### B.E.MBA integrated in ELECTRICAL & ELECTRONICS 2011-12

#### SEMESTER-III

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MA 301
Engineering Mathematics – III

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

PART A


(8 Lectures)


Eigen values, eigen vectors, Cayley – Hamilton theorem (statement only). Similarity of matrices, Basis of eigenvectors, diagonalization (Scope as in Chapter 7, Sections 7.1, 7.5 of Reference 1).

(7 Lectures)

PART B

Complex Functions: Definition of a Complex Function, Concept of continuity and differentiability of a complex function, Cauchy – Riemann equations, necessary and sufficient conditions for differentiability (Statement only). Study of complex functions: Exponential function, Trigonometric functions, Hyperbolic functions, real and imaginary part of trigonometric and hyperbolic functions, Logarithmic functions of a complex variable, complex exponents (Scope as in Chapter 12, Sections 12.3 – 12.4, 12.6 – 12.8 of Reference 1).

(8 Lectures)

Laurent Series of function of complex variable, Singularities and Zeros, Residues at simple poles and Residue at a pole of any order, Residue Theorem (Statement only) and its simple applications (Scope as in Chapter 15, Sections 15.1 – 15.3 of Reference 1).

Conformal Mappings, Linear Fractional Transformations (Scope as in Chapter 12, Sections 12.5, 12.9 of Reference 1).

(7 Lectures)

(8 Lectures)

References:

EE-301

ELECTRIC MACHINERY-I

External: 50 L T P
Sessional: 50 3 1 0
Credits: 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

1. Transformers

2. Direct Current Machines
Generators: Mechanical construction, Armature windings, Induced emf equation, Developed torque, Magnetization characteristics, Theory of commutation, Armature reaction, Types of d.c. generators, Voltage regulation, Losses, Separately excited, shunt, series and compound generators and characteristics, Maximum efficiency criterion.


Part-B

3. Polyphase Induction Machines

Induction Generator: Motor to generator transition, Induction generator starting and operation with other three phase sources, Isolated generator operation and voltage build up. [Hubert : 5.18]

4. Single Phase Induction Motors
Double revolving field theory, Analysis of single phase induction motor and speed torque characteristics, Split Phase, Capacitor start, Capacitor start capacitor run motor, Permanent split capacitor motor, Shaded pole motor, Testing of single phase induction motor: No load and block rotor tests. [Guru-Hiziroglu:10.1-10.4, 10.6-10.7]

Text book:

Other Recommended Books:
EE- 352
ELECTRIC MACHINERY-I LAB

Sessional: 50
Credits : 2

Note: At least eight experiments to be done.

1. Open circuit and short circuit test of single phase/ three phase transformer and obtain its equivalent circuit.
2. Parallel operation of two single phase transformers.
4. Different winding connections of three phase two winding transformer and to identify proper combination for parallel operation.
5. Parallel operation of two three phase transformers.
8. Efficiency at different loads of the given dc shunt machine through swinburne / load test.
9. Speed control characteristics of a given dc shunt motor by (i) Armature control (ii) Field control.
10. No load and blocked rotor test on a three phase induction motor and to obtain its Equivalent circuit
11. Torque speed characteristics of three phase induction motor.
EE-302

ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

External: 50 L T P
Sessional: 50 3 1 0
Credits : 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part A

1. Units, Dimensions and Standards:
Introduction to MKS & Rationalised MKSA System, SI Units, Standards of EMF, Resistance, Capacitance and Inductance, Systematic errors

2. General Theory of Analog Measuring Instruments:
Operating torque, damping & controlling torque, T/W ratio, Pointers & Scales. Principles of operation of various types of electro mechanical indicating / registering instruments viz. PMMC, dynamometer, induction, thermal, etc. for dc & ac measurement of V, I, W, frequency, phase & power factor etc., energy meter, their sources of error & compensation, shunts & multipliers, multi-meter.

3. Potentiometers:
Basic Potentiometer circuit, multiple range potentiometers, constructional details of potentiometers, applications of d-c potentiometers; self balancing potentiometers. A-C potentiometers, polar and co-ordinate types.

Part B

4. Bridges:

5. Magnetic Measurements:
Flux meter, B-H Curve, Hysteresis loop, Permeameters, AC Testing of Magnetic materials, Separation of iron losses, iron loss measurement by Wattmeter and Bridge methods.

6. Instrument Transformers:
Theory and construction of current and potential transformers, ratio and phase angle errors and their minimization, Characteristics of CTs. & PTs., Testing of CTS & PTS.

BOOKS RECOMMENDED

2. Electronic Inst. & Measurement techniques. By W.D. Cooper.
EE-352

ELECTRICAL MEASUREMENTS & INSTRUMENTATIONS LAB.

Sessional: 50
Credits : 1

Note: At least eight experiments to be done.

List of experiments:

1. Study of principle of operation of various types of electromechanical measuring instruments.
6. Plotting of Hysteresis loop for a magnetic material using flux meter.
7. Measurement of frequency using Wein's Bridge.
8. To study the connections and use of Current and potential transformers and to find out ratio error.
9. Determination of frequency and phase angle using CRO.
11. To find 'Q' of an inductance coil and verify its value using Q-meter.
EE- 303
Linear Circuit Analysis

External: 50
Sessional: 50
Credits : 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

PART-A

1. Methods of analyzing A.C. Circuits
   - Nodal Analysis: Node voltages, matrix node equations
   - Mesh Analysis: Mesh currents, matrix mesh equations
   - Network Theorems: Superposition, Thevenin’s, Norton’s, Maximum Power Transfer
   (10-hours)

2. Network Topology
   - Introduction, Network Graph, Tree and Co-tree, Twigs and Links, Incidence Matrices and its properties, Link currents: Tie-Set Matrix, Cut-Set and Tree Branch Voltages
   (7-hours)

3. Two-Port Networks
   - Introduction, Open Circuit Impedance Parameter, Short Circuit Admittance Parameter, Transmission Parameter, Inverse Transmission Parameter, Hybrid Parameter, Interrelationship of different parameters, Inter-Connection of Two-Port Networks, Terminated Two-Port Network, T and Π representation.
   (8-hours)

PART-B

1. Laplace Transform Analysis
   - Definition of Laplace Transform, Step function, Impulse function, Periodic function, Inverse transform, Initial and Final value theorem, Circuit Elements in the S-Domain,
   - Transfer Functions: Circuit Analysis, Convolution and Impulse Response
   (10-hours)

2. Network Functions and s- Domain Analysis
   - Complex Frequency and its Physical Interpretation, Transform Impedance and Transform Circuits, Series and Parallel Combination of Elements, Terminal Ports.
   - Network Functions: Network functions for One-Port and Two-Port Networks, Poles and Zeros and their Significance, Properties and Necessary Conditions of Driving Point Functions and Transfer Functions, Routh Criteria
   (10-hours)

Text Book


Other Recommended Books

EE-353

Linear Circuit Analysis Lab

Sessional: 50
Credits : 2

1. To make 3-phase unbalanced network with neutral return of known impedance. Measure phase currents, neutral currents and the potential difference between the load and supply neutral. Verify the results theoretically.

2. To determine phase sequence of three phase supply system and to find the line currents for three phase three wire load when the sequence is i) RYB ii) RBY. Verify the results theoretically.

3. To study the current build up and current decay in RL / RC circuit by obtaining its response to a square wave input.

4. To check the polarity marking of a transformer and to determine self inductance of each winding and mutual inductance between the windings.

5. To study the resonance in R-L-C circuit, and to measure Q-factor of the coil.

6. To find the various two port network parameters (open circuit, short circuit, transmission and hybrid parameters)

7. For a circuit supplied from a non-sinusoidal source verify the following current and voltage relations:

\[ V^2 = V_{dc}^2 + V_1^2 + V_2^2 + \ldots \]
\[ I^2 = I_{dc}^2 + I_1^2 + I_2^2 + \ldots \]

8. To analyze a complex waveform.

9. To obtain capacitor voltage vs. time curve and time constant of an RC circuit when
   i) It is switched on to dc supply
   ii) Capacitor is discharged through the resistance

10. PSpice simulation of circuits to obtain steady state response for dc and ac excitation

11. PSpice simulation for transient response of circuits

12. PSpice simulation of unbalanced three phase circuits and for circuits with mutual inductance
EE – 304
SEMICONDUCTOR AND DIGITAL ELECTRONICS

External: 50          L T P
Sessional: 50            3 1 0
Credits : 3

Note: Examiner shall set eight questions four from each part. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part-A

1. **Transistor at low frequencies**: (08)
   Graphical analysis of CE configuration two port devices and hybrid model, h-parameters, comparison of amplifier configurations of circuits

2. **Transistor biasing and Thermal stabilization**: (08)
   Concept of biasing & biasing of BJT circuits, Operating point, bias stability, stabilization against variation in Ico, Vbe, and β, thermal run away, thermal stability.

3. **Power amplifiers**: (10)
   Classification of amplifiers, Class A large signal amplifier, second and higher harmonic distortion, transformer coupled amplifiers, Efficiency of amplifiers, Push pull amplifiers (class A & class B).

Part-B

4. **Data Converters**: (5)
   Sample & Hold switch, D/A converters, weighted resistor type, R-2R Ladder type, A/D converters: Counter-Ramp type, Dual Slope type, Successive Approximation type, Specifications of ADC & DAC.

5. **Digital Logic Families**: (10)
   Characteristics of digital circuits: fan in, fan-out, power dissipation, propagation delay, noise margin, Transistor-transistor logic (TTL), Manufacturer Data Sheets & Specifications, Types of TTL gates (Schottky, standard, low power, high speed), Emitter Coupled logic (ECL), Manufacturers Data Sheets & Specifications, Comparison of characteristics of TTL, ECL, Tristate Logic & its applications.

6. **Semiconductor Memories & Programmable Logic**: (4)
   ROM, PROM, EPROM, EEPROM, RAM: Static RAM, Typical Memory Cell, Dynamic RAM cell, Reading & Writing Operation in RAM, PLA & FPGA.

Books Recommended:

Integrated Electronics Millman & Halkias (Mc-Graw Hill)
Microelectronic Circuits AS Sedra & KC Smith (OXFORD)
Electronics Devices & Circuit Theory RL Boylestead & L Nashelsky (PHI)
Digital Electronics Taub Schilling
Digital Logic Design Morris Mano
Digital System Principles & Applications R J Tocci (PHI)
EE - 354

SEMICONDUCTOR AND DIGITAL ELECTRONICS LAB

Sessional: 50
Credits : 1
L T P 0 0 2

Note: At least six experiments to be done.

1. To study the specification sheet & draw the characteristics of transistor in CB or CE configuration.
2. To draw the frequency response of a single stage BJT amplifier.
3. To measure the voltage and current gain of a BJT amplifier.
4. To measure the distortion in the output of a push pull amplifier.
5. To study the data sheets of TTL and ECL gates.
6. To convert 8 bit digital data to analog value using DAC.
7. To convert analog value into 8 bit digital data using ADC.
8. Verify the truth tables of/with various gates, RS, D, JK Flip Flops.

To simulate the following using P-spice

1. Frequency Response of a single state FET amplifier.
2. Voltage and current gain of BJT amplifier.
3. Distortion of a push pull power amplifier.
IBM 301
Organization Behavior

External: 50            L T P
Sessional: 50            3 1 0
Credits : 3

Note: Examiner shall set eight questions four from each part. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Introduction to Organization Behavior

Definition and meaning of OB, impact of other sciences (Anthropology, Sociology, Psychology) on OB, perception, self esteem, attitude & personality, meaning of culture, impact of technology on OB.

Motivation, Learning & Leadership

Meaning of Motivation, Content theories of motivation (Maslows Hierarchy of needs, Herzberg’s two factor theory), Process theories (Vroom’s Expectancy theory, Porter-Lawler Model), Motivation applied (Job design, job rotation, goal setting, MBO), various methods of motivating employees, Behavioral & Cognitive theories of learning, Leadership theories (Trait theory, Fiedler’s Contingency theory, Path–Goal leadership theory), Leadership styles (Blake & Mouton managerial grid, Hersey & Blanchard’s life cycle approach)

Part B

Group behavior:

Group Dynamics, conflict, power & politics, Group behavior, types of groups, group decision making, conflict in organizations and reason, interpersonal conflict, inter group conflict, meaning of power, classification of power, politics in organizations

Organization environment & Communication

Authority & responsibility, delegation and division of work, quality of work life, communication process, modes of communication in organization and barriers to communication, formal & informal communication,

Recommended Books:


### B.E.MBA integrated in ELECTRICAL & ELECTRONICS

#### IV SEMESTER

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MA 401  
Numerical Analysis

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Note for the paper setter: Total of 8 questions may be set covering the whole syllabus. Candidate will be required to attempt any 5 questions selecting at least two from each part.

PART A

Error analysis: Relative error, Absolute error, Round-off error, Truncation error, significant digits and numerical instability. (Scope as in Section 1.3, Chapter 1 of Reference 1).

(4 Lectures)

Transcendental and polynomial equations: Bisection method, Iteration Method based on first degree equation: Secant method, Regula-falsi method and Newton – Raphson methods, Rate of convergence of Secant method, Regula-Falsi method and Newton-Raphson Method. Bairstow’s method to find quadratic factor of a polynomial (Scope as in corresponding topics in Section 2.3, 2.5, 2.9 of Chapter 2 of Reference 1)

(8 Lectures)

Interpolation: Polynomial interpolation: Finite differences, Lagrange and Newton interpolation (Forward, Backward and Divided difference methods), inverse interpolation, Hermite interpolation (Scope as in corresponding topics in Section 4.1-4.3, 4.5 of Chapter 4 of Reference 1)

(10 Lectures)

PART B

Solution of Linear Systems: Gauss elimination method, Gauss-Seidel method, Cholesky’s Decomposition. Matrix inversion: Gauss-Jordan method. Eigenvalue problem: Bounds on Eigenvalues (Gerschgorin and Brauer theorems), Householder’s method for symmetric matrices, Power method (Scope as in corresponding topics in Section 3.2, 3.4, 3.6, 3.9, 3.11 of Chapter 3 of Reference 1).

(10 Lectures)

Numerical Integration: Trapezoidal Rule, Simpson’s 1/3 and 1/8 rule, Romberg integration, Newton – Coates formulae (Scope as in corresponding topics in Section 5.7, 5.8 of Chapter 5 of Reference 1).

(5 Lectures)

Numerical solutions of ordinary differential equations: Taylor’s series, Euler and Runge – Kutta methods. Finite difference methods for boundary value problems (Scope as in corresponding topics in Section 6.4 of Chapter 6 of Reference 1).

(5 Lectures)
**Functional approximation:** Chebyshev polynomials, Economization of power series, Least square approximation (Scope as in corresponding topics in Section 4.9 of Chapter 4 of Reference 1).  

(3 Lectures)

References:

4. James B. Scarborough. Numerical Mathematical Analysis
EE- 401

ELECTRICAL MACHINERY-II

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Synchronous Machines: (18)


Part-B

Parallel operation of alternators: (12)

Synchronizing to infinite Bus-Bars, synchronoscope, parallel operation of alternators, Operating characteristics, generating Machine, motoring machine, power angle characteristic, operation at constant load with variable excitation, generating Machine, motoring machines, minimum excitation, observation, compounding curve, synchronous condenser, consideration of armature resistance, power flow (transfer) equations,

Special motors: (10)

Brushless dc motors, schematic and operation, circuit model characteristics of brushless dc motor, PM Brushless dc machine, universal motor and stepper motor, linear induction motor, Hysteresis motor, reluctance motors

Text Books:


Other Recommended Books:
1. Electrical Machinery and Transformers by Bhag S. Guru and Huseyin R. Hiziroglu,


EE- 451

ELECTRICAL MACHINERY-II LAB

Sessional: 50  

Credits : 2  

L T P  0 0 3

Note: At least eight experiments are to be performed.

1. To perform no load test on a 3 phase alternator (cylindrical rotor).
2. To perform short circuit test on a 3 phase alternator (cylindrical rotor). Measure the resistance of stator winding of alternator. Find out regulation of alternator at full load at (i) unity power factor (ii) 0.85 Power factor lagging (iii) 0.85 Power factor leading using synchronous impedance method.
3. To synchronize an alternator with the 3 phase supply.
4. To perform the parallel operation of two alternators.
5. To perform the slip test to determine the Xd and Xq.
6. To run a stepper motor in different modes with the help of microprocessor.
7. To analyze the power factor improvement of an industry and design the capacitor bank.
8. Computer aided transformer design
9. Computer aided induction machine design
10. Computer aided synchronous machine design
11. To obtain positive, negative and zero sequence impedances of a three phase synchronous generator
12. To obtain positive, negative and zero sequence impedances of a three phase transformer
EE-402

CONTROL ENGINEERING

External: 50          L T P
Sessional: 50          3 1 0
Credits: 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Introductory Concepts: Open loop and closed loop control systems, Servomechanisms, feedback and effects of feedback, linear and non-linear systems, time variant & invariant, continuous and sampled data control systems, illustrative examples.

Modelling: Mathematical models of linear electrical, mechanical, translational, rotational, gear, thermal, pneumatic and hydraulic systems, electrical and mechanical analogies. Laplace transforms Transfer function, Block diagram representation, signal flow graphs and associated algebra, characteristics equation.

State Space Analysis: Concepts of state variable, state vector and state space, State space representation, solution of state equation for LTI and LTV systems, state transition matrix.

Time Domain Analysis: Typical test-input signals, Transient response of the first and second order systems. Time domain specifications, Dominant closed loop poles of higher order systems. Steady state error and error co-efficient.


Part-B

Root Locus Technique: The extreme points of the root loci for positive gain. Asymptotes to the loci, Breakaway points, intersection with imaginary axis, location of roots with given gain & sketch of the root locus plot.. Rules for construction of root locus, root contours, root sensitivity, generalized root locus.


Control Components: Error detectors- potentiometers and synchros, a.c. and d.c. servo motors, brushless d.c. motors, A.C. and D.C. techogenerators, stepper motors.
RECOMMENDED BOOKS:

EE-452

CONTROL ENGINEERING LAB.

Sessional: 50
Credits: 2

Note: At least eight experiments are to be performed.

1. To study the input-output characteristics of a potentiometer and to use a potentiometer as an error detector.
2. To study transmitter - receiver characteristics of a synchros set and to use the set as control component.
3. To study the operation of d.c. position control system.
4. To study the operation of d.c. speed control system.
5. To design different compensating networks for the given cut off frequency response.
6. To study PID controller and to obtain the effect of proportional, integral and derivative control action.
7. To study the MATLAB Programming for controls systems related to steady state and transfer function conversions.
8. To obtain the step and ramp input response for the various transfer functions using MATLAB.
9. To obtain the root locus response for different systems using MATLAB.
10. To obtain response of basic control system problems in SIMULINK and tune them in MATLAB.
11. To run and use SIMULINK based models in MATLAB. To analyze and simulate the models of following real time applications in MATLAB:
    12. Missile System.
    13. Sun-seeker System
EE- 403

POWER SYSTEMS-I

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

1. **Introduction**
   
   Introduction to Power System, Representation of power system components, One line diagram and impedance diagram, Per unit system, Complex power.  \( \text{(4-hours)} \)

2. **Transmission-Line Parameters**
   
   Resistance, Conductance, Inductance: Solid Cylindrical Conductor, Inductance: Single-Phase Two-Wire Line and Three-Phase Three-Wire Line with Equal Phase Spacing, Composite Conductors, Unequal Phase Spacing, Bundled Conductors, Series Impedances: Three-Phase Line with Neutral Conductors and Earth Return,
   
   Electric Field and Voltage: Solid Cylindrical Conductor
   
   Capacitance: Single-Phase Two-Wire Line and Three-Phase Three-Wire Line with Equal Phase Spacing, Stranded Conductors, Unequal Phase Spacing, Bundled Conductors
   
   Shunt Admittances: Lines with Neutral Conductors and Earth Return
   
   Electric Field Strength at Conductor Surfaces and at Ground Level
   
   Parallel Circuit Three-Phase Lines

   \[ \text{[Glover-Sarma: 4.1-4.13]} \] \( \text{(10-hours)} \)

3. **Transmission Lines: Steady-State Operation**
   

   \[ \text{[Glover-Sarma: 5.1-5.7]} \] \( \text{(8-hours)} \)

4. **Symmetrical Faults**
   
   Three-Phase Short Circuit—Unloaded Synchronous Machine, Power System Three-Phase Short Circuits, Bus Impedance Matrix and its formation.

   \[ \text{[Glover-Sarma: 7.1-7.5]} \] \( \text{(8-hours)} \)

5. **Symmetrical Components**
   
   Definition of Symmetrical Components, Sequence Networks of Impedance Loads, Sequence Networks of Series Impedances, Sequence Networks of Three-Phase Lines, Sequence Networks of Rotating Machines, Per-Unit Sequence Models of Three-Phase Two-Winding Transformers, Per-Unit Sequence Models of Three-Phase Three-Winding Transformers, Power in Sequence Networks

   \[ \text{[Glover-Sarma: 8.1-8.8]} \] \( \text{(6-hours)} \)

6. **Unsymmetrical Faults**

[Glover-Sarma: 9.1-9.5] [8-hours]

Text Book


Other Recommended Books

Design/analysis projects relating to the following.

1. Determination of line parameters and sequence impedances of transmission lines.
2. Line loadability.
3. Steady state operation of transmission lines.
4. Symmetrical and Unsymmetrical power system faults.
EE- 404
ANALOG ELECTRONICS

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Note: Examiner shall set eight questions four from each part. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part-A

TRANSISTOR AND FET AMPLIFIERS (09)

FEEDBACK AMPLIFIERS AND OSCILLATORS (8)
Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Ideal feedback topologies, Voltage series, current series, voltage shunt, current shunt feedback circuits and their analysis, Oscillator, Condition of oscillations, Types of oscillator: RC Phase Shift, Wein Bridge, Hartley, Colpitts and Crystal Oscillators.

ACTIVE FILTER & TUNED AMPLIFIERS (10)
Advantages of active filters, classification of filters, response characteristics of butter worth, chebyshev and causal filters, first and second order low pass high pass, band pass and band stop filters. Tuned Amplifiers: single tuned, double tuned and stagger tuned amplifiers and their analysis

Part-B

OPERATIONAL AMPLIFIER & ITS APPLICATION (10)
Differential Amplifier, Block diagram representation of a typical Op-amp, Ideal Op-amp characteristics, equivalent circuit of op-amp, open loop op-amp configuration, practical op-amp, Input Offset voltage, Bias and offset currents, compensation, frequency response, CMRR, Supply voltage rejection ration (SVRR), Slew Rate, application of Op-amp Inverting and non inverting mode, differential mode, instrumentation amplifiers, comparator, Schmitt trigger, Clippers and Clampers, Sample and Hold Circuit, logarithmic amplifiers, Summer, Integrator and Differentiator
PULSE CIRCUITS

RC circuit as integrator and differentiator, Switching characteristics of a BJT, Astable, monostable and bistable multivibrators, Multivibrators with 555 IC timer, Schmit Trigger Circuits, voltage and current time base generators, Miller & bootstrap sweep generator

Book recommended

2. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits Theory,

3. Theodore F. Bogart Jr., J.S. Beasley and G. Rico, Electronic Devices and Circuits,

4. Op-Amps and Liner integrated Circuits by Ramakant A. Gayakward, 4th edition,
   Pearson Education Asia Low price Edition

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EE - 454
ANALOG ELECTRONICS LAB

Sessional: 50
Credits : 1

L T P 0 0 2

Note: At least eight experiments to be done.

1. To study the phase shift oscillator and find its frequency.

2. To study the frequency of a given crystal oscillator and measure the output

3. To study WEIN-BRIDGE oscillator and determine its frequency

4. To study voltage gain and frequency response of FET audio power amplifier

5. To study the two stage RC coupled transistor amplifier

6. To study the series and shunt feedback amplifiers and determine it frequency and i/p & o/p impedance
7 To study the frequency response of Tuned Amplifier
8 To study the Pspice Simulation software

9 To study the frequency response of OP-Amp & simulate using P-spice

10 To design Butter worth Low pass filter, High pass filter & simulate using P-spice

11 To design Monostable & Free running Multivibrator using 555
IBM 401
Management of Information Technology

External: 50          L T P
Sessional: 50          3 1 0
Credits : 3

Note: Examiner shall set eight questions four from each part. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A
Information Technology (IT) [8]
IT and society, IT infrastructure in India vis-à-vis developed nations (Telecommunication, Internet reach, PC, Broadband, Mobile Phones), IT applications in Healthcare & Education, meaning of E-Readiness and E-participation index as defined by United Nations, areas where growth is expected in future.

System Investigation & Analysis, Networking [8]
System Analysis & Design, Symbols used in modeling a business process, Networking concepts, Ethernet, IP addressing, Functioning of Routers, Bridges, hubs and switches in a network, Telecommunication (GSM, CDMA, Wireless and other new technologies).

Internet & Intranet [7]
Functioning of Internet, Encryption & Digital signatures, Firewalls, Fraud on the Internet, Virus, Hacking & Denial of Service attacks, Intellectual Property Protection on the Internet, Intranet & security

Part B
E-Commerce & E-Governance [12]
E-Commerce models, Intermediaries in E-Commerce, E-Governance in India, study of successful E-Governance models like E-Choupal, E-Payments (E-Cash, E-Wallets) and major players in the area, Online Shopping, Revenue models for Online Shopping Portals, Web Auctions like EBay, dealing with E-Waste.

Knowledge Management & Business Intelligence [10]
Meaning of Knowledge Management, Designing a Knowledge Management System, Nature & Scope of Business Intelligence, Software for Business Intelligence, Data Warehousing and Data Mining techniques.

Recommended Books:


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<th>Subject</th>
<th>SCHEDULE OF TEACHING</th>
<th>THEORY</th>
<th>PRACTICAL</th>
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EE- 511
Power Systems-II

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

1. Power System Protection


Power System Overvoltages, protection against over voltages by shielding or ground wires and lightning arrestors, insulation coordination.

2. Circuit Breakers

Transient recovery voltage, resistance switching, first pole to clear factor, Transient recovery voltage, arc and arc extinction, volt ampere characteristics of arc, methods of arc extinction, construction, working and applications of air-break circuit breakers, oil circuit breakers, vacuum circuit breakers, air blast circuit breakers, SF6 circuit breakers, circuit breaker ratings

3. Substations and Distribution

Location and types of substations, bus-bar arrangements, major substation equipment

Types of insulators, voltage distribution across suspension insulators, string efficiency, methods of improving string efficiency

Types of Underground cables, capacitance of single core cables, grading of cables, capacitance of three core belted cables, power factor and heating of cables

Radial, parallel or loop, network or grid types of distribution systems and their relative merit.

4. Grounding

Grounding fundamentals, Ground resistance, step voltage, touch voltage and transferred voltage, tolerable step and touch voltages, ground resistance of a hemisphere and driven rod, IEEE Standard 80 formulae for ground resistance and step and mesh voltages of a grounding grids, limitations of the formulae

Neutral grounding: ungrounded systems, resonant grounding, solid or effective grounding, reactance grounding, earthing transformer, neutral grounding practice

Text Book / Standards


Other Recommended Books

EE- 561

POWER SYSTEMS II LAB

Note: At least eight experiments / projects / technical reports relating to the following:

1. Measurement of soil resistivity and soil model evaluation
3. Grounding system design for a substation.
4. To study the characteristics of over current relay.
5. To study the characteristics of percentage differential relay.
6. To study the characteristics of distance relay.
7. To study current time characteristics of fuses.
8. Technical visit to a substation/generating station, Load Dispatch Centre and preparation of a technical report for the same
9. Conventional and renewable energy sources
10. Distribution system design
11. Digital relaying
12. Reactive compensation of lines

EE- 512

ELECTRICAL MACHINERY-II

L T P
3 1 0

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Synchronous Machines: (18)

Part-B

Parallel operation of alternators:                                                                                     (12)

Synchronizing to infinite Bus-Bars, synchronoscope, parallel operation of alternators, Operating characteristics, generating
Machine, motoring machine, power angle characteristic, operation at constant load with variable excitation, generating
Machine, motoring machines, minimum excitation, observation, compounding curve, synchronous condenser, consideration of
armature resistance, power flow (transfer) equations,

Special motors:                                      (10)

Brushless dc motors, schematic and operation, circuit model characteristics of brushless dc motor, PM Brushless dc machine,
universal motor and stepper motor, linear induction motor, Hysteresis motor, reluctance motors

Text Books:


Other Recommended Books:

1 Electrical Machinery and Transformers by Bhag S. Guru and Huseyin R. Hiziroglu

   2005.


EE- 562

ELECTRICAL MACHINERY-II LAB

L T P
0 0 3

External: 25
Sessional: 50

Note: At least eight experiments are to be performed.
13. To perform no load test on a 3 phase alternator (cylindrical rotor).
14. To perform short circuit test on a 3 phase alternator (cylindrical rotor). Measure the resistance of stator winding of alternator. Find out regulation of alternator at full load at (i) unity power factor (ii) 0.85 Power factor lagging (iii) 0.85 Power factor leading using synchronous impedance method.
15. To synchronize an alternator with the 3 phase supply.
16. To perform the parallel operation of two alternators.
17. To perform the slip test to determine the Xd and Xq.
18. To run a stepper motor in different modes with the help of microprocessor.
19. To analyze the power factor improvement of an industry and design the capacitor bank.
20. Computer aided transformer design
21. Computer aided induction machine design
22. Computer aided synchronous machine design
23. To obtain positive, negative and zero sequence impedances of a three phase synchronous generator
24. To obtain positive, negative and zero sequence impedances of a three phase transformer
External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

(4 h)

(4 h)

(5 h)

(4 h)

Part-B

Counters and Time Delays: Counters and Time Delays, Hexadecimal Counter, Modulo Ten, Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs.
(4 h)

Stack and Subroutines: Stack, Subroutine, Conditional Call and Return Instructions.
(2 h)

Interrupts: The 8085 Interrupt, 8085 Vectored interrupts.
(2 h)

Interfacing Data Converters: Digital- to- Analog (D/A) Converters, Analog- to- Digital (A/D) Converters, stepper motor interfacing
(4 h)

General-Purpose Programmable Peripheral Devices: The 8255A Programmable Peripheral Interface, Illustration: Interfacing Keyboard and Seven-Segment Display, Illustration: Bi-directional Data Transfer between Two Microcomputers, The 8254
TEXT BOOK

Ramesh S. Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085” 5th edition 2003, TMH.

OTHER RECOMMENDED BOOKS:


Douglas V. Hall, “Microprocessors and Interfacing programming and Hardware” 2nd edition TMH.
1. Study of 8085 Microprocessor kit
2. Write Assembly Language Program to add n given numbers with and without carry.
3. Write Assembly Language Program to count positive & negative numbers in given n numbers.
4. Write Assembly Language Program to de-assemble 8-bit number in two nibbles.
5. Write Assembly Language Program to reassemble two nibbles in 8-bit number.
6. Write Assembly Language Program to sort given n numbers in ascending & descending order using subroutine.
7. Write Assembly Language Program to relocate the given numbers in same & reverse order.
8. Write Assembly Language Program to Flash different letters using your own delay subroutine.

Interfacing of Microprocessor 8085:

1. To obtain a square wave on CRO
2. To interface A to D converter
3. To interface D to A converter
4. To interface input/output module for complementing the input data.
5. To interface stepper motor with µp to control its step size and direction of rotation
6. To develop a traffic light controller program and interface using Input/Output Module.
External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

1) Transducers & Standards
Standards of Instrumentation Systems and Their Classification: Emf, Current, Resistance and Capacitance Standards. Sensors and Transducers: Primary Sensing Elements; Characteristics; Classification.
Passive Transducers - Resistive, Inductive, Capacitive; Types, Features, Configurations, Analysis, Applications.
Active Transducers - Thermoelectric, Electromagnetic, Piezo-Electric, Photoelectric; Types - Principle, Construction, Analysis and Applications.

2) Digital - Analog Instruments and Recording Systems

Part - B

3) Signal Conditioning:
Analog Conditioning - Instrumentation and Logarithmic Amplifiers.
Digital Conditioning - A/D, D/A Converters - Common Types, Operation. Types - Analog/Digital, Block Diagram, Operation, Comparative Performance (Data Display and Recording Devices: Principle, Operation and Use of - LEDs, LCDs, Recorders - Paper Chart, Magnetic Tape, Semi-Conductor;

4) Virtual Instrumentation
Introduction to lab VIEW Front Panel, Block Diagram, Tools And Palettes, Menus, Code Debugging, Creating Sub-Vis, For Loop, While Loop, Structures, Arrays And Clusters, Graphs And Charts, File Input And Output , Data acquisition and applications.

TEXT-BOOK
2. A.K Sahnwey “Electronic and Electrical Instrumentation” 2nd EDITION 1976, DHANPAT RAI.

References:
Note: At least eight experiments are to be performed.

1) Displacement measurement using LVDT
2) To study the operation of Instrumentation Amplifier.
3) Measurement of flow using electromagnetic and positive displacement parameters.
4) Measurement of level using capacitance probe differential pressure transducer.
5) Design of linearization circuit for thermistor.
6) Experiments based on Lab VIEW.

Marketing Management

IBM 501

Objectives:
(i) To understand the nature, tasks and the environment under which marketing operates. (ii) To study the theory, principles and practical aspects of various marketing functions. (iii) To learn to take marketing decisions.

Part A

Introduction to Marketing:
[5]
Definition; Scope and Importance of Marketing; Key Customer Markets; Concepts/Philosophies of Marketing; Holistic Marketing Concept; Marketing Tasks; Marketing Mix

Marketing Environment:
[5]
Marketing Environment; New Marketing Realities; New Consumer Capabilities; Demographic Environment; Social-Cultural Environment; Natural Environment; Technological Environment and Political-Legal Environment; SWOT analysis.

Analyzing Markets:
[5]
Marketing Research Process; Sources of data collection; factors influencing consumer behavior; buying decision process; post-purchase behavior; Organizational Buying; Stages in the Buying Process.

Market Segmentation:
[6]
Levels of market segmentation; segmenting consumer markets; Niche Marketing; segmenting business markets; Michael Porter’s five forces model; Analyzing competitors; strategies for market leaders; Targeting and Positioning.
Product Decisions: [6]
Product characteristics; classifications; differentiation; packaging and labeling; Product Life Cycle.

Pricing Strategies: [6]
Understanding Pricing; Setting the Price; Initiating and Responding to Price Changes; Reactions to Competitor’s Price Changes.

Marketing Channels: [6]
Marketing Channels; Role of Marketing Channels; Identifying Major Channel Alternatives; Types of Intermediaries; Channel-Management Decisions, Retailing, Wholesaling.

Marketing Communication: [6]
The Role of Marketing Communications; Communications Mix-Advertising, Sales Promotion, Public Relations and Publicity, Events and Experiences, Direct and Interactive Marketing, Personal Selling.

References:
2. Ramaswamy, V.S. & Namakumari, S: Marketing management, planning, implementation and control, 2nd edition Mcmillan
10. Saxena, R: Marketing Management, 2nd edition TMH.

Human Resource Management

IBM 502

L T P

3 0 0

External: 100

Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objectives: The objective of the paper is to make student aware of the various functions and importance of the HR department in any organization. It is basically concerned with managing the human resources, whereby the underlying objective is to attract
retain and motivate the human resources in any organization, which is the most challenging and daunting look for any organization today.

Part A

Introduction:
Meaning, scope, objectives and functions of HRM; Importance of Human Resource Management; HRM & HRD a comparative analysis;

Environment of HRM:
Role of government, internal and external forces; Human Resource Management practices in India.

Human Resource Planning:
Definition, objectives, process and importance; Job analysis, description, specification & job evaluation; Recruitment, selection, placement and induction process;

Human Resource Development:
Concept, Employee training & development; Career Planning & development; Promotions, demotions, transfers, separation, absenteeism & turnover;

Part B

Job Compensation:
Wage & salary administration, incentive plans & fringe benefits.

Performance Management:
Concept & process, performance appraisal, Potential appraisal;

Quality of work life (QWL):
Meaning, techniques for improving QWL.

Industrial Relations:
Concept and theories, trade unions; Health, Safety & Employee welfare measures; Employee grievances and discipline, participation & empowerment; Introduction to collective bargaining.

References:
<table>
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<th>SCHEME OF EXAMINATION</th>
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<td>Power Electronics and Drives</td>
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Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Introductory Concepts: Open loop and closed loop control systems, Servomechanisms, feedback and effects of feedback, linear and non-linear systems, time variant & invariant, continuous and sampled data control systems, illustrative examples.

Modelling: Mathematical models of linear electrical, mechanical, translational, rotational, gear, thermal, pneumatic and hydraulic systems, electrical and mechanical analogies. Laplace transform, Transfer function, Block diagram representation, signal flow graphs and associated algebra, characteristics equation.

State Space Analysis: Concepts of state variable, state vector and state space, State space representation, solution of state equation for LTI and LTV systems, state transition matrix.

Time Domain Analysis: Typical test-input signals, Transient response of the first and second order systems. Time domain specifications, Dominant closed loop poles of higher order systems. Steady state error and error co-efficient,


Part-B

Root Locus Technique: The extreme points of the root loci for positive gain. Asymptotes to the loci, Breakaway points, intersection with imaginary axis, location of roots with given gain & sketch of the root locus plot.. Rules for construction of root locus, root contours, root sensitivity, generalized root locus.


Control Components: Error detectors- potentiometers and synchos, a.c. and d.c. servo motors, brushless d.c. motors, A.C. and D.C. techogenerators, stepper motors.
RECOMMENDED BOOKS:

Control System Engineering by I.J. Nagrath & Gopal, New Age International (P) Limited, New Delhi, 3rd edition, 2004


15. To study the input-output characteristics of a potentiometer and to use a potentiometer as an error detector.
16. To study transmitter - receiver characteristics of a synchros set and to use the set as control component.
17. To study the operation of d.c. position control system.
18. To study the operation of d.c. speed control system.
19. To design different compensating networks for the given cut off frequency response.
20. To study PID controller and to obtain the effect of proportional, Integral and derivative control action.
21. To study the MATLAB Programming for controls systems related to steady state and transfer function conversions.
22. To obtain the step and ramp input response for the various transfer functions using MATLAB.
23. To obtain the root locus response for different systems using MATLAB.
24. To obtain response of basic control system problems in SIMULINK and tune them in MATLAB.
25. To run and use SIMULINK based models in MATLAB. To analyze and simulate the models of following real time applications in MATLAB:
27. Sun-seeker System
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Thyristor and Semiconductor Power Switching Devices

Devices of Thyristor family and their V-I characteristics: Thyristor, Diac, Triac, GTO, MOSFET, IGBT, Principle of operation of SCR. Turn on methods of a Thyristor, Switching characteristics of Thyristor during turn-on and turn-off, Gate characteristics, Thyristor triggering and commutation circuits

Series and parallel operation of SCR’s, Thyristor specifications (latching current and holding current, dv/dt and di/dt etc.), Thyristor Protection circuits, UJT: characteristics and as a relaxation oscillator.

Phase controlled Rectifiers


Choppers

Principle of chopper operations, Control strategies, types of chopper (A, B, C, D, and E), and voltage commutated chopper or classical Jones chopper, Morgan chopper.

Part-B

Inverters

Single-phase and three phase inverters, 180-degree and 120-degree conduction, PWM inverters, Series and parallel inverters, Mc-Murray Bedford inverters.

Cycloconverters

Single phase bridge cycloconverter. Three phase to single phase, single phase to single phase cycloconverter. Advantages disadvantages of cycloconverter.

D C and A C Drives

FACTS Technology, objectives, types of controllers, FACTS Devices: STATCOM, SSG, SVG, UPFC and SSSC.

Text Books


Other Recommended Books

Mohammed H. Rashid, Power Electronics- Circuits, Devices and applications, 3rd edition PHI New Delhi, 2001


EE –662
POWER ELECTRONICS AND DRIVES LAB

L T P
0 0 3

External: 25
Sessional: 50

Note: At least eight experiments are to be performed.

1. To plot the V-I characteristics of the SCR.
2. To draw V-I characteristics of Triac.
3. Study of SCR triggering circuits and check the performance of UJT as triggering device.
4. Study of SCR commutation circuits and check the performance of one commutation circuit.
5. Study of Jones chopper or any chopper circuit to check the performance.
7. Speed Control of induction motor using Thyristor.
8. Study of series inverter and Mc Murray half-bridge inverter and check their performance.
10. Design and simulation of following Thyristor circuits using PSCAD / MATLAB software.

i. commutation,
ii. chopper,
iii. invertors,
iv. rectifier
v. UJT as triggering circuit
vi. Speed control of motors.
EE- 613

Computer Aided Power Systems Analysis

L T P
3 1 0

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

1. **Power Flow Studies**
   
   
   10 h

2. **Power System Controls**
   
   Generator-Voltage Control, Turbine-Governor Control, Load-Frequency Control (single area and two area case), Economic Dispatch, Introduction to Optimal Power Flow. 10h

Part- B

3. **Transient Stability Studies**
   
   
   18 h

Text Book


Other Recommended Books

EE-663

Computer Aided Power Systems

Analysis Laboratory

L T P
0 0 3

External: 25

Sessional: 50

Note: At least four design / analysis projects relating to the following.

5. Power flow analysis.
6. Power flow control
7. Economic dispatch
8. Transient stability studies.
9. Load frequency control
EE -614
Microcontroller, PLCs and Applications

L T P
3 1 0

External: 100
Sessional: 50
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Introduction: Micro controller, Comparison of Microprocessor and Micro controller, micro controller and embedded processors. 2 h

The 8051 Architecture: 8051 Micro controller hardware, Input/Output Pins, Ports, and Circuits, External memory, Counter & timers, Serial Data Input/Output, Interrupts 6 h

8051 Assembly Language Programming: Introduction to 8051 Assembly programming, Assembling and running an 8051 program. Data Types and directives. Addressing modes and accessing memory using various addressing modes. Arithmetic instructions and programs, Logic instructions and programs, Single bit instructions and programming, Jump loop and call instructions, I/O Port programming, Timer/counter programming in the 8051 8 h

Serial Communication: 8051 connection to RS 232, 8051 serial communication Programming. 3 h

Part-B

Real World Interfacing: LCD, ADC and sensors, Stepper motor, keyboard, DAC and external memory 7 h

Introduction to PLC: Introduction to Process Control & Automation, PLC as a Computer, PLC CPU, Solid State Memory, CPU Processor, I/O Modules, PLC-Advantages & Disadvantages. 5 h

General PLC programming: Introduction, Programming Equipment, Program Format, Construction of Ladder Diagrams 4 h

Programming ON-OFF Inputs to produce ON-OFF Outputs: PLC Input Instructions, Outputs Coil Indicators & others, Operational procedures, Contact & Coil Input/Output Programming Examples, Industrial Process Example. 5 h

Recommended Books:
The 8051 Microcontroller Architecture, Programming & application, by Ayala, 2004, west publishing company.
An embedded software primer, David e Simon, Pearson Education, 1st edition

EE-664
Micro Controller, PLCs and Applications Lab
List of Experiments:

Note: At least eight experiments to be done selecting at least two from the last experiment.

1. Study of 8051/8031 Micro controller kits.
2. Write a program to add two numbers lying at two memory locations and display the result.
3. Write a program for multiplication of two numbers lying at memory location and display the result.
4. Write a program to check a number for being ODD or EVEN and show the result on display.
5. Write a program to split a byte in two nibbles and show the two nibbles on display.
6. Write a program to arrange 10 numbers stored in memory location in Ascending and Descending order.
7. Write a program to find a factorial of a given number.
8. Write a program to show the use of INT0 and INT1.
9. Write a program of Flashing LED connected to port 1 of the Micro Controller
10. Write a program to generate a Ramp waveform using DAC with micro controller.
11. Write a program to interface the ADC.
12. Write a program to control a stepper motor in direction, speed and number of steps.

Write Ladder programs (at least two) using PLC for control of simple industrial Processes.
Managerial Economics
IBM 601

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objectives: To provide students with an understanding of basic economic principles of production & exchange-essential tools in making business decisions in today’s global economy. The object presents the foundation to understanding how the economy works, covering microeconomic description of business applications, including pricing for profit maximization, price elasticity, market structures and modeling of business in varying economic climates. The focus is on market economics, the organization that operation there and their business strategies.

Part A

Introduction to Managerial Economics:
Nature Scope and Importance of Managerial Economics, opportunity costs, incremental principle, time perspective, discounts and equi marginal principles.

Demand Concepts and Analysis: [4]
Individual Demand, Market Demand, Kinds of Demand, Determinants of Demand, Demand Functions, Functions, Demand Schedule and Law of Demand.

Theory of Consumer Behavior: [4]
Cardinal Utility Approach and Ordinal Utility (Indifference Curves) Approach;

Elasticity of Demand: [4]
Concept, Types, Measurement and importance.

Demand Forecasting: [5]
Sources of Data-Expert Opinions, Surveys and Market Experiments; Time Series Analysis-Trend Projection; Barometric Forecasting-Leading Indicators, Composite and diffusion Indices.

Part B

Production Function: [4]
Concept and types, Returns to Factor and Returns to Scale, Law of Variable Proportions.

Cost concepts and Analysis: [4]
Concept of Cost, Short run and Long-run Cost Curves, Relationships among various costs, Break-even Analysis.

Revenue Curves: [4]
Concept and Types.
Perfect Competition:
Characteristics, Equilibrium Price, Profit Maximizing output in Short Run and Long Run;

Monopoly:
Characteristics, Equilibrium Price, Profit Maximizing output in Short Run and Long Run; Price Discrimination;

Imperfect Competition:
Monopolistic Competition, oligopoly and Barriers to Entry.

References:
3. Dr. V. Panduranga Rao: Microeconomics-IBS Publication
8. Mote, Paul Gupta: Managerial Economics, Vikas Publisher, New Delhi, 2001 TMH

Corporate Legal Environment

IBM 602

L T P
3 0 0

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: Corporate legal environment represents that external environment in which the organization has to work. The course covers the basic laws which a student must be aware of.

Part A

Information Technology Act-2000:
Objective of the act, documents excluded from the scope of the act, digital signatures, types of digital signatures in India, certifying authorities in India, regulation of certifying authorities, duties of subscribers, offences, appellate tribunal, penalties and adjudication

Company Law:
Definition and nature of a company, kinds of companies, formation of a company, memorandum of association, articles of association, prospectus, membership in a company, shares, transfer and transmission of shares, meetings and proceedings.

Part B

Patents Law:

[11]

Consumer Protection Act 1986 :
Definitions under the act : complaint , consumer, defect, deficiency , unfair trade practice, consumer protection councils, redressal machinery under the act, district forum, state commission, national commission

References:
## Scheme of Examination

### VII Semester

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EE-711
NON – CONVENTIONAL ENERGY SOURCES

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A
INTRODUCTION: Limitation of conventional energy sources, need and growth of alternative energy source, basic scheme and application of direct energy conservation.

MHD GENERATORS: Basic principles, gaseous, conduction and hall effect, generator and motor effect, different types of MHD generator, types of MHD material, conversion effectiveness, analysis of constant area MHD generator, practical MHD generator, application and economic aspects.

THERMO-ELECTRIC GENERATORS: Thermoelectric effects, Seeback effect, Peltier effect, Thomson effect, thermoelectric converters, figures of merit, properties of thermoelectric material, brief description of the construction of thermoelectric generators, application and economic aspect.

PHOTO VOLTAIC EFFECT AND SOLAR ENERGY: Photovoltaic effect, different types of photovoltaic cells, cell fabrication, characteristics of photovoltaic cells, conversion efficiency, solar batteries, application, solar radiation analysis, solar energy in India, solar collectors, solar furnaces and applications.

Part-B
FUEL CELLS: Principle of action, Gibb's free energy, general description of fuel cells, types, construction, operational characteristics and application.

MISCELLANEOUS SOURCES: Geothermal system, characteristic of geothermal resources, choice of generator set, electric equipment precautions low hydro-plants, definition of low head hydrometer, choice of site, choice of turbine wind power, history of wind power, wind machines, theory of wind power, characteristic of suitable wind power site, tidal energy, idea of tidal energy, tidal electric generator.

Recommended Books:
EC-712
Communication Engineering

L T P
3 1 0

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Course Duration: 45 Lectures of one hour each.

Part-A

Amplitude Modulation & Demodulation and Systems


(15)

Frequency Modulation

Principles and generation of FM and PM signals, Reactance Modulator method, Armstrong Method, noise consideration in FM and PM system.

(07)

Part-B

Frequency Demodulation and Systems

detection of FM and PM signals, Foster Discriminator, ratio and PLL detectors, FM Transmitter(Block Diagram), FM receiver (Block Diagram), Pre-emphasis and de-emphasis circuit.

(08)

(15)
Pulse Modulation & Demodulation

Principles, generation and detection of PAM, PWM, PPM & PCM signals, noise in pulse modulation system, band width consideration, companding, delta modulation ,adaptive delta modulation systems. TDM & FDM

(15)

Books Recommended:

3. Principles of Communication Systems by Taub and Schilling, Edition 2\textsuperscript{nd}
List of experiments:-

1. To measure the modulation index of AM signals using the trapezoidal method
2. To study DSB/ SC AM signal and its demodulation using product Detector Circuit.
3. To study the voltages and waveforms of various stages of super-heterodyne receiver
4. To measure the sensitivity and selectivity of a super heterodyne radio receiver
5. To study the voltages and waveforms of various stages of FM Receiver
6. To study the pulse code modulation and demodulation circuit
7. To study the Time division multiplexing and demultiplexing circuit
8. To study delta modulation and demodulation circuits.
9. To study sigma delta modulation and demodulation circuits.
EC-713

Digital Signal Processing

External: 100
Sessional: 50

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

PART A

CONTINUOUS TIME SIGNALS (04)
Review of Fourier series and Fourier Transform, Sampling of Continuous Time signals.

DISCRETE TIME SIGNALS (08)
Discrete time Signals & Systems, Linear Time Invariant systems, Stability and Causality, Solution of Linear constant coefficient difference equations, Convolution, Correlation, Z-Transform and its properties, Inverse Z transform.

FREQUENCY DOMAIN REPRESENTATION OF SIGNALS & SYSTEMS (10)

PART B

DIGITAL FILTERS (10)
Ideal Filter vs. Practical Filters, General Specifications and Design Steps, Comparison of FIR & IIR Filters.
Design of FIR Filters: Window technique, Frequency sampling technique.
Design of IIR Filters: Impulse Invariance technique, Bilinear Transformation, Design of IIR Filters using Butterworth, Chebyshev and Elliptic filter, Digital frequency transformation.

IMPLEMENTATION OF DISCRETE TIME SYSTEMS (05)
Block diagrams and signal flow graphs for FIR and IIR systems. Direct form, Cascade and Frequency Sampling Structures for FIR systems, Direct forms, Cascade and Parallel form realization of IIR systems, Finite Word Length Effects.

DSP PROCESSORS (08)
Introduction to fixed point and floating point processors and their architecture, TMS320C5X Architecture, Memory, Addressing Modes, Interrupts and Assembly Language Programming

Recommended Books:
2. “Digital Signal Processing” by E C Ifeacher and B W Jervis
EC-763
Digital Signal Processing Lab

External: 25
Sessional: 50

List of Experiments:

1. Generating & Plotting Discrete time signals using MATLAB.
2. Use of basic multi-signal processing signals of MATLAB
3. To perform different operations - addition, multiplication, scaling, folding, and shifting using MATLAB.
4. Convolution of Causal & Non Causal sequences in MATLAB.
5. Auto & Cross-Correlation in MATLAB.
7. DFT & IDFT of two sequences.
8. FFT of two Sequences.
9. FIR Filter Design using Window Method in MATLAB.
10. IIR Filter Design using Bilinear Transformation in MATLAB.
11. IIR Filter Design using Impulse Invariance in MATLAB.
12. Butterworth and Chebyshev Digital IIR Filters in MATLAB.
13. Implementation of Filter Structures in MATLAB.
15. System Design based on DSP kits.
IBM 701

Entrepreneurship and Project Management

External: 100
Sessional: 50

Course duration: 45 lectures of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objectives: To understand the concept and importance of entrepreneurship and its role in business life for individual, corporate growth and development.

Part – A

Introduction: Definition, Need, Classification, Process, Scope and Nature of Entrepreneurship, Difference between entrepreneur, entrepreneurship, enterprise and entrepreneurial.
(6 hrs)

Concepts of Entrepreneurship: Factors affecting entrepreneurship, Functions of entrepreneurship, Culture of modern entrepreneurship, Competencies and traits of entrepreneurship, Entrepreneurial ventures in India.
(6 hrs)

Types of entrepreneurship: Role of mitigation in entrepreneurship, Myths of entrepreneurship, Role of family structure in entrepreneurship. Women entrepreneurs, Internet Entrepreneurship, Case Study.
(8 hrs)

Part – B

Project Management: Meaning, Concept, Characteristics, Types, Importance, and Steps in Project Identification, Concept of Project Management, Forms of Project Organization.
(11 hrs)

Project system: Life cycle of system; Project Manager: Attributes;
(7 hrs)

(7 hrs)

Internal Assesment:
Sessionals 15+15 marks

Quiz/Project/Assignment: 20 marks

Text Books:

Reference Books:

IBM 702
Industrial Relations

L T P
3 1 0

External: 100
Sessional: 50

Course duration: 45 lectures of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: The objective of this course is to make the students familiar with various industrial relations approaches and procedure to resolve industrial dispute and with various industrial relations legislations

Part A
**Industrial Relations** - Concepts & Definitions - Impact of Industrial Revolution on Industrial Relations - Indian Industrial Workers- Work Culture - wages and industrial relations - Objectives of Industrial Relations.

6hrs

**Four Actors in Industrial Relations** – The Workers – management – Government – Society & their Importance in maintaining Industrial Relations.

4hrs


4hrs


6hrs

**Strikes** – Types of strikes

2hrs

**Part B**

**Trade Union** – Definition structure – features – Functions of trade Union – Trade Union Security – Types of Trade Unions – Reformist trade union


2hrs

**Industrial Democracy and Workers’ participation in Management** - Role of workers and management in the industry.

3hrs

**Employees’ grievance** – Meaning – Causes – Grievance redressal procedures.

2hrs

**Industrial Relations Legislations:**

a) Trade Union Act,1926

b) Industrial Disputed Act, 1947

(Tripartite and Bipartite bodies : Resolution of Industrial Disputes by conciliation , Arbitration, Ad-judication, Prohibition of strikes – Lockout – Layoff – Retrenchment – Closure etc. )

c) Industrial Employment (Standing Orders) Act, 1946

(Terms and Conditions of employment and disciplinary procedure)

6hrs

**Other Legislations**

Payments of Wages Act,1936

Minimum Wages Act,1948

The Factories Act,1948

6hrs

**Suggested Readings:**

1. Industrial Law –P.L.Malik,Eastern Book Co.Lucknow

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EE-801
ELECTRIC POWER GENERATION

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

1. Introduction:
Electrical energy sources, organization of power sector in India, single line diagram of thermal, hydro and nuclear power stations.

2. Loads and Load curves:
Maximum demand, Group diversity factor, Peak diversity factor, Types of load, chronological load curves, load-duration Curve, mass curves, load factor, capacity factor, utilization factor, base load and peak load plants, load forecasting.

3. Power Plant Economics:
Capital cost of plants, annual fixed cost, operating costs and effect of load factor on cost of energy, depreciation.

4. Tariffs and power factor improvement:

Part-B

5. Selection of plant:
Plant location, plant size, no. and size of units in plants, economic comparison of alternatives, annual cost, rate of return, present worth and capitalized cost methods.

6. Economic operation of steam plants:
Methods of loading turbo-generators, input-output curve, heat rate, incremental cost, method of lagrangian multiplier, effect of transmission losses, co ordination equations, iterative procedure to solve co-ordination equations.

7. Hydro-thermal co-ordination:
Advantages, combined working of run off river plant and steam plant, reservoir hydro plants and thermal plants-long term operational aspects, scheduling methods.

8. Pollution and environmental problems:
Energy and environment, Air pollution, Aquatic impacts, nuclear plant and hydro plant impacts.

9. Cogeneration:
Definition and scope, Topping and Bottoming Cycles, Benefits, cogeneration technologies.

Recommended Books:
2. Power Plant Engineering Dom Kundwar.
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Fundamentals of Neural Networks

Classical AI and Neural Networks, characteristics of neural networks, Historical perspective.


Supervised Learning

Learning and memory, Representation of perceptron, Linear separability, Perceptron Learning, Training of single layer and multi-layer, back propagation training algorithm, Applications of backpropogation, Universal function approximation.                   (6)

attractors Neural Networks

Introduction, Associative memory, Hopfield networks, Content addressable memory, Bidirectional associative memories.                              (5)

Part-B

ART Networks

Vector quantization & simplified ART architecture, Architectures & algorithms of ART1 & ART2 networks, Applications.                                (4)

Self-organizing Feature Map

Introduction, Competitive learning, Maxican Hat networks, SOFM algorithm, Applications.                                             (5)
Fuzzy Logic

Basic concepts of Fuzzy Logic, Fuzzy vs Crisp set, Fuzzy uncertainty & Linguistic variables, membership functions, operations on fuzzy sets, fuzzy rules for approximate reasoning, variable inference techniques, defuzzification techniques, Applications of fuzzy logic, Fuzzy system design.

(5)

Books Recommended:

1. Neural Networks – A Classroom Approach by Satish Kumar, TMH.
2. Neural Networks, fuzzy Logic, and Genetic Algorithms by Rajasekaran & Vijayalakshmi Pai, PHI.
5. Fuzzy Logic with engineering applications by Ross, Mc-Graw Hill.

EC-861

Neural Networks and Fuzzy Logic Lab

L T P
0 0 3

External: 25
Sessional: 50

Practicals related to Theory.
EC- 812

Embedded Systems

L T P

3 1 0

External: 100

Sessional: 50

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

PART-A

Introduction Review of Embedded Hardware

PIC Micro controller & Interfacing

PART-B


Introduction to Real Time Operating Systems: Task And Task States, Tasks and Data, Semaphores and shared data (5)

Operating System Services: Message queues, Mailboxes and Pipes, Timer Function, Events, Memory Management, Interrupt Routines in an RTOS Environment, Basic Design Using RTOS. (7)

Book Recommended:

Embedded Systems Lab

Practicals related to Theory.

IBM-801

Research Methodology

**Course Duration**: 45 lectures of one hour each.

**Note**: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

**Objectives**: The main objective of this subject is to help the students to understand the nature, scope, complexities and process of defining a business research question. The learning focus is on developing business research skills to underpin the approach taken to a work integrated project.

**PART-A**

**Introduction**: Meaning, Features, Objectives/Motives, Steps & Types of Research; Attributes of good Research, Research Methods and Research Methodology; Research Process, Significance of Research in Managerial decision making.  

(8 hrs)

**Research Design**: Meaning, Characteristics and various concepts relating to research design and classification of research design, Importance, Design for different types of research. 

(5 hrs)

**Concepts**: Concept, Constructs, case study and Variables.  

(3 hrs)

**Formulation of Hypothesis**: Meaning, Characteristics and Concepts relating to testing of Hypothesis, Types of Hypothesis, Procedure of testing Hypothesis. Chi – Square test.  

(5 hrs)
PART-B

Data Collection: Sources of Data-Primary/Secondary Methods of collecting data; direct personal interview, indirect oral interview, information through local agencies, mailed questionnaire method, schedule sent through enumerators; questionnaire and its designing and characteristics of a good questionnaire. (8 hrs)

Sampling Design: Meaning, Need, Purpose and Principles of Sampling, Types of Sampling. (5 hrs)

Data Analysis & Interpretation: Introduction to Multivariate analysis- Multiple and partial correlation, multiple regression analysis (with two independent variables), specification of regression models and estimation of parameters, interpretation of results. Analysis of Variance (ANOVA)-One way and Two way ANOVA. (Numerical not to be asked) (6 hrs)

Report writing: Style/format, contents and essential steps for report writing. (5 hrs)

Internal Assessment:

Sessionals 15+15 marks

Quiz/Project/Assignment: 20 marks

Text Books:


Reference Books:

2. Ranjit Kumar: Research Methodology, Pearson Education.
IBM-802

Financial Management

L T P

3 1 0

External: 100

Sessional: 50

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: The objective of this course is to create basic understanding of corporate finance, Capital Budgeting decisions, working capital management, project management etc in the Engineering profession.

PART-A

Corporate Finance

4hrs

Working Capital Management

6hrs

Ratio Analysis

4 hrs.

Techniques of capital Budgeting : Various types of Capital Budgeting, Payback method, NPV, IRR, ARR, Capital Rationing.

6hrs

Cost of Capital: Cost of Enquiry, Cost of Debt, Cost of Retained Earnings, Weighted Average cost of Capital.

3hrs

PART-B

Portfolio Management
Securities, Markets, Stock Exchanges, Risk Return, Relationship, Portfolio Structures.

6hrs

Dividends, Bonus and Rights
Dividends Policy, Legal Requirements for issue of Bonus Shares, Right Shares and Share Premium.

6hrs
Financial Management in Public Enterprises.

Concept & its applications 4hrs.

Concept of Leverages 3 hrs.

Operating, Financial and Combined

Optimum Capital Structure 3 hrs.

EBIT-EPS Relationship, Tax shield Analysis

Suggested Readings: