysis ", 3rd edition, Tata M Graw – Hill Publishing Company Ltd.*

REFERENCE BOOKS:

1. *J.Duncan Glover and M.S.Sarma (2009), "Power System Analysis and Design", 3rd Edition, Thompson,.*
2. *O.I.Elgerd (2002), "Electric Energy systems Theory ",Tata Mc Graw-hill Publishing Company Ltd., Second edition.*
3. *Grainger and Stevenson (2008), "Power System Analysis", Tata McGraw Hill.*
4. *Hadi Saadat (2008), "Power System Analysis", TMH Edition.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Designing an optimal operation setup of power system which minimizes operation costs and meet desired needs
- Describe future trends in power system control and operation with a focus on new information and control systems technologies.

UTILIZATION OF ELECTRICAL POWER (UEP)

(For IV B. Tech EEE - I Semester)

Scheme : 2010	Internal assessment : 30
Contact Periods : (3L+1T)/Week	End Exam Marks : 70
Credits : 4	End Exam Duration : 3 hrs

Course Objectives:

- Understand the Principle and design of illumination systems and methods of heating, welding and find the applications
- Analyze Electric traction systems and their performance.

Unit – I

Refrigeration and air conditioning: Introduction, types of refrigeration, vapour compression cycle, operational features of absorption refrigeration process, household refrigerator, air conditioning, types of air conditioning systems, room air conditioner, water cooler.

Unit – II

Electric Heating: Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating.

Unit – III

Electric Welding: Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

Unit – IV

Illumination Fundamentals: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, sources of light.

Unit – V

Various Illumination Methods: Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

Unit – VI

Electric Traction – I: System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor.

Unit – VII

Electric Traction – II: Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

Unit – VIII

Electric Traction – III: Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. E. Openshaw Taylor (1995), "Utilisation of Electric Energy ", Orient Longman.
2. Partab (2004), "Art & Science of Utilization of electrical Energy ", *3 rd edition* Dhanpat Rai & Sons.
3. J.B.Gupta (1997), "Utilisation of Electric Power & Electric Traction", S.K. Kataria & Sons Publishers.

REFERENCE BOOKS:

1. N.V.Suryanarayana (1996), "Utilization of Electrical Power including Electric drives and Electric traction", New Age International (P) Limited, Publishers.
2. C.L. Wadhwa (1997), "Generation, Distribution and Utilization of electrical Energy", New Age International (P) Limited, Publishers.
3. Gupta and Bhatnagar (2009), "A Course in Electrical Power", By Soni, , Dhanpat Rai & sons.
4. G.C. Garg (2008), "Utilisation of Electric Power", Khanna Publishers.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe fundamental system issues in electric railway traction including running resistance, tractive effort, adhesion, and power and energy consumption.
- Describe the various applications of electrical energy.

INTRODUCTION TO SIGNALS AND SYSTEMS (ISS)

(For IV B. Tech EEE - I Semester)

Scheme : 2010 — Internal assessment : 30
Contact Periods : (4L+1T) /week — End Exam Marks : 70
Credits : 5 — End Exam duration : 3 hrs

Course Objectives:

- Give students Emphasis on the concepts and methods that are necessary for the analysis of continuous and discrete-time signals and systems.
- To study the behavior of Linear Time Invariant System. Laplace transforms, properties and Transient Analysis of the System.

Unit – I

Introduction: Basic continuous and discrete time signals-systems and their properties - classification of signals-analogy between vector and signal - principles of least squares, Orthogonality and completeness – trigonometric and exponential Fourier series - convergence Direchlets conditions.

Unit – II

Fourier Transform Representation: Fourier Transforms and properties - Fourier Transform of periodic signals, Fourier transform of some common signals.

Unit – III

Signal Analysis: Spectrum - Energy and power spectral densities - Auto-correlation and cross correlation properties - Hilbert transform and properties - pre envelope - band pass signals.

Unit - IV

Sampling: Sampling of continuous time signals (low pass). Aliasing, recovery of signals from samples, practical aspects of sampling – pulses of Finite duration, flat top sampling.

Unit – V

Signals Through Various Systems : Transmission of signals through discrete and continuous LTI systems – Unit impulse response, convolution integral, convolution as summation, graphical method of convolution, causality and stability, system transfer function.

Unit – VI

Laplace Transforms: Introduction – Properties – Laplace transform of some common signals - Laplace transform of periodic signals – Inverse Laplace transform

Unit – VII

Laplace Transform Applications: Application of Laplace transform Methods of Analysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions.

Unit – VIII

Z-Transforms: Introduction, Distinction between Laplace, Fourier and Z-Transforms - Region of convergence in Z-Transforms, properties of ROC, properties of Z-Transforms – Z-transform of some common signals - Inverse Z-Transform.

TEXT BOOKS:

1. Simon Haykin (2002), "Communication systems", Wiley-Eastern.
2. Oppenheim AV and Willisky (1995), "Signals and Systems", PHI.
3. B.P.Lathi (2001), "Communication Systems", Wiley Eastern.

REFERENCE BOOKS:

1. *Simon Haykin(2007), "Signals and Systems", Wiley India Pvt Ltd.*
2. *I Nagrath,S. Sharan,R Ranjan(2010), " SIGNALS & SYSTEMS",TMH.*
3. *B.Kumar (2011)," Signals and Systems", New Age International.*
4. *L.Ravi Kumar (2009)," Signals and Systems", Phi Leraning*
5. *H P Hsu (2008),"Signals and Systems", Schaum's Outline Series,TMH.*

Note : The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Know the concepts of linearity, causality, time-invariance, and stability for continuous-time systems and discrete time systems.
- Know how to characterize LTI discrete-time systems in the time domain using impulse response and difference equations.

Advanced Information Systems (AIS)
(Common to IV B. Tech I Semester EEE & ECE)

Scheme : 2010 — Internal Assessment : 30
Contact Periods: (4L+1T)/week — End Exam Marks : 70
Credits: 5 — End Exam Duration : 3hrs

Course Objectives:

- Justify the philosophy of object-oriented design and understand the concepts of ISO OSI and TCP/IP protocol stacks, IP addressing, network security issues, client server concepts, World Wide Web, HTTP, FTP, DNS, middleware technologies, web server, and application server.
- An ability to learn the different elements of User Interface Design, what makes a good interface design.

Unit – I

Object Oriented Concepts: Introduction, Programming Techniques, Introduction to Object Oriented Concepts, concept of Structured Procedural Programming, objects and its constituents,

Unit – II

Data Abstraction, Classification, Encapsulation and information hiding, Data Access Specifies, UML Notations of a class.

Unit – III

Inheritance, advantages of inheritance, Generalization and Specialization, forms of generalization, Multiple and Multilevel Inheritance, abstract classes, Polymorphism and binding, Implementation of OOC through C++.

Unit – IV

Introduction to computer Networks: Introduction, ISO – OSI 7 layered Architecture , Internetworking, IP Addressing, Assigning and Resolving IP Addresses, Network Security, Client Server Concepts.

Unit – V

Introduction to Web Technology: World Wide Web (WWW) and Hyper Text Transfer Protocol (HTTP), file transfer protocol (FTP), Domine Name Server(DNS), Web Security, Mobile Web Application

Unit – VI

Web Based Applications and Technologies, Case Study, Middleware Technologies, SQL Oriented Data Access, RPC, Transaction Processing Monitor

Unit – VII

Web Server, Application Server Case Study -Introduction to Web Server /App Server and Load Balancing Load Balanced Web/ App Servers Configuration

Unit – VIII

User Interface Design: Introduction to User Interface- its evolution, The process of User Interface Design, Elements of User Interface Design, Good Versus Bad User Interface Design, UID Principle, Tips and Techniques of designing a UID, Reports

TEXT BOOKS:

1. *"Campus Connect Foundation Programme – Computer Hardware and System Software Concepts, Programming Fundamentals" – Vol. – 1, INFOSYS.*
2. *"Campus Connect Foundation Programme – Relational Database management System, Client Server Concepts, Introduction to Web Technologies" - Vol. – 2, INFOSYS*

3. *"Campus Connect Foundation Programme – Object Oriented Concepts – System Development Methodology, User Interface Design" - Vol. – 3, INFOSYS*
4. *E.Balaguruswamy (2008), "Object Oriented programming with C++".*
5. *Forouzan, "Data Communications & Computer Networking", Tata McGrawHill,*

REFERENCE BOOKS:

1. M.P. Bhave and S.A. Patekar (2008)," Object Oriented Programming with C++", Pearson Education.
2. Herbert Schildt (2007), "Teach Yourself C++, TMH".
3. Herbert Schildt (2007), "The Complete Reference C++".
4. Robert Lafore (2008), "Object Oriented Programming in Turbo C++".

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Able to use object oriented programming languages effectively and understand the major functions of each layer of the OSI and TCP/IP Protocol suites, Network security issues and client server concepts.
- Graduates are able to learn the techniques to design a good User Interface.

DRIVES AND CONTROL LAB (DC (P))
(For IV B. Tech EEE - I Semester)

Scheme : 2010 — Internal assessment : 30
Contact Periods : 3P/week — End Exam Marks : 70
Credits : 2 — End Exam duration : 3 hrs

Course Objectives:

- To develop in students the practical skills relevant to understand, analyze and operate power electronics and drives systems.
- To promote teamwork among students and effective communication skills.

LIST OF EXPERIMENTS

1. Verification of SPWM algorithm on DSP based V/f controlled induction motor drive
2. Simulation and implementation of SPWM algorithm on dSPACE kit
3. Microcontroller based speed control of separately excited DC motor.
4. Static Kramer drive
5. Static rotor resistance control of SRIM using chopper.
6. Speed control of induction motor using three-phase AC voltage controllers.
7. Four-quadrant chopper fed DC motor drive.
8. 1-phase IGBT based PWM inverter fed resistive load
9. 3-phase IGBT based PWM inverter fed 3-phase induction motor
10. 3-phase fully controlled bridge rectifier fed DC motor

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Understand the working principles of single phase and three phase IGBT based PWM inverters
- To understand the latest trends in speed control of electrical motors using DSP, microcontroller, etc.

ELECTRONICS ENGINEERING – III LAB (LE3(P))
(For IV B. Tech EEE – I Semester)

Scheme : 2010	Internal assessment : 30
Contact Periods : 3P/week	End Exam Marks : 70
Credits : 2	End Exam duration : 3 hrs

Course Objectives:

- Study the ac characteristics of the non□inverting and inverting op amp configuration, DAC and ADC using microprocessor
- Study the properties of Schmitt trigger circuit, Integrators and differentiators using op-amp.

LIST OF EXPERIMENTS

1. Inverting and Non-inverting Amplifier.
2. Integrators and differentiators.
3. Precision Rectifiers.
4. Schmitt Trigger.
5. Active Filters – Second Order LPF & HPF.
6. Digital to Analog Converter.
7. 723 Low Voltage and High Voltage Regulators.
8. 555 Astable and Monostable Multivibrator.
9. Arithmetic Programs using 8086 Microprocessor.
10. Searching and Sorting using 8086 Microprocessor.
11. Factorial and Fibonacci Series generation using 8086 Microprocessor.
12. ADC & DAC Interfacing with 8086 Microprocessor.

Note: A minimum of **eight** experiments should be conducted

Course Outcomes:

- Understand the conversion from analog to digital and vice-versa.
- Understand the theoretical and practical specification of OpAmp circuits (noninverting and inverting amplifiers, and the applications circuits (summer, Differentiator and Integrator).

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination
(Effective from 2010-11)

IV B.Tech (EEE) - II Semester **Scheme: 2010**

S.No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of End Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	**Theory**									
1	Professional Elective – II		4	4	–	–	3	70	30	100
2	Professional Elective – III		4	4	–	–	3	70	30	100
3	Open Elective –II		2	2	–	–			100	100
II	**Practical**									
4	Project Work	PW(P)	10	–	–	6	3	70	30	100
	Total		**20**	**10**		**6**		**210**	**190**	**400**
OR										
I	Practice School/ Internship	PS	10	-	-	-	-	--	100	100
II	Project Work	PW(P)	10	-	-	-	-	70	30	100
	Total		**20**	**-**	**-**	**-**		**70**	**130**	**200**

List of Open Electives

Open Elective – I

1. Professional Ethics And Human Values (PEHV)
2. Intellectual Property Rights (IPR)
2. Entrepreneurship Development (ED)
3. Entrepreneurship Development (ED)

Open Elective – II

1. Indian Constitution And Society (ICTS)
2. Research Methodology (RM)
3. General Psychology (GPS)

List of Professional Electives

1. Elements of Digital Signal Processing (EDSPR)
2. Neural Networks & Fuzzy logic (NNFL)
3. VLSI Design (VLSID)
4. Modern Control Theory (MCT)
5. Non-Conventional sources of energy (NCSE)
6. Electrical distribution systems (EDS)
7. High Voltage Engineering (HVE)
8. EHV AC Transmission (EHV AC)
9. Reliability Engineering and Applications to Power Systems (REAPS)
10. Programmable Logic Controllers (PLC)
11. HVDC FACTS (HVDC FACTS)
12. Electrical Machine Design (EMD)

PROFESSIONAL ETHICS AND HUMAN VALUES (PEHV)
(Open Elective – I Common for All Branches)

Scheme : 2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer and appreciate ethical dilemma while discharging duties in professional life.

Unit – I

Human Values: Morals- Values- Ethics-Integrity-Work Ethic- Respect for others-Peaceful Life- Honesty- Courage Valuing Time- Empathy- Character- Spirituality

Unit – II

Engineering Ethics: Senses of Engineering Ethics- Variety of Morals-Types of Inquiry-Kohlberg's Theory-Gilligan's Theory-Consensus & Controversy-Models of Professional Roles -Customs and Religion-Uses of Ethical Theories

Unit – III

Safety, Responsibilities & Rights: Safety and Risk-Risk benefit analysis and reducing risk-Collegiality and loyalty-Respect for Authority
Confidentiality-Occupational Crime-Professional Rights-Employee Rights-Intellectual property Rights (IPR) – it's Discrimination

Unit – IV

Global Issues: Multinational Corporations-Environmental Ethics-Computer Ethics-Engineer as Managers-Consulting Engineer-Moral Leadership-Sample ode of Ethics Like ASME, ASCE, IEEE, Institute of Engineers, Indian Institute of Materials Management, IETE etc.,

TEXT BOOKS:

1. Suresh, B. S. Raghavan, "Human Values and Professional Ethics", S. Chand Publications

REFERENCE BOOKS:

1. Mike Martin and roland Schinzinger (1996), "Ethics in Engineering", McGraw Hill, New York.
2. Charles D.Fleddermann (1999), "Engineering Ethics", prentice Hall, New Mexico.
3. S. Dinesh Babu, "Professional Ethics & Human Values", Laxmi publications.

Course Outcomes:

- Ability to utilize the professional competence for augmenting universal human order.
- Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.

INTELLECTUAL PROPERTY RIGHTS (IPR)
(Open Elective – I For III B. Tech – I Semester All Branches)

Scheme : 2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To develop IPR awareness among the students and to improve their exposure to IP basic legal concepts.

Unit – I

Basics of IPR: Introduction to IPR-IPR Systems-Benefits of IPR-Various Types of IPR-Violation of IPR

Unit – II

Patents : Introduction to Patents-Various kinds of Patents-Patenting Process-Copy Right-Remedies against Infringement

Unit – III

Method of Designing Registrations: Designing Registrations-How Chart for Registration-Trade Mark-Geographical Indications
Integrated Circuits-Trade Secrets

Unit – IV

IPR Policy and Management: IP in various sectors like Government and Nation-R &D organizations-IT, Media, Entertainment
Chemical Engineering & Services Sector-Industries & Small Scale Industry

TEXT BOOKS:

1. *"Intellectual Property Rights: Key to New Wealth", National Research Development Corporation*
2. *Prabuddha Ganguli , " Intellectual Property Rights", TMH*

REFERENCE BOOKS:

1. *"Intellectual Property Rights: Key to New Wealth", National Research Development Corporation*
2 *Prabuddha Ganguli, "Intellectual Property Rights", TMH*

Course Outcomes:

- Be able to acquire fundamental competencies with regard to intellectual property rights.

ENTREPRENEURSHIP DEVELOPMENT (ED)
(Open Elective – I for III B. Tech – II Semester All Branches)

Scheme : 2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To promote entrepreneurial culture amongst students and help them acquire competencies needed for setting up small enterprises.

Unit - I

Introduction: Concept of an entrepreneur; Definition of an entrepreneur; Types of entrepreneurs; Characteristics of an entrepreneur.

Entrepreneurship: Definitions; Theories of entrepreneurship; Key elements of entrepreneurship; Six important segments of entrepreneurship environment; Advantages of entrepreneurship; Barriers to entrepreneurship; Role of entrepreneurship in economic development.

Unit – II

Rural Entrepreneurship: Meaning; Need; Retrospection of rural industrialization in India; Problems of rural entrepreneurship; Development plan for rural entrepreneurship.

Small Enterprises : Definition of SSI; Types, Characteristics of SSI; Role of SSI in economic development; Problems faced by SSI.

Unit – III

Project Planning: Project Identification; Project Selection; Project Report – Contents & Formulation; Methods of Project Appraisal.

Ownership Structures: Sole Proprietorship; Partnership; Company; Co-operative; Selection of appropriate ownership structure.

Unit – IV

Institutional Finance: Commercial banks; Other Financial Institutions – IDBI, IFCI, ICICI, IRBI, SFC, SIDC, SIDBI & EXIM Bank.

Institutional Support : Need; Support to Small Entrepreneurs – NSIC, SIDO, SSIB, SSIDC, SISI, DICs

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TEXT BOOKS:

1. *Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, "Principles of Entrepreneurship", Everest Publishing House Pub.*
2. *S.S. Khanka,"Entrepreneurial Development", S. Chand & Company Ltd. Pub.*

REFERENCE BOOKS:

1. *Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, "Principles of Entrepreneurship", Everest Publishing House Pub.*
2. *S.S. Khanka,"Entrepreneurial Development", S. Chand & Company Ltd. Pub.*

Course Outcomes:

- Be able to build on personal as well as external resources with a view to successfully launching and subsequently managing their enterprises.

INDIAN CONSTITUTION AND SOCIETY (ICTS)
(Open Elective – II Common for All Branches)

Scheme :2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To create a meaningful understanding of basic philosophical tenets of Indian Constitutional Law.

Unit – I

Historical back ground-Preamble to the Constitution of India-Fundamental rights-Derivative principles of state policy-Elections in India- Indian Judiciar

Unit – II

Union Executive: Structures of Union Government & Functions-President-Vice President-Prime Minister-Cabinet Parliament-Supreme Court of India

State Executive: Structures and Functions-Governor-Chief Minister-Cabinet-State Legislature-High Courts & Sub ordinate courts

Unit – III

Central – State Relations-President's Rule-Constitutional Amendments [42, 44, 74, 76, 86 & 91]-Constitutional functionaries-Working of Parliamentary system in India

Unit – IV

Nature, Meaning & Definition, Indian Social Structure-Language in India-Political Parties & Presume groups-Right of Women-S.C's, S.T's & other weaker sections.

TEXT BOOKS:

1. Durga Das Basu, "Introduction to the Constitution of India", Wedwe & Company
2. Macivel, Page, "An Introduction Analysis", Society
3. M.V. Pylee, "Indian Constitution", S. Chand Publications

REFERENCE BOOKS:

1. Durga Das Basu, "Introduction to the Constitution of India", Wedwe & Company
2. Macivel, Page, "An Introduction Analysis", Society

Course Outcomes:

- Be able to know how constitution govern the allocation of power in society and the way in which the Indian constitution was made.

RESEARCH METHODOLOGY(RM)
(Open Elective – II for IV B. Tech – II Semester All Branches)

Scheme : 2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To develop a thorough understanding of the issues involved in planning, designing, executing, evaluating and reporting research.

Unit – I

Research Methodology: Introduction -Objectives of Research-Types of Research-Research Methods (Vs) Methodology
Researching process-Technique involved in defining a problem

Unit – II

Research Design and Sampling Design: Need for Research Design-Features of good Design-Concepts Related to Research Design-Different research designs-Basics Principles of Experimental Designs-Steps in sampling design-Characteristics of good sample design-Various types of sample designs-Complex Random sampling designs

Unit – III

Data Collection and Processing: Data Collection through observation method & Interview Method-Data Collection through Questionnaires & schedules -Collection of Secondary data
Processing: Measures of Central Tendency-Measures of Dispersion-Measures of Asymmetry -Measures of Relationship-Simple Regression Analysis-Chi-square Test for comparing valiance

Unit – IV

Sampling Fundamentals & Report writing: Central Limit Theorem-Sampling Theory-Concept of standard error-Estimating population Mean-Sample size & Determination-Technique for Interpretation-Significance of Report writing-Types of Reports-Mechanics of writing a Research Report

TEXT BOOKS:

1. *C.R. Kothari, "Research Methodology (Methods & Techniques)", New Age International Publishers.*
2. *R. Cauvery, V. K. Sudha Nayak, M. Girija, "Research Methodology", S. Chand Publications.*

REFERENCE BOOKS:

1. *C.R. Kothari, "Research Methodology (Methods & Techniques)", New Age International Publishers.*
2. *R. Cauvery, V. K. Sudha Nayak, M. Girija, "Research Methodology", S. Chand Publications.*

Course Outcomes:

- Able to understand overview of research process, state research problem and conduct a preliminary literature review of the concepts comprising the research questions.

GENERAL PSYCHOLOGY (GPY)
(Open Elective – II for IV B. Tech – II Semester All Branches)

Scheme : 2010 Internal assessment : 100
Contact Periods : 2L/week
Credits : 2

Course Objectives:

- To explain the primary objectives of psychology: describing, understanding, predicting and controlling behavior and mental processes.

Unit – I

Introduction: Defining Psychology & Behavior-Branches and fields of Psychology-Utility of Psychology

Methods of Psychology: Introspection Method-Naturalistic observation-Experimental Method-Differential Method-Clinical Method-Psycho Physical Methods

Unit – II

Physiological Basis of Behavior: The Neuron-Central Nervous system-Brain and localization of Brain functions-Spinal chord

Influence of Nervous system on human behavior-Endocrine system and it's impact-The role of heredity and environment in the development of personality

Unit – III

Instincts, Emotions Senses and Sensitivity: Instincts and Reflex actions-Emotion & it's characteristics-Physiology of Emotions-Sensation and Sensitivity

Thinking, Reasoning and Problem solving : Nature of thinking-Elements of thoughts-Tools of thinking-Rigidity-Types of thinking-Reasoning & types-Problem solving and it's methods

Unit – IV

Motivation and Behavior & Attention & Learning: Biological and socio psychological Needs-Drives and Incentives-Motives and Types of Motives-Types & Effect of attention-Types of Learning-Problem Solving-Mechanism of Memorization

Intelligence – Aptitude – Personality : Nature of Intelligence-Concept of Metal age and IQ-Constantly of IQ-IQ Classification-Aptitude Ability & Achievement-Measurement of Aptitude -Features and Characteristics of Personality-Personality Assessment-Walters social Learning Theory

TEXT BOOKS:

1. S.K. Mangal, "General Psychology", Sterling Publishers Private Limited

REFERENCE BOOK:

1. Saundra K.Ciccarelli&Gkenn E.Meyer, "Psychology", Dorliing Kindersley (I) Pvt Limited

Course Outcomes:

- Be able to articulate the general history of psychology by explaining depth and breadth of the field from the perspective of a future educator or researcher.

ELEMENTS OF DIGITAL SIGNAL PROCESSING (EDSPR)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To be familiar with the most important methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors.
- Understand the definition, properties, and applications of the Discrete-time Fourier Transform (DTFT), DFT and FFT.

Unit – I

Introduction: Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

Unit – II

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

Unit – III

Fast Fourier Transforms: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N

Unit – IV

IIR Digital Filters: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations

Unit – V

FIR Digital Filters: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

Unit – VI

Realization Of Digital Filters: Basic structures of IIR systems-Direct form I & II , Cascade, parallel forms. Basic structures of FIR systems.

Unit – VII

Introduction to DSP Processors: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes. Pipelining, Special addressing modes, On-Chip Peripherals.

Unit – VIII

Architecture of TMS 320C67XX- Internal architecture, addressing modes, external memory access, peripherals.

TEXT BOOKS:

1. *John G. Proakis, Dimitris G. Manolakis (2007), "Digital Signal Processing, Principles, Algorithms, and Applications", Pearson Education / PHI.*
2. *A.V.Oppenheim and R.W. Schaffer, "Discrete Time Signal Processing", PHI.*
3. *B.Venkataramani, M. Bhaskar (2002), "Digital Signal Processors – Architecture, Programming and Applications", TATA McGraw Hill.*

REFERENCE BOOKS:

1. *Andreas Antoniou (2006) , "Digital Signal Processing", TATA McGraw Hill.*
2. *MH Hayes, Schaum's Outlines (2007), "Digital Signal Processing", TATA Mc-Graw Hill.*
3. *DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.*
4. *Robert J. Schilling, Sandra L. Harris(2007), "Fundamentals of Digital Signal Processing using Matlab", Thomson,.*
5. *Alan V. Oppenheim, Ronald W. Schafer(2006), "Digital Signal Processing", PHI Ed.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Know how to characterize LTI discrete-time signals and systems in the frequency domain using z transforms (transfer function) and the discrete-time Fourier transform (frequency response).
- Demonstrate knowledge of the DFT for finite duration signals and its computation using FFT.

NEURAL NETWORKS AND FUZZY LOGIC (NNFL)

(Professional Elective Common for IV B. Tech (EEE & ECE))

Scheme : 2010 — Internal Assessment : 30
Contact Periods: (3L+ 1T) / Week — End Exam Marks : 70
Credits : 4 — End Exam Duration : 3 hrs

Course Objectives:

- To learn the fundamentals of Crisp sets, Fuzzy sets and Fuzzy Relations
- To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.

Unit – I

Biological Neural Networks: Organization of human brain, Neuron functions, Cell body, Axon, Dendrites, Cell membrane, Computers and human brain.

Artificial Neural Networks : Artificial neuron, Mc Culloah-Pitts neuron model,

Characteristics, activation functions, Architectures(single layer and multi layer) and applications of ANNs. Training: supervised and unsupervised, Different learning rules.

Unit – II

Perceptrons: Perceptron representation, Ex – OR problem, Linear separability, Learning, Training algorithm, Advanced algorithm(Back propagation) and applications.

Unit – III

Counter Propagation Networks: Introduction, Network structure, Normal operation, Weight selection, Training Kohenen and Grossberg layers, Full counter propagation network, applications.

Hopfield Networks: Recurrent network configurations, Applications

Unit – IV

Statistical Methods: Training, application, Boltzman training, Back propagation and Cauchy`s training.

Unit – V

Bidirectional Associative Memories (BAM): BAM structure, Retrieving a stored association, Encoding association, Memory capability, Types of BAM: Continuous, Adaptive, Competitive.

Adaptive Resonance Theory: ART architecture, Implementation, Training example, Characteristics.

Unit – VI

Introduction To Fuzzy Systems: Classical (Crisp) sets, Notation, Basic concepts, Fuzzy sets , basic concepts, Properties of fuzzy sets, Fuzzy operations: Compliment, Union, Intersection.

Fuzzy Relations: Binary relations review, Equivalence and similarity relations, Compatibility relations, Orderings and Morphisms.

Fuzzy Measures : Belief and plausibility measures, Probability, Possibility and necessity measures.

Unit – VII

Adaptive Fuzzy Systems: Neural and fuzzy machine intelligence, Fuzzyness as multi-variance, Fuzzyness in probabilistic world, randomness Vs ambiguity, Sets as points in cube.

Unit – VIII

Fuzzy Associative Memories (FAM): Fuzzy systems as between cube mappings, Fuzzy and neural function estimators, Neural Vs fuzzy representation of structured knowledge, FAMs as mappings, Fuzzy Hebb FAMS: Bidirectional FAM theorem, Superimposing FAM rules, FAM system architecture.

TEXT BOOKS:

1. Philip D. Wasserman, "Neural Computing, Theory and Practice", Van Nostrand Reinhold.

2. George I. Klir and Tina A. Folger," Fuzzy Sets, Uncertainty and Information" (unit 4), PHI

3. Bart Kosko, "Neural Networks and Fuzzy Systems (unit 5), PHI.

REFERENCE BOOKS:

1. Jacek M. Zurada, "Introduction to Artificial Neural Systems", Jaico Publishing House.

2. Laurence Fausett, "Fundamentals of Neural Networks, Architectures, Algorithms and Applications", Pearson Ed.

3. Timothy Ross, "Fuzzy Logic with Engineering Applications", TMH.

4. Fakhreddine O.Karray, Clarence De Silva, "Soft Computing and Intelligent Systems Design", Pearson Ed.

Note: The question paper shall consist of **EIGHT** questions, **ONE** question from each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Explore the functional components of neural network classifiers or controllers, and the functional components of fuzzy logic classifiers or controllers.

VLSI DESIGN (VLSID)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To be familiar with MOS Inverters and their characteristics, PLAs, FPGAs, CPLDs.
- Design and implementation of CMOS digital circuits using CAD tools, including: Gate and transistor-level design, Layout, Hierarchical design, Verilog HDL design Logic synthesis, Simulation and verification.

Unit – I

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

Unit – II

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit ùo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit – III

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

Unit – IV

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations - ô - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

Unit – V

Subsystem Design: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters, High Density Memory Elements.

Unit – VI

Semiconductor Integrated Circuit Design: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

Unit – VII

Vhdl Synthesis: VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, Test Principles.

Unit – VIII

Cmos Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chiplevel Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXTBOOKS:

1. *Kamran Eshraghian, Eshraghian Dougles and A. Pucknell (2005), "Essentials of VLSI circuits and systems", PHI.*
2. Weste and Eshraghian (1999), "Principles of CMOS VLSI Design", Pearson Education.

REFERENCE BOOKS :

1. *John P. Uyemura, "Chip Design for Submicron VLSI: CMOS Layout & Simulation", Thomson Learning.*
2. John .P. Uyemura (2003), "Introduction to VLSI Circuits and Systems", JohnWiley.
3. John M. Rabaey (1997), "Digital Integrated Circuits", PHI, EEE.
4. Wayne Wolf (1997), "Modern VLSI Design ",Pearson Education, 3rd Edition.
5. S.M. SZE (2003), "VLSI Technology", 2nd Edition, TMH.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Design CMOS logic using MOSFET devices, perform circuit-level simulation of CMOS logic gates to determine logic delay
- Students will be able to implement designs with Field Programmable Gate Array devices using HDL.

MODERN CONTROL THEORY (MCT)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L /week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam duration : 3 hrs

Course Objectives:

- To understand the concepts of controllability and Observability
- To provide adequate knowledge in the Liapunov stability analysis.

Unit – I

Review of state space representation of continuous time systems and their solution. State models for discrete time systems described as difference equations and transfer functions.

Unit – II

Transfer function from state model. State transition matrix and solution of state equation for discrete time systems. Adjoint systems – state space representation of sampled data systems.

Unit – III

Controllability and Observability: Concepts of controllability and Observability, Controllability tests for continuous time, discrete time, time invariant systems, Observability tests for continuous time and discrete time, time invariant systems, controllability and Observability modes in state.

Unit – IV

Jordon's canonical form, controllable and observable companion forms for single input single output systems. Pole placement by state feed back. State observer.

Unit – V

Nonlinear systems: Behaviour of non-linear systems, Jump resonance, sub-harmonic oscillation, limit cycles, common physical non linearities, singular points, phase plane method.

Unit – VI

Construction of phase plane trajectories, isocline method, delta method, computation of time.

Unit – VII

Stability: Liapunov's stability criteria, Theorems. The direct method of Liapunov for linear systems. Methods of constructing Liapunov function Krasovski's method, variable gradient method.

Unit – VIII

Optimal Control – Formulation of optimal control problem, calculus of variations, Minimisation of functionals. Formulation of variational calculus using Hamiltonian method.

TEXT BOOKS:

1. Gopal M (1993), "Modern Control System Theory", New Age International Publishers.
2. Nagrath I.J and Gopal M. (1982), "Control System Engineering", Wiley Eastern Publishers.

REFERENCE BOOKS:

1. K.Ogata (1992), "Modern Control Engineering", PHI.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Nonlinear system properties. Liapunov stability, circle criterion, Popov stability.
- Gain the knowledge about the controllability& Observability.

NON–CONVENTIONAL SOURCES OF ENERGY (NCSE)

(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks :70
End Exam Duration : 3 hrs

Course Objectives:

- To understand the applications of non conventional energy sources.
- Estimate the advantage and disadvantage of renewable and non-renewable biomass energy, geothermal energy and hydro power.

Unit – I

Principles Of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit – II

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Unit – III

Solar Energy Storage And Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

Unit – IV

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Unit – V

Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

Unit – VI

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Unit – VII

Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

Unit – VIII

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. *G.D. Rai , "Non-Conventional Energy Sources".*
2. *Ramesh & Kumar, "Renewable Energy Technologies", Narosa.*

REFERENCE BOOKS:

1. *Tiwari and Ghosal ,"Renewable energy resources", Narosa.*
2. *Ashok V Desai, "Non-Conventional Energy", Wiley Eastern.*
3. *K Mittal ,"Non-Conventional Energy Systems", Wheeler*
4. *Sukhame, "Solar Energy" .*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels.
- Compare different renewable energy technologies and choose the most appropriate based on local conditions.

ELECTRICAL DISTRIBUTION SYSTEMS (EDS)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010 — Internal assessment : 30
Contact Periods : 4L/Week — End Exam Marks :70
Credits : 4 — End Exam Duration : 3 hrs

Course Objectives:

- Have knowledge of Sub Station Equipments, switchgears including transformers, isolators, circuit breakers etc.
- Learn Specifications, Construction, Operations and maintenance of Power Distribution System.

Unit – I

General Concepts: Introduction to distribution systems, Load modeling and characteristics. Coincidence factor, contribution factor loss factor - Relationship between the load factor and loss factor. Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

Unit – II

Distribution Feeders: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system.

Unit – III

Substations: Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

Unit – IV

System Analysis : Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

Unit – V

Protection: Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizes, and circuit breakers

Unit – VI

Coordination: Coordination of Protective Devices: General coordination procedure.

Unit – VII

Compensation For Power Factor Improvement: Capacitive compensation for power-factor control.

Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors

(Fixed and switched),

Power factor correction, capacitor allocation - Economic justification - Procedure to determine the best capacitor location.

Unit – VIII

Voltage Control: Voltage Control: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

TEXT BOOKS:

1. *Turan Gonen, "Electric Power Distribution system, Engineering", Mc Graw-hill Book Company.*

2. A.S. Pabla (1997), "Electric Power Distribution", Tata Mc Graw-hill Publishing company, 4^{th} edition.

REFERENCE BOOKS:

1. S. Sivanagaraju, V.Sankar (2006), "Electrical Power Distribution and Automation", Dhanpat Rai & Co.

2. V. Kamaraju, "Electrical Power Distribution Systems", Right Publishers.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Analyze a representative distribution system and make design changes to satisfy a given set of system operating constraints.
- Explain about different types of electrical power distribution systems and their characteristics.

HIGH VOLTAGE ENGINEERING (HVE)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To know the basic design principles of high voltage AC-, DC- and impulse generators.
- To understand and perform measurements of insulation breakdown strength, dielectric properties and partial discharges.

Unit – I

Introduction To High Voltage Technology And Applications: Electric Field Stresses, Gas / Vaccum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

Unit – II

Break Down In Gaseous And Liquid Dielectrics: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

Unit – III

Break Down In Solid Dielectrics: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

Unit – IV

Generation Of High Voltages And Currents: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

Unit – V

Measurement Of High Voltages And Currents: Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

Unit – VI

Over Voltage Phenomenon And Insulation Co-Ordination: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

Unit – VII

Non-Distructive Testing Of Material And Electrical Apparatus: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

Unit – VIII

High Voltage Testing Of Electrical Apparatus: Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

TEXT BOOKS:

1. *High Voltage Engineering by M.S. Naidu and V. Kamaraju – TMH Publications, 3rd Edition*
2. *High Voltage Engineering: Fundamentals by E .Kuffel, W.S. Zaengl, J. Kuffel by Elsevier, 2nd Edition.*

REFERENCE BOOKS:

1. *C.L. Wadhwa (1997), "High Voltage Engineering", New Age Internationals (P) Limited.*
2. *Ravindra Arora, Wolfgang Mosch (1995), "High Voltage Insulation Engineering", New Age International (P) Limited.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- To describe Breakdown mechanisms of solids, liquids and gases.
- To approximately judge the breakdown strength of contaminated liquids and solids.

EHV AC TRANSMISSION (EHV AC)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- To understand the necessity, merits and demerits of EHV AC transmission
- To clearly know the effect of corona, electrostatic field of EHV AC lines

Unit – I

Preliminaries: Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses-mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius-Examples.

Unit – II

Line and ground reactive parameters: Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return - Examples

Unit – III

Voltage gradients of conductors: Electrostatics – field of sphere gap – field of line changes and properties – charge – potential relations for multi-conductors – surface voltage gradient on conductors – distribution of voltage gradient on sub-conductors of bundle – Examples.

Unit – IV

Corona effects – I: Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between 1-phase and 3-phase AN levels – Examples.

Unit – V

Corona effects – II: Radio interference (RI) - corona pulses generation, properties, limits – frequency spectrum – modes of propagation – excitation function – measurement of RI, RIV and excitation functions – Examples.

Unit – VI

Electro static field: Electrostatic field: calculation of electrostatic field of EHV/AC lines – effect on humans, animals and plants – electrostatic induction in unenergised circuit of double-circuit line – electromagnetic interference-Examples.

Unit – VII

Traveling wave theory: Traveling wave expression and solution- source of excitation- terminal conditions- open circuited and short-circuited end- reflection and refraction coefficients-Lumped parameters of distributed lines-generalized constants-No load voltage conditions and charging current.

Unit – VIII

Voltage control: Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system.

TEXT BOOKS:

1. *R. D. Begamudre, "EHVAC Transmission Engineering", New Age International (p) Ltd.*
2. *S. Rao , "HVAC and DC Transmission".*

REFERENCE BOOKS:

1. *R. D. Begamudre, "EHVAC Transmission Engineering", New Age International (p) Ltd.*
2. *S. Rao , "HVAC and DC Transmission".*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Explain the phenomenon of corona and its effect
- Calculate the electrostatic field of EHV AC lines

RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS (REAPS)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010 — Internal assessment : 30
Contact Periods : 4L/Week — End Exam Marks : 70
Credits : 4 — End Exam Duration : 3 hrs

Course Objectives:

- The course will give a thorough understanding of the main principles in power system reliability and security analysis as well as knowledge of different methods and tools for reliability analysis.
- Introduction to basic concept of reliability, MTTF. MTBF, FOR, series and parallel system models. Probability Theories. Markov process and its applications. Multistate model, Reliability Indices. Segmentation method, Convolution, evaluation of LOL, Frequency and Duration techniques.

Unit – I

Basics of Probability theory & Distribution: Basic probability theory – rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

Unit – II

Network Modeling and Reliability Analysis: Analysis of Series, Parallel, Series-Parallel networks – complex networks – decomposition method.

Unit – III

Reliability functions: Reliability functions f(t), F(t), R(t), h(t) and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF.

Unit – IV

Markov Modelling: Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities. – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabilities using STPM – two component repairable models.

Unit – V

Frequency & Duration Techniques: Frequency and duration concept – Evaluation of frequency of encountering state, mean cycle time, for one , two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering of merged states.

Unit – VI

Generation System Reliability Analysis: Reliability model of a generation system– recursive relation for unit addition and removal – load modeling - Merging of generation load model – evaluation of transition rates for merged state model – cumulative Probability, cumulative frequency of failure evaluation – LOLP, LOLE.

Unit – VII

Composite Systems Reliability Analysis: Decompositions method – Reliability Indices – Weather Effects on Transmission Lines.

Unit – VIII

Distribution System and Reliability Analysis: Basic Concepts – Evaluation of Basic and performance reliability indices of radial networks.

TEXT BOOKS:

1. *R. Billinton (2007), R.N. Allan, "Reliability Evaluation of Engg. System", Plenum Press, New York, reprinted in India by B.S. Publications,.*
2. *Reliability Evaluation of Power systems – R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S. Publications.*

REFERENCE BOOKS:

1. *R. Billinton (2007), R.N. Allan, "Reliability Evaluation of Engg. System", Plenum Press, New York, reprinted in India by B.S. Publications,.*
2. *Reliability Evaluation of Power systems – R. Billinton, R.N. Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S. Publications.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Discuss Markov chain process for evaluation limiting state probabilities
- Develop analytical models for power system reliability analysis; Implement and use algorithms for power system reliability analysis

PROGRAMMABLE LOGIC CONTROLLERS (PLC)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010
Contact Periods : 4L/Week
Credits : 4

Internal assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Course Objectives:

- Learn the major components of a Programmable Logic Controller (PLC)i.e.,CPU, input modules, and output modules in a PLC;
- To learn programming of PLC; Work with PLC programming using ladder logic

Unit – I

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

Unit – II

PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

Unit – III

Digital logic gates, programming in the Boolean algebra system, conversion examples

Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

Unit – IV

PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

Unit – V

PLC Functions: Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

Unit – VI

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications

Unit – VII

Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

Unit – VIII

Analog PLC operation: Analog modules& systems, Analog signal processing, Multi bit Data Processing, Analog output Application Examples, PID principles, position indicator with PID control, PID Modules, PID tuning, PID functions.

TEXT BOOKS:

1. *John W. Webb & Ronald A. Reiss, "Programmable Logic Controllers- Principles and Applications" Fifth Edition, PHI*
2. *JR. Hackworth & F.D Hackworth Jr. (2004), "Programmable Logic Controllers- Programming Method and Applications", Pearson.*

REFERENCE BOOKS:

1. *John W. Webb & Ronald A. Reiss, "Programmable Logic Controllers- Principles and Applications" Fifth Edition, PHI*
2. *JR. Hackworth & F.D. Hackworth Jr. (2004), "Programmable Logic Controllers- Programming Method and Applications", Pearson.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Demonstrate an ability to program Programmable Logic Controllers using ladder logic and other programming standards
- Describe the advantages, use and applications of Programmable Logic Controllers (PLC's).

HVDC AND FACTS (HVDC FACT)
(Professional Elective for IV B. Tech (EEE))

Scheme : 2010 — Internal assessment : 30

Contact Periods : (3L+1T) /week — End Exam Marks : 70

Credits : 4 End Exam duration : 3 hrs

Course Objectives:

- Know the fundamentals of HVDC Transmission systems, equipment and their characteristics, and their basic controls.
- Understand the concept of HVDC transmission, advantages and disadvantages

Unit – I

Basic concepts: Economics and terminal equipment of HVDC transmission systems – Types of HVDC links – Apparatus required for HVDC systems – Comparison of AC and DC Transmission – Application of DC Transmission System – Planning and Modern trends in D.C.Transmission.

Unit – II

HVDC Converters: choice of converter configurations -Analysis of Graetz circuit – characteristics of 6-pulse and 12-pulse converters – principle of DC link control

Unit – III

Converter control: converter control characteristics – firing angle control – current and extinction angle control – effect of source inductance on the systems.

Unit – I V

Converter faults & protection: converter faults – protection against over currents & over voltages in converter station – surge arresters – smoothing reactors – DC breakers – Effects of proximity of AC & DC transmission lines.

Unit – V

Power flow analysis in AC/DC systems: Modelling of DC Links – solution of DC load flow – P.U.system for d.c quantities.

Unit – VI

FACTS concept and General System considerations: Transmission Interconnections- Flow of power in an AC system- What limits the loading capability- power flow and dynamic stability considerations of a transmission interconnection – relative importance of controllable parameters- basic types of FACTS controllers- Brief description and definitions of FACTS controllers.

Unit – VII

Static Shunt Compensation: Objectives of shunt compensation – Mid point voltage Regulation for Line segmentation – end line voltage support to prevent voltage Instability – Improvement of Transient Stability – power Oscillation Damping.

Unit – VIII

Static Series Compensation: Objectives of series compensation – Concept of series capacitive compensation – voltage stability - Improvement of Transient Stability – power oscillation Damping – sub synchronous Oscillation Damping.

TEXT BOOKS:

1. *K.R. Padiyar (1992), " HVDC Power Transmission Systems", Wel Publishers.*
2. *Hingorani (2000) , "Understanding Facts Concepts", Standard Publishers*

REFERENCE BOOKS:

1. *K.R. Padiyar (1992), " HVDC Power Transmission Systems", Wel Publishers.*

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Describe the methods and procedures employed in using HVDC to solve asynchronous interconnection problems.
- Discuss replacing existing AC transmission with a new DC system and the associated benefits of making the switch.

ELECTRICAL MACHINE DESIGN (EMD)
(Professional Elective for IV B. Tech (EEE))

Contact Periods : (4L +1T)/week | Internal assessment : 30
End Exam : 3 Hours | Sessional Exam Marks : 30
Credits : 5 | End Exam Marks : 70

Course Objectives:

- To gain the knowledge about the calculation of total MMF in the machine.
- To find out the dimension of various parts of the machine.

Unit – I

General concepts and constraints of design of rotating machines: Main dimensions, Total and specific loadings, output equation, output co-efficients of D.C. and A.C. machine, factors affecting the size of rotating machines, choice of specific magnetic loading, choice of specific electric loading.

D.C. Machine Design: Constructional details and calculation of main dimensions, choice of number of poles, pole proportions, field and armature design, magnetic circuit, commutator and brush design, interpole design, losses and efficiency from design parameters.

Unit – II

Transformer Design: Constructional features, out put equation of single phase and three phase transformers, volts per turn, design of core, yoke, window dimensions, low voltage and high voltage windings, pre-determination of no load current from design parameters, leakage reactance, losses, efficiency and regulation, power and distribution transformers, design of tank and cooling tubes of transformers, cooling of transformers.

Unit – III

Synchronous Machine Design: Constructional features of low and medium speed alternators, output co-efficients of main dimensions, stator design, slots and conductor size, air gap length, rotor design, field winding, short circuit ratio and regulation, Essential features in construction and design of turbo alternators, main dimensions, stator and rotor design.

Unit – IV

Three Phase Induction Motor: Constructional details, output equation, choice of specific and magnetic loadings, calculation of main dimensions, stator design, air gap length, design of slip ring and cage rotors, calculation of magnetsing current ,equivalent circuit, circle diagram, torque, slip and efficiency.

Unit – V

Computer Aided Design: Introduction, Advantages of digital computers, computer aided design different approaches, Synthesis method, Hybrid method, Optimization, General procedure for Optimization, Variables and Constraints, Computer aided design of three phase induction motors, List of symbols used, General design procedure.

TEXT BOOKS:

1. *M. G. Say (1983), "Performance & Design of Alternating Current Machines", CBS Publications.*
2. A. K.Sawhney (2004), "A Course in Electrical Machine Design", Dhanpat Rai.

REFERENCE BOOKS:

1. A. E. Clayton & Hancock (1985), "Perfomance & Design of Direct Current Machines", CBS Publications.
2. H.M.Rai (1995), "Electrical Machine Design", Satya Prakashan Publications.

Note: The question paper shall consist of **EIGHT** questions with **ONE** question in each unit. The student shall answer any **FIVE** questions.

Course Outcomes:

- Design electrical machines
- Calculate the losses and efficiency in the machines

Mini Project & Comprehensive Viva
(Scheme-2010)
LAB EXPERIMENTS

Course Objectives:

- To provide the knowledge of industrial requirements to the graduates.
- To give knowledge and skills necessary to participate as a effective team member or leader in the development of software systems covering engineering and scientific applications.

OOPS WITH JAVA LAB

1. Programs to illustrate constructors.
2. Programs to illustrate Overloading & Overriding methods in Java.
3. Programs Illustrate the Implementation of Various forms of Inheritance. (Ex. Single, Hierarchical, Multilevel inheritance….)
4. Program which illustrates the implementation of multiple Inheritance using interfaces in Java.
5. Program to illustrate the implementation of abstract class.
6. Programs to illustrate Exception handling
7. Programs to create packages in Java.
8. Programs, which illustrate the manipulation of strings.
    a. Ex. 1. Sorting an array of Strings.
    b. Frequency count of words & Characters in a text.
9. Programs, which illustrate the use of Streams.
10. Java Program that reads on file name from the user and displays the contents of file.
11. Write an applet that displays a simple message.
12. Write an applet that computes the payment of a loan based on the amount of the loan, the interest rate and the number of months. It takes one parameter from the browser: Monthly rate; if true, the interest rate is per month; Other wise the interest rate is annual.

Assessment:

a) **Lab work: 30 marks (Internal)** - based on regular performance in the lab

b) **End Exam**

i) Mini project: 50 marks - based on documentation (thesis), execution and results obtained.
ii) Comprehensive Viva: **20 marks**

TEXT BOOKS:

1. Herbert Schildt , "The Complete Reference Java J2se 5th Edition", TMH

REFERENCE BOOKS:

1. Patrick Naughton & Herbet Schildt, "The Complete Reference JAVA 2 (Fourth Edition) ", (TMH)
2. Decker&Hirsh (2001), "Programming Java" Field Vikas Publisking (Thomson Learning) (Second Editon)
3. Y. Daniel Liang(2002), "Introduction To Java Programming", PHI

Mini Project:

The project is a Group Activity consisting of 4 or 5 members in a team. The project, which carries 25 marks, will be evaluated before the final examination.

Evaluation Frame Work:

a) **Lab work: 30 marks (Internal)** - based on regular performance in the lab

b) **End Exam**

iii) Mini project: 50 marks - based on documentation (thesis), execution and results obtained.
iv) Comprehensive Viva: **20 marks**

Course Outcomes:

- Able to analyze, design and develop the application, tool with the learned technologies
- The graduate able to communicate orally about analyzing a problem