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

<table>
<thead>
<tr>
<th>Ref No.</th>
<th>Subject</th>
<th>SCHEDULE OF TEACHING</th>
<th>SCHEME OF EXAMINATION</th>
<th>THEORY</th>
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<th>Credits</th>
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**Note:**

*marks refer to mid semester evaluation and end semester evaluation.
Note for Examiner- Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt at least two questions 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 (Gershgorin 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  
Sessional: 50  
Credits : 4  

**L T P**

**Note for Examiner-** Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt at least two questions from each part.

**Part-A**

**Synchronous Machines:**  

**Part-B**

**Parallel operation of alternators:**
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:**

**Text Books:**

**Other Recommended Books:**
1. Electrical Machinery and Transformers by Bhag S. Guru and Huseyin R. Hiziroglu, New York Oxford University Press 2004
EE- 451
ELECTRICAL MACHINERY-II LAB

Mark: 50          L   T   P
Credits : 2                   0 0 3

Note: At least eight experiments are to be performed.

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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. To obtain positive, negative and zero sequence impedances of a three phase
   synchronous generator
9. To obtain positive, negative and zero sequence impedances of a three phase
   transformer
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Part-A

1. **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.
   
   (4 hours)

2. **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.
   
   (6 hours)

3. **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.
   
   (6 hours)

4. **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.
   
   (8 hours)

5. **Stability**
   Concepts of absolute and relative stability, pole –zero location, Routh-Hurwitz stability criterion.
   
   (6 hours)

PART-B

6. **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.
   
   (9 hours)

7. **Frequency Domain Analysis**
8. **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.

(7 hours)

**RECOMMENDED BOOKS:**

### EE-452
**CONTROL ENGINEERING LAB.**

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Note: At least eight experiments are to be performed.

**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 : 4

Note for Examiner- Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt at least two questions from each part.

PART-A

1. Introduction
Introduction to Power System, Basic structure of AC power system, Distribution voltage level, Layout of power supply network, System interconnection, System voltage and transmission efficiency, Working voltage, Choice of next high voltage, Representation of power system components, One line diagram and impedance diagram, Complex power.

2. Conductors and Underground Cables
Types of conductors: Hard drawn copper conductors, AAC, AAAC, ACSR and bundled conductors, Resistance, Skin effect
Types of Underground cables, capacitance of single core cables, grading of cables, capacitance of three core belted cables, power factor and heating of cables

3. Insulators and Supporting Structures
Types of insulators, voltage distribution across suspension insulators, string efficiency, methods of improving string efficiency.
Line supports, wood poles, Concrete poles, Steel poles, Supporting towers, Vibration of conductors, Effect of vibration on transmission lines, Prevention of vibration.

Part-B

4. Transmission-Line Parameters
Conductance and 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

5. Transmission Lines: Steady-State Operation

(6 hours)

6. Transients of Transmission lines

Transmission-line transients, Transient Analysis: Travelling Waves, reflections and refraction of waves.

(5 hours)

TEXT BOOKS

3. Other Recommended Books

EE-453
POWER SYSTEMS-I LAB

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

Design/analysis projects relating to the following.
1. Determination of ABCD parameters of short and medium transmission lines.
2. Line loadability.
3. Steady state operation of transmission lines.
4. To study different types of underground cables.
5. To study different types of insulators.
6. To study various supporting structures.
7. Ferranti effect
8. Power factor improvement
PART A

1. Transistor Biasing and Stability
   Transistor fundamentals, transistor configurations, DC operating point, BJT characteristics & parameters, fixed bias, emitter bias with and without emitter resistance, analysis of above circuits and their design, variation of operating point and its stability
   (8 hours)

2. Low and High Frequency Transistor Model
   Transistor Hybrid Model, h parameter equivalent circuit of transistor, Analysis of transistor amplifier using h-parameters in CB, CE and CC configuration, The high frequency T model, hybrid pi CE transistor model, hybrid pi conductance in terms of low frequency h parameters.
   (8 hours)

3. Feedback Amplifiers and Oscillators
   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.
   (6 hours)

PART B

4. Power Amplifiers
   (8 hours)

5. Differential and Operational Amplifiers
Scaling and Average amplifiers, Integrators and differentiators, Log amplifier, Active filters.

(15 hours)

TEXT BOOKS

OTHER RECOMMENDED BOOKS

EE - 454
ANALOG ELECTRONICS LAB
Marks: 50
Credits: 1

LT P
0 0 2

Note: At least eight experiments to be done.
1. To draw the frequency response of a single stage BJT amplifier.
2. To measure the voltage and current gain of a BJT amplifier.
3. To measure the distortion in the output of a push pull amplifier.
4. To study the phase shift oscillator and find its frequency.
5. To study the frequency of a given crystal oscillator and measure the output.
6. To study WEIN-BRIDGE oscillator and determine its frequency.
7. To study the P-spice software & simulations
8. To study the frequency response of OP-Amp & simulate using P-spice
9. To study opamp applications and simulate using p-spice.
10. To design Butter worth Low pass filter ,High pass filter & simulate using P-spice
IT FOR MANAGERS

Course: BE-MBA IV th Semester

Paper – Compulsory

Paper Code: IBM-401

Course Duration: 45 Lectures of one hour each.

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Internal Assessment: 50  External Assessment: 50

Part A

Information Technology (IT): IT and society, IT infrastructure in India vis-à-vis developed nations (Telecommunication, Internet reach, PC, Broadband, Mobile Phones), IT applications in Healthcare & Education

System Investigation & Analysis, Networking: System Analysis & Design, Symbols used in modeling a business process, modeling different business processes, 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: 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: E-Commerce models, Intermediaries in E-Commerce, study of successful 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: study of portals like EBay, dealing with E-Waste, E-Governance in India, study of implementation of E-Governance in different states in India, scope for further improvement

New Technologies shaping the IT field: Study of new technologies like RFID, WiMAX, Bluetooth, GPS, smart cards etc and their implementation case studies

Online Banking: infrastructure and implementation of Online Banking in India, intermediaries in online banking

Cloud Computing: The business model of cloud computing, advantages and drawbacks of adopting the cloud computing framework.

References:
1. Business Data Communications & Networking, Jerry FitzGerald, Alan Dennis, John Wiley
2. Information Technology for Management: Improving Performance in the Digital Economy, Efraim Turban, Linda Volonino, John Wiley