Maharshi Dayanand University
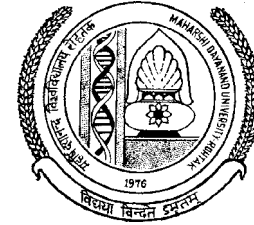# Rohtak

**Syllabus and Courses of Reading for
B.E. (Electrical Engineering)
Semester VII to VIII**

Session - 2010-2011

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.E. IV Year Electrical Engineering
<u>SEMESTER – VII</u>
Modified 'E' Scheme effective from 2010-11

Course No.	Course Title	L	T	P	Total	Marks for Class Work	Theory	Practical	Total Marks	Duration of Exam.
EE-401 E	Data Communication (EL, EE)	3	1	-	4	50	100	-	150	3
EE-403-E	Electric Drives	3	1	-	4	50	100	-	150	3
EE-407-E	Digital Signal Processing (EL, EI, IC, EE)	3	1	-	4	50	100	-	150	3
EE-411-E	Power System Operation & Control	3	1	-	4	50	100	-	150	3
	*Open Elective	4	-	-	4	50	100	-	150	3
EE-413-E	Electric Drives Lab.	-	-	2	2	25	-	25	50	3
EE-421-E	Data Communication Lab (EL, EE)	-	-	2	2	25	-	25	50	3
EE-427-E	Digital Signal Processing Lab. (EL, EI, IC, EE)	-	-	2	2	25	-	25	50	3
EE-415-E	Project	-	-	4	4	50	-	-	50	3
EE-417-E	Practical Training-II	-	-	2	2	-	-	-		-
	Total	16	4	12	32	375	500	75	950	

LIST OF OPEN ELECTIVES

1 HUM-451-E   Language Skills for Engineers
2 HUM-453-E   Human Resource Management
3 HUM-457-E   Business Communication
4 HUM-455-E   Entrepreneurship
5 PHY-451-E   Nano technology
6 PHY-453-E   Laser Technology
7 ME-451-E   Mechatronics Systems
8 CSE-451-E   Artificial Intelligence & Expert Systems
9 CSE-303-E   Computer Graphics
10 IC-455-E   Intelligent Instrumentation for Engineers
11 IC-403-E   Embedded Systems & Design
12 CH-453-E   Pollution & Control
13 IT-471-E   Management Information System
14 IT-204-E   Multimedia Technologies

NOTE:

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

2. *Student will be permitted to opt for any one elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.

3. Assessment of Practical Training-II, carried out at the end of VI semester, will be based on seminar, viva-voce and project report of the student from the industry. According to performance letter Grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.

4. Project load will be treated as 2 hours per week for Project Coordinator and 1 hour for each participating teacher. Project will commence in VII semester where the students will identify the Project problem, complete the design/procure the material/ start the fabrication/complete the survey etc., depending upon the nature of the problem. Project will continue in VIII semester.

EE-401-E

DATA COMMUNICATION

L	T	P		Class Work	:	50
3	1	0		Exam	:	100
				Total	:	150
				Duration of Exam : 3 Hrs.		

Unit-1: DIGITAL COMMUNICATION : Introduction, digital communication, Shannon limit for information capacity, digital radio, digital amplitude modulation, frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), band width efficiency, carrier recovery, differential phase shift keying,(DPSK), clock recovery, probability of error & bit error rate, trellis encoding.

Unit-2: DATA COMMUNICATIONS: Introduction, history of data communication, standard organization for data communication, data communication circuits, data communication codes, error control, synchronization, data communications hardware, serial interfaces: RS-232, RS-449 & RS-530, CCITT X.21, parallel interfaces: centronics parallel interfaces. the telephone network: DDD network, private- line service, the telephone circuit, data modems: synchronous modems, asynchronous modems, modem synchronization.

Unit-3: DATA COMMUNICATIONS PROTOCOLS AND NETWORK CONFIGURATIONS : Introduction, open system interconnection (OSI), data transmission mode, asynchronous protocols, synchronous protocols, public data network, integrated services digital network (ISDN), local area networks, token pass ring, Ethernet.

Unit-4: MULTIPLEXING : Introduction, time division multiplexing, T1 digital carrier system, CCITT time division multiplexed carrier systems, CODECS, COMBO chips, line encoding, T-CARRIERS, frame synchronization, bit interleaving VS word interleaving, frequency division multiplexing, AT&T's FDM hierarchy, composite base band signal, formation of a master group.

Unit-5: INTERNET AND TCP/IP: Introduction, history, use of Internet, accessing the Internet, Internet addresses, security on the internet, authentication, firewalls, intranet and extranet, TCP/IP reference model, domain name service, world wide web.

TEXT BOOK:
1. Electronic Communications Systems (4th Ed.) : Wayne Tomasi; Pearson
2. Data Communication and Networking (2nd -edition): Forauzan;

NOTE:
Eight questions are to be set at-least one from each unit. Students have to attempt any five questions

EE-403-E

ELECTRIC DRIVES

L	T	P		Theory	:	100
3	1	-		Class Work	:	50
				Total	:	150
				Duration of Exam : 3 Hrs.		

1. **ELECTRICAL DRIVES:** Introduction, Classification, advantages, Characteristics of Electric Motors, choice of electrical drive machines, status of ac and dc drives.

2. **CONTROL OF ELECTRICAL DRIVES:** Modes of operation, closed loop control of drives, sensing of current and speed, Microprocessor based control of electric drives

3. **DYNAMICS OF ELECTRICAL DRIVES:** Fundamental torque equations, multi-quadrant operation, equivalent values of drive parameters, load torque components, types of loads.

4. **SELECTION OF MOTOR POWER RATING:** Heating and cooling, determination of motor rating, continuous, short time

and intermittent duty rating, load equalization and determination of moment of inertia of the flywheel.

5. **DC MOTOR DRIVES:** Starting, Acceleration control, braking, transient analysis, Converter fed dc drive & chopper fed dc drive.

6. **INDUCTION MOTOR DRIVES:** Starting, Acceleration control, braking, transient analysis, Static control techniques- stator frequency control, stator voltage control, rotor resistance control. Static Scherbius system & static Kramer system, vector control.

7. **PMBLDC & PMSAC DRIVES:** Permanent Magnet Brushless D C drive, Permanent Magnet Sine-fed drives, Switched Reluctance Machine Drives.

TEXT BOOKS:

1. Fundamentals of Electrical Drives:- by G.K.Dubey, Narosa Publishing House, New Delhi, 1995

2. Electric drives: Concepts and applications, V.Subrahmaniyam, TMH, New Delhi.

REFERENCE BOOKS:

1. Power Semiconductor controlled drives; by G.K.Dubey, Prentice Hall.

2. Kusko, A., Solid State DC Motor Drives, MIT Press, Cambridge, Mass.USA,1969

3. Pillai S.K., A First course in elecric drives, Wiley Eastern, New Delhi.

4. Chillikan, M., Electric Drives, Mir Publishers, Moscow, 1970.

5. Bose B.K., Power Electronics & AC Drives, Prentice Hall, New Delhi,1991.

NOTE:

8 questions are to be set –atleast one from each unit. Students have to attempt any 5 questions.

EE-407-E

DIGITAL SIGNAL PROCESSING

L	T	P			
3	1	0	Class Work :	50

Exam : 100
Total : 150
Duration of Exam : 3 Hrs.

Unit-1: **DISCRETE-TIME SIGNALS:** Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

Unit-2: **DISCRETE-TIME SYSTEMS :** Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

Unit-3: **SAMPLING OF TIME SIGNALS:** Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

Unit-4: **DFT & FFT WITH APPLICATIONS :** Discrete Fourier transform, properties of DFT, Circular Convolution, Fast Fourier Transform, Realizations of DFT.

Unit-5: **Z-TRANSFORM WITH APPLICATIONS :** The Z-transform, the system function of a digital filter, Digital Filter implementation from the system function, the inverse Z-transform properties & applictions, Special computation of finite sequences, sequence of infinite length & continuous time signals, computation of fourier series & time sequences from spectra.

Unit-6: **BASICS OF DIGITAL FILTERS :** Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters : window technique for FIR, bi-linear transformation and backward difference

methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

Unit-7: MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :

1. Digital Signal Processing : Proakis and Manolakis; PHI

2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH

REFERENCE BOOKS:

1. Digital Signal Processing: Alon V. Oppenhelm;PHI

2. Digital Signal processing(II-Edition): Mitra, TMH

NOTE:
Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

EE-411-E
         POWER SYSTEM OPERATION AND CONTROL

L	T	P			
3	1	-	Theory	:	100
			Class Work	:	50
			Total	:	150
			Duration of Exam : 3 Hrs.		

1. **AUTOMATIC GENERATION CONTROL:** Load frequency control (single area case), load frequency control and economic dispatch, optimal load frequency control, Load Management.

2. **ECONOMIC LOAD DESPATCH:** Introduction, Optimal Operation of Generators of Bus bar, Unit Commitment, Reliability Considerations, Optimal Generation Schedule Hydro thermal optimal scheduling.

3. **POWER SYSTEM STABILITY:** Steady state, transient & dynamic stabilities, equal area criteria, effect of fault clearing time on transient stability, dynamics of synchronous machine, factors affecting transient stability.

4. **AUTOMATIC VOLTAGE CONTROL & EXCITATION SYSTEMS:** AVRs, role of AVR on transient stability of system, type 0 & 1 excitation system, power system stabilizers.

5. **VOLTAGE STABILITY:** Basic concept, Voltage collapse, Modelling & prevention.

TEXT BOOKS:

1. Power System Engineering, : I.J. Nagrath & D.P. Kothari : TMH

2. Power System Stability Volume-I : E.W. Kimbark, John Wiley & Sons.

REFERENCE BOOKS:

1. Voltage stability by Taylor

2. Power System Control and Stability: P.Kundur : Mc Graw Hill

3. Electric Energy System Theory: O.I.Elgerd : TMH

4. Computer Aided Power System Analysis : S.I. Ahson, D.P.Kothari & A.K. Mahalanabis, TMH.

5. Power System Analysis & Design : B.R.Gupta, Wheelers Publication,

6. EHV-AC/DC Transmission System ; S.Rao : Khanna Pub.

7. PGO & C: Wood & Wallenberg, John Wiley & Sons.

NOTE:
8 questions are to be set – atleast one from each unit. Students have to attempt any five questions.

EE-413-E

ELECTRIC DRIVES LAB

L T P
- - 2

Practical : 25
Class Work : 25
Total : 50
Duration of Exam : 3 Hrs.

1. Speed control of dc motor using dc chopper.
2. Speed control of dc motor using single- phase converter.
3. Speed control of dc motor using 3- phase converter.
4. Speed control of dc motor using single- phase dual converter.
5. Inverter fed single-phase induction motor drive.
6. CSI fed induction motor drive.
7. Speed control of single- phase induction motor using ac regulator.
8. Regenerative braking of dc motor using single- phase converter.
9. Speed control of single-phase induction motor using cycloconverter.
10. Static rotor resistance control method.

NOTE :
At least 10 experiments have to be performed with atleast 7 from above list, remaining 3 may either be performed from above list or designed & set by concerned institution as per scope of syllabus.

EE-421-E

DATA COMMUNICATION LAB

L T P
- - 2

Class Work : 25
Exam : 25
Total : 50
Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS:

1. To study different types of transmission media
2. To study Quadrature Phase Shift Keying Modulation.
3. To study Quadrature Amplitude Modulation.
4. To Study !6 Quadrature Amplitude Multiplexing.
5. To Study Serial Interface RS-232 and its applications.
6. To study the Parallel Interface Centronics and its applications.
7. To configure the modem of a computer.
8. To make inter-connections in cables for data communication in LAN.
9. To install LAN using Tree topology.
10. To install LAN using STAR topology.
11. To install LAN using Bus topology.
12. To install LAN using Token-Ring topology
13. To install WIN NT
14. To cofigure a HUB/Switch.

NOTE :
At least ten experiments have to be performed in the semester; At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus .

EE-427-E
DIGITAL SIGNAL PROCESSING LAB

L   T   P   Class Work :   25
-   -   2   Exam   :   25
                                 Total   :   150
                                 Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS:

Perform the experiments using MATLAB:

1. **To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).**
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter(low-pass, high pass, band-pass, band-stop).
7. To design digital IIR filters(low-pass, high pass, band-pass, band-stop).
8. To design FIR filters using windows technique.
9. To design a program to compare direct realization values of IIR digital filter
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter
12. To develop a program for computing inverse Z-transform of a rational transfer function.]

NOTE:

At least ten experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.E. II Year Electrical Engineering
SEMESTER – VIII
Modified 'E' Scheme effective from 2010-11

Course No.	Course Title	Teaching Schedule				Marks for Class Work	Examination Schedule (Marks)		Total Marks	Duration of Exam.
		L	T	P	Total		Theory	Practical		
EE-406-E	Advanced Control System	3	1	-	4	50	100	-	150	3
EE-408-E	Computer Applications to Power System Analysis	3	1	-	4	50	100	-	150	3
	Dept. Elective-I	4	-	-	4	50	100	-	150	3
	Dept. Elective-II	4	-	-	4	50	100	-	150	3
EE-410-E	Computer Applications to Power System Analysis	-	-	2	2	50	-	50	100	3
EE-412-E	Independent Study Seminar	-	-	4	4	50	-	-	50	
EE-415-E	Project	-	-	8	8	50	-	100	150	3
GFEE-402-E	General Fitness For the Profession	-	-	-	-	50	-	100	150	3
	Total	**14**	**2**	**14**	**30**	**400**	**400**	**250**	**1050**	

DEPT. ELECTIVE – I

EE-432E   EHV AC/DC

EE-434E   Advanced Instrumentation

IC-404E   Fuzzy Control System (IC, EL, EE)

EE-438E   Recent Trends in De-regulated Power Systems

EE-466E   Utilization of Electric Power & Traction

DEPT. ELECTIVE – II

EE-442E   High Voltage Engineering

EE-444E   Electrical Power Quality

EE-446E   Artificial Intelligence

IC -405E   Computer Based Instrumentation & Control

EE-450E   Power Management

NOTE:

1. Project load will be treated as 2 hrs. per week for the project coordinator and 1 hour for each participating teacher. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.

2. For the subject EE-412-C (Independent Study Seminar), a student will select a topic from emerging areas of Computer Sc. & Engineering and study it thoroughly and independently. Later he will give a seminar talk on the topic.

3. A team consisting of Principal/Director, HOD of concerned department and external examiner appointed by University shall carry out the evaluation of the student for his/her General Fitness for the Profession.

4. Students will be allowed to use the non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination

5. *The subject GFEE-404-E (General Fitness for the Profession) code has been changed to GFEE-402-E and will be effective from 2006-07.

EE-406-E

ADVANCED CONTROL SYSTEMS

L	T	P			
3	1	-	Theory	:	100
			Class Work	:	50
			Total	:	150
			Duration of Exam	:	3 Hrs.

Unit-1. STATE VARIABLE TECHNIQUES: State variable representation of systems by various methods. Solution of state equations-state transition matrix. Transfer function from state variable model. Controllability & observability of state variable model.

Unit-2. SECOND ORDER SYSTEMS & STATE PLANE: Phase portrait of linear second systems. Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

Unit-3. DESCRIBING FUNCTION ANALYSIS: Definition, limitations, use of describing function for stability analysis , describing function of ideal relay, relay with hysteresis & dead zone, saturation/coulomb friction & backlash,

Unit-4. LINEAR APPROXIMATION OF NONLINEAR SYSTEMS: Taylor series, Liapunov's 2nd method.

Unit-5. SAMPLED DATA SYSTEMS: Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shannon's theorem, reconstruction of sampled signal zero order & first order hold, Z-transform, definition, evaluation of Z-transform, Inverse Z-transform, pulse transfer function, limitations of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-Hurwitz criterion to discrete time systems.

TEXT BOOKS:

1. Digital Control & State Variable Methods : M.Gopal ; TMH.

REFERENCE BOOKS :

1. Modern Control Theory : M.Gopal ; Wiley International.

2. Discrete time control system : K.Ogate ; PHI

3. Digital Control Systems : B.C.Kuo

4. Applied non-linear control : J.E.Slotine & W.P.Li; Prentice Hall, USA,

5. Nonlinear Control Systems: Isidari ; Springer-Verlag.

NOTE :

8 questions are to be set –one from each unit. Students have to attempt five questions.

EE-408-E

COMPUTER APPLICATION TO POWER SYSTEM

L   T   P   Theory   :   100
3   1   -   Class Work :   50
                                          Total   :   150
                                          Duration of Exam : 3 Hrs.

Part-A: **LOAD FLOW STUDIES:** Introduction, Bus Admittance Matrix, Formation of Y Bus, Tree graph, Cotree, Primitive network, Bus Incidence matrix, Formulation of Y Bus using singular transformation, Load flow equations Approximate Load flow study, Cious-Seidel method for Load flow Study, Algorithm and flow, Chart for Computer application to Load flow studies, using G-I method, Newton-Rophson method for Load flow studies, Algerthm and flow chart for Computer Application to Load flow studies using N.R. Method. Decenpted Load flow Studies, Fast Decenpted Load flow. Comparison between G-S & N.R. Methods. Load flow Study of Distribution System.

Part-B: DIGITAL TECHNIQUES IN FAULT CALCULATIONS: Review of symmetrical components, Sequence networks for synchronous machines, transforms and transmission Lines. Bus Impedene matrix, Altorithn for formulation of Bus. All types of modifications Short circuit Studies : Single line to ground fault, Line to Line fault, Double line to Ground fault and symmetrical fault. Consideration of Prefault currents.

Part-C: COMPUTER CONTROL & AUTOMATION: Introduction to energy control centres, various states of a power system, SCADA Systems and RTU. Introduction to the MATLAB Power System block Set. Introduction of the features of EMTP.

TEXT BOOKS:

1. Power System Engg.: B.R.Gupta.

2. Computer methods in power system: G. W. Stagg and A. H. El-Abiad, M.G.H.

REFERENCE BOOKS:

1. Advance power system analysis and dynamics: L.P. Singh, Wiley Eastern ltd.

2. Electrical Energy system theory: An introduction by O.I.Elgerd, TMH.

3. Elements of power system analysis: W. D. Stevenson, M.G.H.

4. Power System Engineering, : I.J.Nagrath & D.P.Kothari(TMH).

5. Power System Analysis : Hadi Saadat, TMH, New Delhi.

NOTE:

8 questions are to be set –atleast 3 questions from Part -A & Part-B each and 2 questions from Part-C. Students have to attempt any five questions.

EE-410-E
COMPUTER APPLICATIONS TO POWER SYSTEMS ANALYSIS LAB

L   T   P   Practical   :   100
-   -   2   Class Work :   50
                                       Total   :   100
                                       Duration of Exam : 3 Hrs.

1. Draw the flow chart and develop the computer program for the formation of the Y Bus of a generalized network.

2. Draw the flow chart and develop the computer program for the formation of the Z Bus of a generalized network.

3. To plot the swing curve and observe the stability.

4. To perform load flow study using Gaus Shiedel method.

5. Perform short circuit study for any type of fault.

6. To observe transmission losses and efficiency with variations in power for the given example.

7. Design of distribution system

8. To study the features of EMTP

9. To study the MATLAB Power System block set features.

NOTE:
At least 10 experiments have to be performed with at least 7 from above list, remaining 3 may either be performed from above list or designed & set by concerned institution as per the scope of syllabus.

EE-432-E
EXTRA HIGH VOLTAGE AC/ DC

L   T   P   Exam   :   100
3   1   -   Sessionals :   50
                                       Total   :   150
                                       Duration of Exam : 3 Hrs.

1. **Break Down Mechanism of Gaseous Materials :** Mechanism of Breakdown of gases, Townsend's first Ionization Co-efficient, Townsend's second Ionization Co-efficient, Townsend's Breakdown Mechanism, Streamer Theory of Breakdown in gases, Paschen's law.

2. **Breakdown in Liquid and Solid Dielectrics:** Suspended Particle Theory, Cavity Breakdown, Electro-convection Breakdown, Breakdown in solid Dielectrics, Intrinsic Breakdown, Electromechanical Breakdown, Breakdown due to Treeing and Tracking, Thermal Breakdown, Electrochemical Breakdown

3. **Generation of High Voltage AC. and D.C :** Half wave and Full wave Rectifier, Cockroft Walton Voltage Multiplier Circuit, Ripple in Multiplier Circuit, Electrostatic Vandegraff Generator, Generation of High Alternative Voltage, Cascade Transformer, Resonant Transformer, Generation of High Frequency A.C. High Voltage

4. **Generation of Impulse Voltages and Currents**: Standard Impulse Wave Shapes, Impulse Generator Circuit, Multistage Impulse Generator, Marx's Circuit, Generation of Switching Surges, Impulse Current Generation, Tripping and Control of Impulse Generator

5. **Measurement of High Voltage and Current:** Sphere-Gap, Uniform field Spark gap, Rod Gap, Electrostatic Voltmeter, Generating Voltmeter, Impulse Voltage Measurement using Voltage divider, Measurement of high DC, AC and Impulse Current.

6. **High Voltage Testing of Electrical Equipments** :Testing of line Insulator, Testing of Cable, Testing of Bushings, Testing of Power Capacitor, Testing of Power Transformers, Testing of Circuit Breaker.

7. **Transients & Insulation Co-ordination in Power System**: Over Voltage due to disturbances in D.C & A.C. System, Lightening surges, Switching Surges, Insulation Co-ordination in Power System, Surge Arrestor, Application of surge Arrestor.

TEXT BOOK:

1. High Voltage Engineering By M.S. Naidu & V. Kamaraju - TMH Publication

REFERENCE BOOKS:

1. J. Arrillaga, *High Voltage Direct Current Transmission.* Pub: Peter Peregrinus Ltd. on behalf of I.E.E Power Engg. Series.

2. Rakos Das Begamudre, *Extra EHV A.C Transmission.* PHI Publication.

3. C.L Wadhwa , *High Voltage Engineering.* Pub.: New Age International Ltd.

EE-434-E

ADVANCED   INSTRUMENTATION

L	T	P			
3	1	-	Exam	:	100
			Sessionals	:	50
			Total	:	150
			Duration of Exam : 3 Hrs.		

1. **INTRODUCTION:** Functional block diagram of generalized Instrumentation system. Input-output configuration, specifications under steady & transient state & their performance characteristics.

2. **REVIEW OF SENSORS AND TRANSDUCERS:** Temperature, pressure, displacement, velocity, acceleration, strain and torque type.

3. SIGNAL CONDITIONING: Current & voltage sensitive bridges, Blumlein Bridges, Shielding & grounding, Instrumentation Amplifier & its Characteristics, Linearizing circuits, Wave form and frequency conversion, Acitve filters, A/D & D/A converters; Balanced modulators & demodulators.

4. **NOISE:** Characteristics & Measurements of signal in the presence of noise.

5. **MICROCONTROLLER BASED INSTRUMENTATION SYSTEM:** Interfacing of 8051 Microcontroller with (a) ADC and DAC, (b) Alphanumeric Devices (Sixteen-segment Display, Dot Matrix Displays, LCD Display).

REFERENCES:

1. E.O. Doeblin, *Measurement System – Application & Design.* TMH

2. A.K. Sawhney, *A Course in Electrical & Electronics Measurement & Instrumentation.* Pub.: Dhanpat Rai & Sons.

3. C.S. Rangan, G.R. Sarma, V.S.V. Mani, *Instrumentation Devices & Systems.* New Delhi: Tata McGraw-Hill Pub. Co. Ltd.

4. Oliver & Cage, *Electronic Measurement & Instrumentation.*

5. Raj Kamal, *Microcontrollers: Architecture, Programming, Interfacing and System Design.* Delhi: Pearson Education (Singpaore) Pte. Ltd., Indian Branch.

6. Kenneth. J. Ayala, *The 8051 Microcontrollers – Architecture, Programming & Applications.* Mumbai: Penram International Publishing (India) Pvt. Ltd..

7. Scott Mackenzie, *The 8051 Microcontrollers.* Englewood Cliffs: Prentice Hall Pub. Co.

IC-404-E

FUZZZY CONTROL SYSTEM

L	T	P			
3	1	-	Theory/Exam :	100
			Class Work	:	50
			Total	:	150
			Duration of Exam : 3 Hrs.		

Unit-: **INTRODUCTION:** Fuzzy control from an industrial perspective, knowledge-based controllers, knowledge representation in KBC's.

Unit-2: **THE MATHEMATICS OF FUZZY CONTROL:** Vagueness, fuzzy logic versus probability theory, fuzzy

sets, their properties & operations on fuzzy sets, fuzzy relations & operations on fuzzy relations, the Extension Principle, Fuzzy propositions, The Compositional Rule of Inference, Different implications, Representing a set of rules.

Unit-3: FKBC DESIGN PARAMETERS: The PKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzzification procedure, choice of defuzzification procedure, comparison and evaluation of defuzzification methods.

Unit-4: NONLINEAR FUZZY CONTROL: The Control Problem, The FKBC as a Non-Linear Transfer Element, Types of FKBC such as PID-like FKBC, Sliding Mode FKBC, Sugeno FKBC.

Unit-5: ADAPTIVE FUZZY CONTROL: Design & Performance Evaluation, Approaches to Design such as membership function tuning using gradient descent, membership function tuning using performance criteria, the self-organizing controller, model based controller.

Unit-6: STABILITY OF FUZZY CONTROL SYSTEMS: The State space approach, Stability and robustness indices, input-output stability, circle criterion, the conicity criterion.

TEXT BOOK:

An Introduction to Fuzzy Control: D.,Driankov, H.Hellendoorn and M.Reinfrank.; Narosa.

REFERENCE BOOKS:

Fuzzy Control Systems : Abraham Kandel and Gideon Imngholz; Narosa

NOTE :

Eight question are to be set at least one from each unit. Students have to attempt five questions in all.

EE-438-E
RECENT TRENDS IN DEREGULATED POWER SYSTEMS

L	T	P		Theory	:	100
3	1	-		Sessionals	:	50
				Total	:	150
				Duration of Exam : 3 Hrs.		

1. **Deregulation of the Electricity Supply Industry**: Background of deregulation and the current situation, Benefits from a competitive Electricity Market, After effects of Deregulation.

2. **Power System Operation in Competitive Environment :** Role of Independent System operator, Operational Planning activities of ISO, operational planning activities of Genco.

3. **Transmission open Access and Pricing Issues:** Power Wheeling, Transmission Open Access, Cost component in Transmission, Pricing of Power Transmissions, Security Management in Deregulated environment, Congestion management in Deregulation.

4. **Reliability and Deregulation :** Reliability Analysis, Optimal Power Flow as a Basic Tool, Unit Commitment, Formation of Power Pools.

REFERENCES:

1. Lei Lee Lal, *Power System Restructuring and Deregulation*. UK: John Wiley and Sons, 2001.

2. Kankar Bhattacharya, Math H.J.Bollen and Jaap E. Daalder, *Operation of Restructured Power Systems.* USA: Kluwer Academic Publishers, 2001.

3. Md Shahidehpour and Muwaffaq Alomoush, *Restructured Electrical Power Systems.* Marcel Dekker, Inc.

4. S.S. Rao, *Switch Gear Protection and Power System Analysis.* Khanna Publications.

EE- 466-E

UTILIZATION OF ELECTRIC POWER AND TRACTION

L   T   P   Theory   :   100
4   -   -   Class Work :   50
                             Total   :   150
                             Duration of Exam : 3 Hrs.

Unit-1:   ILLUMINATION: Basic laws of illumination, light sources and their characteristics, sources of light, design of lighting schemes, incandescent lamp, sodium lamp, mercury lamp and fluorescent lamp, comparison of various lamps.

Unit-2:   ELECTRIC HEATING : Principle and application of resistance, induction and dielectric heating.

Unit-3:   ELECTRIC WELDING : Resistance welding, arc welding, welding generator and welding transformer, properties of arcing electrode.

Unit-4:   ELECTROLYTIC PROCESS: Principles and applications of electrolysis. Faraday's law of electrolysis, electroplating, charging and discharging. Capacity and efficiency of battery, defects in battery.

Unit-5:   ELECTRIC TRACTION : Advantages of electric traction, requirements of an ideal traction system, train movement, mechanism of train movement, traction motors, traction motor control, multi unit control, braking of electric motors, thyristor control of electric traction.

REFERENCE BOOKS :

1.   Utilization of Electrical Energy : Open Shaw Taylor ; ELBS

2.   Art and Science of Utilization of Electrical Energy : H. Pratab; Dhanpat Rai & Sons, Delhi.

3.   Generation, Distribution and Utilization of Electrical Power : C.L. Wadhwa ; Khanna Pub.

NOTE:

8 questions are to be set – at least one from each unit. Students have to attempt any five questions.

EE- 442-E

HIGH VOLTAGE ENGINEERING

L   T   P   Theory marks   : 100
4   -   -   Class Work marks : 50
                             Total marks   : 150
                             Duration of Exam : 3 Hrs.

1.   **Introduction:** Recent trends in high voltage transmission.

2.   **Conduction and breakdown:** Conduction & breakdown in gases, liquids and solid dielectrics, insulator breakdown, insulation characteristics of long air gaps.

3.   **Voltage gradients on conductors:** Electrostatic fields of sphere gaps, fields of line charges and their properties, charge-potential relations for multi-conductor lines, surface voltage gradients on conductors, distribution of voltage gradient on sub conductors of bundle.;

4.   **Corona:** Corona and corona loss, corona loss formula, attenuation of travelling waves due to corona, audible noise-generation and characteristics, corona pulses-their generation and properties, properties of pulse, radio interference.

5.   **Lightening:** Lightening phenomenon, lightning stroke mechanism, principle of lightning protection, tower foot resistance, insulator flash over and withstand voltage, lightning arresters and their characteristics.

6.   **H.V. testing and Lab equipments :** Standard wave-shapes for testing, wave-shaping circuits: principles and theory; impulse generator, generation of ac high voltage for testing, generation of direct voltage, measurement of high voltage, general layout of H.V. Laboratory.

TEXT BOOKS:

1.   E.H.V. AC Transmission: R.D. Begamudre, Wiley Eastern Ltd.

2.   H.V. Engg.: V. Kamaraju and M.S. Naidu, T.M.H., N.Delhi.

NOTE:

8 questions are to be set – at least one from each unit. Students have to attempt any five questions.

EE-444-E

ELECTRICAL POWER QUALITY

L T P   Exam   :   100
3 1 -   Sessionals :   50
                                 Total   :   150
                                 Duration of Exam : 3 Hrs.

1. **INTRODUCTION TO ELECTRICAL POWER QUALITY:** Definition of Power Quality, Power Quality Issues, Power Quality v/s Equipment Immunity, Electric Power Quality Standards.

2. **POWER FREQUENCY DISTURBANCES:** Common Power Frequency Disturbances, Voltage Sag, Isolation Transformers, Voltage Regulators, Static Uninterruptible Power Source Systems.

3. **ELECTRICAL TRANSIENTS:** Types and Causes of Transients, Atmospheric Causes, Switching Loads On or Off, Interruption of Fault Circuits, Capacitor Bank Switching, Motor Start Transient, Power Factor Correction, Capacitor Switching Transient.

4. **HARMONICS:** Definition of Harmonics, Causes of Voltage and Current Harmonics. Individual and Total Harmonic Distortion, Effect of Harmonics on Power System Devices, Guidelines for Harmonic Voltage and Current Limitation, Harmonic Current Mitigation.

5. **MEASURING & SOLVING POWER QUALITY PROBLEMS:** Power Quality Measurement Devices, Harmonic Analyzers, Transient-Disturbance Analyzers, Oscilloscopes, Data Loggers and Chart Recorders, True RMS Meters, Power Quality Measurements.

REFERENCE BOOKS:

1. G.T. Heydt, *Electric Power Quality.* 2nd ed. West Lafayette, IN: Stars in a Circle, 1994.

2. A Ghosh, G. Ledwich, *Power Quality Enhancement Using Custom Power Devices.* Kluwer Academic, 2002

3. R.C. Dugan, M.F. McGranaghan and H.W. Beaty, *Electric Power Systems Quality.* New York: McGraw-Hill.1996.

4. C. Sankaran, *Power Quality.* CRC, 2002.

5. J. Arrillaga, D.A Bradely and P.S. Bodger, *Power System Harmonics.* New York: Wiley, 1985.

EE-446-E

ARTIFICIAL INTELLIGENCE

L T P   Theory marks   : 100
3 1 -   Sessionals   : 50
                                 Total marks   : 150
                                 Duration of Exam : 3 Hrs.

Unit-1: FOUNDATIONAL ISSUES IN ARTIFICIAL INTELLIGENCE: Foundation and history of AI, AI problems and techniques, AI programming languages, introduction to LISP and PROLOG, problem spaces and searches, blind search strategies, Breadth first-Depth first - heuristic search techniques, Hill climbing, best first - A* algorithm, AO* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning.

Unit-2: KNOWLEDGE REPRESENTATION: Issues, predicate logic, logic programming, semantic nets, frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

Unit-3: APPROXIMATE REASONING: Reasoning under uncertainty, review of probability, Baye's probabilistic inferences and Dempster Shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non-monotonic reasoning.

Unit-4: PLANNING & LEARNING: Planning in situational calculus, Representation for planning, Partial order planning algorithm, Learning from examples, Discovery as learning, Learning by analogy, Explanation based learning, Introductory remarks on learning by Neural Networks and Genetic Algorithms.

Unit-5: APPLICATIONS: Rule based systems architecture, Expert systems, Knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

TEXT BOOK:

1. Artificial Intelligence: A Modern Approach,. Russell & Norvig. Prentice Hall, 1995.

REFERENCE BOOKS:

1. Elain Rich and Kevin Knight, "Artificial Intelligence", TMH, 1991.

2. Staurt Russel and Peter Norvig, "Artificial Intelligence - A modern approach", PHI, 1998.

3. Patrick Henry Winston, "Artificial intelligence", 3rd Ed., Addition Wesley, 1992.

4. Dan W. Patterson, "Artificial Intelligence", PHI, 1990

NOTE:

Eight questions will be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

IC-405-E
COMPUTER BASED INSTRUMENTATION AND CONTROL

```
L   T   P                      Theory      :   100
3   1   -                      Class Work  :   50
                               Total       :   150
                               Duration of Exam : 3 Hrs.
```

Unit-1: INTRODUCTION: Necessity and functions of computers. Level of automation and economy of computer control. Centralized computer control Vs distributed computer control.

Unit-2: COMPUTER ARCHITECTURE: Micro and mini computer, functional models of I.O. system .

Unit-4: INTERFACING: Sampling; Multiplexing; A/D and D/A converters, interfacing with different types of transducers - Analog / Digital, Electrical and non electrical selection of sensors; Micro computer interfacing standard buses Serial buses; Serial data communication protocols.

Unit-4: STRUCTURAL STUDY OF AUTOMATIC PROCESS CONTROL: Fundamental of automatic process control, building block of automatic system, direct and distributed digital control system. Programmable controllers.

Unit-5: PERSONAL COMPUTER IN REAL LIFE ENVIRONMENT: Introduction, personal computer: system and facility, PC bus and signals, interrupts, interfacing PC with outer world, PC in RTE, Real time application of IBM PC PC based distributed control system

Unit-6: PROGRAMMING AND APPLICATION: Modeling and simulation for plant automation, PLC Architecture and programming of PLC, industrial control application: cement plant, thermal power plant , water treatment plant, steel plant,

TEXT BOOK :

1. Computer based industrial control: Krishan Kant,; PHI

NOTE :

Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

EE-450-E

POWER MANAGEMENT

L T P
3 1 -

Exam   :   100
Sessionals :   50
Total   :   150
Duration of Exam : 3 Hrs.

1. **INTRODUCTION:** Power Scenario, Power Development, Planning, Power resources, Environment- Power matters Plan, Pre-feasibility and feasibility studies, State relations for Power etc.

2. **RESOURCES:** Resources, Geophysical study, Seismic Considerations, Environmental Restraints, Resettlement and Rehabilitation.

3. **PROCUREMENT:** Contracting and Procurement, Consulting Services, Types of Contracts, Project Management, Organization and Economy Management, Organizational Planning and Time Scheduling, Project Cost Control.

4. **ENGINEERING:** Engineering & General Layout of Equipments, Generator, Transformer and Switch Gear and Control Equipment, Construction Methods, Operation and Maintenance Principle, Maintenance organization and planning, Availability, life cycle cost & future development. Visits to sites.

5. **POWER SECTOR:** Power sector structure in different states, Regulatory Regime in those states, Power utilities in Haryana, Grid management, Power financing, Visit to sites.

6. **POWER STATION:** Management of Fuel, water Resource Electricity deviend scenario storage and handling, Pricing, Contract etc., Human resource management. Visit to sites.

7. **RISK & HAZARD:** Introduction to risk, rules and regulation Aspects of Risk & Hazard Health & risk assessment visit to site.

8. **ELECTRICITY INDUSTRY STRUCTURE & SAFETY REGULATIONS BILL & ETC.:** State and Central Power boards / Power corporations.

REFERENCE BOOKS:

1. Electricity Bill, Safety & Conservation Act

2. Arora & Dom Kundwar, *A Course in Power Plant Engineering*, Pub.: Dhanpat Rai Pub, 2000.

3. Jain & Bala Subranmanyam, "Power Plant Engineering", Dhanpat Rai Pub.,

4. Butter Worth, A.B. Gill, "Power Plant Performance Management", Pub: 1984.

5. P.C. Sharma, "Power Plant Engineering", Dhanpat Rai Pub.,

6. David A. Decenzo, Stephen P. Robbins, *Human Resource Management*. New Delhi: PHI Pvt. Ltd., 2004.

7. P.K. Nag, *Power Plant Engg.* N.Delhi: TMH, 2003.

GFEE-402-E
GENERAL FITNESS FOR PROFESSION

L T P
- - 8

Class Work   : 50
Practical   : 100 marks
Total Marks   : 150 marks

At the end of each year students will be evaluated on the basis of their performance in various fields. The evaluation will be made by the panel of experts/examiners/teachers to be appointed by the Principal/Director of the College. A specimen perform indicating the weight age to each component/activity is given below :-

Name : _____

College Roll No. _____

Univ.Roll No. _____

Branch _____

Year of Admission _____

I.   Academic Performance (15 Marks) :
(a) Performance in University Examination :-

Sem.	Result	%age of Marks obtained	Number of Attempt in which the Sem. exam. has been cleared
I	_____		
II	_____		
III	_____		
IV	_____		
V	_____		
VI	_____		
VII	_____		

II. Extra Curricular Activities (10 Marks) :

Item	Level of Participation	Remarks (Position Obtained)
Indoor Games (Specify the Games	_____	
	_____	
	_____	
Outdoor Games (Specify the Games)	_____	
	_____	
	_____	
Essay Competition	_____	
	_____	
	_____	
Scientific Technical Exhibitions	_____	
	_____	
	_____	
Debate	_____	
	_____	
	_____	
Drama	_____	
	_____	
	_____	
Dance	_____	
	_____	
	_____	
Music	_____	
	_____	
	_____	

Fine Arts _____

_____

_____

Painting _____

_____

_____

Hobby Club _____

_____

_____

N.S.S. _____

_____

_____

Hostel Management _____

Activities _____

_____

Any other _____

activity (Please _____

specify) _____

III. Educational tours/visitis/Membership of Professional Societies (5 Marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

IV. Contribution in NSS Social Welfare Floor Relief/ draught relief/Adult Literacy mission/Literacy Mission/ Blood Donation/Any other Social Service (5 Marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

V. Briefly evaluate your academic & other performance & achievements in the Institution (5 Marks)

_____

_____

_____

_____

_____

_____

VI. Performance in Viva voce before the committee (10 Marks)

_____

_____

_____

_____

_____

*Marks obtained :

1.(   )+II(   )+III(   )+IV(   )+V(   )+VI(   )

**Total Marks :

Member   Member   Member   Member   Member