Maharshi Dayanand University
Rohtak

Syllabus and Courses of Reading for
B.Tech. (Electrical Engg.)
Semester V and VI

Session - 2009-2010

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M.D.UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
Becholer of Engineering (Electrical Engineering)
Modified 'E' Scheme effective from 2007-08
SEMESTER-V

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of class work	Examination Theory	Practical	Total Marks	Duration Exam.
EE-311-E	ELECTRICAL MACHINES-II (EE, EEE)	3	1	-	4	50	100	-	150	3
EE-303-E	ELECTRONIC MEASUREMENT AND INSTRUME-NTATION (EL,EI, IC,EE,EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-305-E	ANALONG ELECTRONICS CIRCUITS (EL,EE,EI, IC, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-315-E	POWER SYSTEMS-I (EE, EEE)	3	1	-	4	50	100	-	150	3
EE-317-E	POWER ELECTRONICS (EE, EEE AEI, Common with VI-sem EI,IC,ACE)	3	1	-	4	50	100	-	150	3
EE-313-E	MICROPROCESSOR (8085) & INTERFACING & APPLICATIONS (EE, ONLY)	3	1	-	4	50	100	-	150	3
EE-323-E	ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB (EL, IC,EE, EEE, AEI)	-	-	2	2	25	-	25	50	3
EE-321-E	POWER ELECTRONICS LAB. (EE, EEE Common with VI sem EI, IC)	-	-	2	2	25	-	25	50	3
EE-319-E	MICROPROCESSOR (8085) & INTERFACING & APPLICATION LAB. (CSE,EL,IT,EE,EI, IC, EEE)	-	-	2	2	25	-	25	50	3
EE-327-E	ELECTRICAL MACHINES-II LAB. (EE, EEE)	-	-	3	3	25	-	25	50	3
EEE-333-E	PRATICAL TRAINING-I	-	-	2	2	-	-	-	-	-
	TOTAL	18	6	11	35	400	600	100	1100	

Note :

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
2. Assessment of Practical Training-I, undergone at the end of IV semester, will be based on seminar, viva-voce, report and certificate of practical training obtained by 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.

EE-311-E **ELECTRICAL MACHINES - II**

L T P **Theory : 100 Marks**

3 1 - **Class work : 50 Marks**

Total : 150 Marks

Duration of Exam : 3 Hours

INDUCTION MACHINES

Poly-phase Induction Machine: Constructional features, production of rotating field, induction motor action, torque production, testing, development of equivalent circuit, performance characteristics, circle diagram, starting methods, methods of speed control - stator voltage control, stator resistance control, frequency control, rotor resistance control, slip power recovery control. double cage and deep bar motors. grid excited and self excited induction generators.

Single phase Motors: Double revolving field theory, cross field theory, different types of single phase induction motors, circuit model of single phase induction motor.

SYNCHRONOUS MACHINES

Principle, construction of cylindrical rotor and salient pole machines, winding, EMF equation, Armature reaction, testing, model of the machine, regulation -- synchronous reactance method, Rothert's mmf method, Potier triangle method. Output power equation, power angle curve, two reactance theory, slip test, transient and sub-transient reactances, synchronization, parallel operation. Principles of synchronous motor, power angle curve, V-curve, starting, damper winding, synchronous condenser, applications.

TEXT BOOKS:

1. Electric Machines: I.J.Nagrath and D.P. Kothari, TMH, New Delhi.
2. Electric Machinery, Fitzgerald and Kingsley, MGH.
3. Electrical Machines, P.S. Bhimbra, Khanna Publishers Delhi

REF. BOOKS:

1. Theory of alternating current machinery: A.S. Langsdorf (TMH)
2. Generalized theory of Electrical Machines: P.S. Bhimbra(Khanna Pub.)

NOTE:

8 questions are to be set; 4 from each part. Students are to attempt 5 questions with at least 2 from each

EE-303-E **ELECTRONIC MEASUREMENT AND INSTRUMENTATION**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

UNIT 1. OSCILLOSCOPE:

Block diagram, study of various stages in brief, high frequency CRO considerations. Sampling and storage oscilloscope.

UNIT 2. ELECTRONIC INSTRUMENTS:

Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meters.

UNIT 3. GENERATION & ANALYSIS OF WAVEFORMS:

Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

UNIT 4. FREQUENCY & TIME MEASUREMENT:

Study of decade counting Assembly(DCA), frequency measurements, period measurements, universal counter, introduction to digital meters.

UNIT 5. DISPLAY DEVICES:

Nixie tubes, LED's LCD's, discharge devices.

UNIT 6 TRANSDUCERS:

Classification, Transducers of types: RLC photocell, thermocouples etc. basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

UNIT 7 INTRODUCTION TO SIGNAL CONDITIONING:

DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system

TEXT BOOK:

1. A course in Electrical & Electronics Measurements & Instrumentation : A.K.Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS.

1. Electronics Instrumentation & Measurement Techniques : Cooper; PHI.

NOTE:

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

EE-305-E ANALOG ELECTRONIC CIRCUITS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

UNIT1. SINGLE AND MULTISTAGE AMPLIFIERS:

Classification of amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, RC-coupled amplifier, low frequency response of RC coupled stage, effect of an emitter bypass capacitor on low Frequency response, multistage CE amplifier .

UNIT2. FEEDBACK AMPLIFIERS :

Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

UNIT3. OSCILLATORS:

Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, generalform of oscillator circuit, wien-bridge oscillator, crystal oscillator.

UNIT4. POWER AMPLIFIERS:

Class A, B, and C operations; Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; class C power amplifier.

UNIT5. OPERATIONAL AMPLIFIERS :

Ideal and practical operational amplifiers, inverting and non-inverting amplifier, differential amplifier, emitter coupled differential amplifier, transfer characteristics of a differential amplifier, offset error : voltage and current, common mode rejection ratio (CMRR) .

UNIT6. LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS :

Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier, AC coupled amplifier, AC voltage follower, Integrator, differentiator.

UNIT7. NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS :

Comparators, sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators , Miller & Bootstrap sweep generators, regenerative comparator (Schmitt Trigger), multivibrators, ADC.

TEXT BOOK:

1. Integrated Electronics: Milman Halkias, TMH.
2. Microelectronic Circuits : Sedra & Smith.

REFERENCE BOOKS:

1. Operational Amplifiers:Gaikwad
2. Electronic Circuit Analysis and Design (Second edition) : D.A.Neamen; TMH

NOTE:

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

EE-315-E POWER SYSTEMS-I

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

1. INTRODUCTION: Structure of a power system, indoor and outdoor substations, equipment for substations, layout, auxiliary supply.
2. DISTRIBUTION SYSTEMS: Radial, ring mains and network distribution system, comparison of various types of ac and dc systems.
3. TRANSMISSION LINES: Calculation of line parameters, Ferranti effect, proximity effect.
4. PERFORMANCE OF LINES: models of short, medium and long transmission lines, performance of transmission lines, circle diagram, capacity of synchronous condenser, tuned lines, voltage control.
5. MECHANICAL DESIGN: Sag and stress calculations, effect of ice and wind, dampers.
6. INSULATORS: Types, insulating materials, voltage distribution over insulator string, equalizer ring.
7. CABLES: Types of LV and HV cables, grading of cables, capacitance, ratings.
8. CORONA: Phenomenon, critical voltage, power loss, reduction in losses, radio-interference, HVDC transmission - types of links, advantages and limitations.

TEXT BOOKS:

1. Power System Engg: I.J.Nagrath and D.P.Kothari (TMH)
2. A Course in Electrical Power: Gupta, Soni & Bhatnagar (Dhanpat Rai & Sons).

REF. BOOKS:

1. Elements of power system analysis: W.D.Stevenson (MGH)
2. Electric Power: S.L.Uppal (Khanna Pub.)
3. Electrical power: J.B.Gupta (S.K.Kataria & Sons).
4. Power System Engineering: B. R. Gupta.
5. Electric Power System: B.M.Weedy, John Wiley & Sons.
6. Transmission & Distribution of Electrical Engineering: H.Cotton.
7. Transmission & Distribution of Electrical Engineering: Westing House & Oxford Univ. Press, New Delhi.

NOTE:

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

EE-317-E POWER ELECTRONICS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

UNIT1. INTRODUCTION :

Role of power electronics, review of construction and characteristics of power diode, Shottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

UNIT2. SCR:

Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors; pulse transformer and opto-coupler, commutation techniques.

UNIT3. AC REGULATORS:

Types of regulator, equation of load current, calculation of extinction angle, output voltage equation, harmonics in load voltage and synchronous tap changer, three phase regulator.

UNIT4. CONVERTERS :

One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT5. INVERTERS :

Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters,

McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

UNIT6. CHOPPERS :

Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

UNIT7. CYCLOCONVERTERS :

Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

UNIT8. DRIVES:

Introduction to electric drives: DC drives - converter and chopper fed dc drives, ac drives - stator voltage control, V/f control, rotor resistance control, static Scherbius system and static Kramer systems.

TEXT BOOK:

1. Power Electronics : MH Rashid; PHI

REFERENCE BOOKS :

1. Power Electronics : PC Sen; TMH

2. Power Electronics : HC Rai; Galgotia

3. Thyristorised Power Controllers : GK Dubey, PHI

4. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai

5. Power Electronics: P.S Bhimra.

NOTE :

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

EE-323-E ELECTRONIC MEASUREMENT AND INSTRUMENTATION-LAB

L	T	P
0	0	2

Class Work: 25 Marks
Exam : 25 Marks
Total : 50 Marks
Duration of Exam : 3 Hours

LIST OF EXPERIMENTS:

1. Measurement of displacement using LVDT.
2. Measurement of distance using LDR.
3. Measurement of temperature using R.T.D.
4. Measurement of temperature using Thermocouple.
5. Measurement of pressure using Strain Guage.
6. Measurement of pressure using Piezo-Electric Pick up.
7. Measurement of distance using Capacitive Pick up.
8. Measurement of distance using Inductive Pick up.
9. Measurement of speed of DC Motor using Magnetic Pick up.
10. Measurement of speed of DC Motor using Photo Electric Pick up.

NOTE :

1 At least ten experiments have to be performed in the semester.

2. 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 of EE-303-C.

EE-313-E MICROPROCESSORS (8085), INTERFACING AND APPLICAITON

L T P
3 0 0

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

1. Introduction to microprocessors, Overview, History of microprocessor.
2. The 8085 Processor : Architecture, Addressing Modes, instruction set, interrupt Timing Diagrams & simple examples, including loops & nested loops, interrupts.
3. The 8255 PPI chip: Architecture, control words, modes and examples.
4. Introduction to other chips : Introduction to DMA process & its controller chip 8257, & a few other chip such as programmable interrupt controller, programmable interval timer.
5. Interfacing and application of 8085 Microprocessor : Interfacing issues, Interfacing ADC & DAC, Interfacing memory, Microprocessor-based voltage, current, frequency, power measurement schemes.

TEXT BOOKS :

1. Ramesh S Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085/8086 A", Wiley Eastern Ltd.

REFERENCE BOOKS:

1. Badri Ram, " Fundamentals of Microprocessors & Microcomputers". Dhanpat Rai & Sons, Delhi.
2. Michael Andrew, " Programming Microperocessor Interfaces for control & instrumentation", Prentice Hall Inc., Engle Wood Clifs, New Jersey.
3. S.I. Ahson, " Microprocessors with Application in Process Control", TMH, New Delhi.

NOTE :

8 questions are to be set at least one question from each unit. Students have to attempt any 5 questions.

EE-321-E POWER ELECTRONICS-LAB

L T P
3 1 0

Class Work: 50 Marks
Exam : 100 Marks
Total :150 Marks
Duration of Exam : 3 Hours

LIST OF EXPERIMENTS:

1. Study of characteristics of diode, thyristor and triac.
2. Study of characteristics of transistor and MOSFET.
3. Study of R and R-C firing circuits.
4. Study of UJT firing circuit.
5. Study of complementary voltage commutation using a lamp flasher.
6. Study of complementary voltage commutation using ring counter.
7. Study of thyristorised d-c circuit breaker.
8. Study of a.c. phase control.
9. Study of full wave converter.
10. Study of dc chopper.
11. Study of series inverter.
12. Study of bridge inverter.
13. Study of single phase cycloconverter.

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 of EE-308-C.

EE-319-E MICROPROCESSORS (8085) INTERFACING AND APPLICATIONS LAB

L T P
0 0 2

Class Work: 25 Marks
Exam : 25 Marks
Total : 50 Marks
Duration of Exam : 3 Hours

1. Study architecture of 8085 & familiarization with its hardware, commands & operation of Microprocessor kit.
2. Write a well-documented program for:
   a. addition of two 8-bit numbers (provision for carry)
   b. addition of two 8-bit numbers.
3. Write a well-documented program for:
   a. subtraction of two 8-bit numbers (display of borrow)
   b. subtraction of two 16-bit numbers (display of borrow)
4. Write a well documented program for:

   Multiplication of two 8-bit numbers by repeated addition method. Check for minimum number of addition and also test for typical data.
5. Write a well-documented program for:

   Multiplication of two 8-bit numbers by bit rotation method.
6. Write a well-documented program for: Division of two 8-bit numbers by repeated subtraction method. Test for typical data.
7. Write a well-documented program for Dividing two 8-bit numbers by bit rotation method. Test for typical data.
8. Write a well-documented program for:
   a. Finding a largest number from an array.
   b. Finding a smallest number from an array.

9. Write a well-documented program for arranging an array of numbers in descending order.
10. Write a well-documented program for arranging an array of numbers in ascending order.
11. Write a well-documented program for finding square of a number using Look-up table.
12. Identification of input & output pins of port 8255, for various control words.
13. To measure an electrical quantity using microprocessor & 8255.
14. Write a program to interface a 2-digit number using seven-segment LEDs. Use 8085 microprocessor and 8255 PPI chip.
15. Write a program to control the operation of stepper motor using 8085 microprocessor & 8255 PPI chip.

Note:

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

EE-333-E PRACTICAL TRAINING-I

L	T	P
-	-	2

At the end of fourth semester each student would undergo six weeks practical training in an industry/Professional organization/research laboratory with the prior approval of the Director Principal/Principal of the concerned college and submit a written typed report along with a certificate from the organization. The record will be evaluated by a board of examiners to be appointed by the Director- Principal/Principal of the concerned college during V Sem. who will award one of the following grades:

Excellent	:	A
Good	:	B
Satisfactory	:	C
Non – Satisfactory	:	F

A student who has been awarded ‘F’ grade will be required to repeat practical training even after eighth semester.

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Becholer of Engineering (Electrical Engineering)
Modified 'E' Scheme effective from 2007-08
SEMESTER-VI

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of class work	Examination Theory	Practical	Total Marks	Duration Exam.
EE-312-E	POWER SYSTEMS -II									
(EE, EEE)	3	1	-	4	50	100	-	150	3	
EE-314-E	Conventional & CAD	3	1	-	4	50	10 0	-	150	3
	of Electric Machines (EE, EEE)									
EE-316-E	ADVANCED MICROPROCESSOR	3	1	-	4	50	100	-	150	3
	AND MICRO-CONTROLLER									
EE-304-E	CONTROL SYSTEMS	3	1	-	4	50	100	-	150	3
	ENGG. (EL,EE, EEE)									
EE-318-E	ELECTRIC POWER	3	1	-	4	50	100	-	150	3
	GENERATION (EE, EEE)									
EE-310-E	DIGITAL SYSTEM DESIGN	3	1	-	4	50	100	-	150	3
	(EL,EI, IC,EE,CSE, AEI)									
EE-324-E	CONTROL SYSTEM ENGG.	-	-	2	2	25	-	25	50	3
	LAB (EL,EE, EEE, AEI)									
EE-320-E	ADVANCED MICROPROCESSOR	-	-	2	2	25	-	25	50	3
	AND MICRO-CONTROLLER LAB									
EE-326-E	Conventional & CAD of	-	-	2	2	25	-	25	50	3
	Electric Machines Lab									
	(EE, EEE)									
EE-328-E	POWER SYSTEMS LAB	-	-	2	2	25	-	25	50	3
	(EE, EEE)									
GPEE-302-E	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note :

1. Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the VII semester.
2. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

EE-312-E **POWER SYTEMS - II**

L T P
3 1 -

Class Work: 50 Marks
Exam : 100 Marks
Total :150 Marks
Duration of Exam : 3 Hours

1. SYMMETRICAL FAULT ANALYSIS: Transients on a transmission line, short circuit of synchronous machine at no load and on full load.

2. SYMMETRICAL COMPONENTS: Symmetrical component transformation, phase shift in star-delta transfor-mation, sequence impedances.

3. UNSYMMETRICAL FAULT ANALYSIS: Single line to ground fault, line to line fault, double line to ground fault, open conductor fault.

4. CIRCUIT BREAKERS: Theory of arc interruption, circuit breaker, circuit breaker ratings, restriking voltage transients, current chopping, duties of switch gear, automatic switch, air circuit breaker, bulk oil, minimum oil, air blast, SF6 CB, vacuum and DC circuit breakers.

5. PROTECTIVE RELAYS: Nature and causes of faults, consequences, zone of protection, essential qualities, primary and backup protections, relay classification, principal types of electromagnetic relays, i.e. attracted ar-mature, induction disc, induction cup types.

6. RELAY APPLICATION AND CHARACTERISTICS: Over - current, instantaneous over current, IDMT, direc-tional and differential relays, distance relays, plain impedance, mho, reactance, offset mho type, transmission line & feeder protection, introduction, over current, distance, pilot wire and carrier current protection, neutral grounding.

7. APPARATUS PROTECTION: Transformer, generator, motor and bus zone protection.

8. STATIC & DIGITAL RELAYS: Classification of static relays, amplitude and phase comparators, block-spike and block-average comparators , rectifier type relays. Introduction to digital relay: basic principles. Application of microprocessors and computers - recent Trends. Travelling wave relay, relaying schemes based on micro-wave and optical fiber link.

TEXT BOOKS:

1. Power System protection and switchgear -B.Ram, D.N.Vishvakarma : TMH.

2. Switchgear and protection - S.S.Rao : Khanna Pub.

REF. BOOKS:

1. Protective Relays -Their Theory and Practice Vol.I & II: W.Van Warrington.

2. Advanced power system analysis and dynamics: L.P.Singh, Wiley Eastern N.Delhi.

3. Digital Protection : Protective relay from Electro Mechanical to Microprocessor-L.P.Singh,Wiley Eastern.

4. Power System Protection and Switchgear -B.Ravinder Nath and M.Chander, Wiley Eastern,N.Delhi.

5. A course in Electrical Power - Soni, Gupta and Bhatnagar - Dhanpat Rai & Sons.

6. Power System Engg: I.J. Nagrath and D.P. Kothari(TMH).

7. Power System Engineering: V. K. Mehta.

Note:

8 questions are to be set -one from each unit. Students have to attempt five questions in all.

EE-314-E CONVENTIONAL AND CAD OF ELECTRIC MACHINES

L	T	P
4	-	-

Class Work: 50 Marks
Exam : 100 Marks
Total :150 Marks
Duration of Exam : 3 Hours

1. GENERAL: General features and limitations of electrical machine design. Types of enclosures, heat dissipation, temperature rise heating and cooling cycles and ratings of machine machines. Cooling media used.

2. BASIC DESIGN PRINCIPLES: Output equation and output coefficient, Specific electric and magnetic loading. Effect of size and ventilation.

3. MAGNETIC CIRCUITS: MMF calculation for airgun and iron parts of electrical machines, gap contraction coefficient. Real and apparent flux densities. Estimation of magnet current of transformers and rotating ma-chines, no load current of transformers and induction motors. Leakage flux and reactance calculations for trans-formers and rotating machines, Design of field magnet.

4. DETAILED DESIGN: Design of transformer, D.C. machines induction motor and synchronous machine and their performance calculations.

5. COMPUTER AIDED DESIGN: Computerization of design Procedures. Development of Computer program and performance prediction. Optimization techniques and their applications to design Problems.

TEXT BOOKS:

1. A course in Electrical Machine Design by A.K. Sawhney, Khanna Pub.

REFERENCE BOOKS:

1. Theory, performance and Design of alternating current machines by MG Say, ELBS, 15th Ed. 1986.
2. Theory, Performance and Design of Direct Current machines by A.E. Clayton, 3rd Ed. 1967.
3. Optimization Techniques, S.S. Rao

NOTE:

8 questions are to be set -at least one from each unit. Students have to attempt any 5 Questions.

EE-316-E **ADVANCED MICROPROCESSOR & MICROCONTROLLER**

L T P
3 1 -

Class Work: 50 Marks
Exam : 100 Marks
Total :150 Marks
Duration of Exam : 3 Hours

1. THE 8086 ARCHITECTURE: Pin diagram of 8086 and description of various signals. Architecture block diagram of 8086 & description of sub-blocks such as EU & BIU & of various registers ; Description of ad-dress computations & memory segmentation; Program relocation; Addressing models; Instruction formats.
2. INSTRUCTION SET OF 8086: Instruction execution timing, Assembler instruction format; Data transfer instructions, Arithmetic instructions, Branch instructions, Looping instructions, NOP & HLT instructions, Flag manipulation instructions, Logical instructions, Shift & Rotate instructions, Directives & operators, simple example such as copying a block of data, finding maximum from an array of numbers, using look up table technique etc.
3. MICROCONTROLLERS: comparison between Microcontrollers & Microprocessors. Block diagram of 8051, Pin diagram & details, I/O structure, Memory organization. Special function registers. External memory, 8032/8052 Enhancements, Reset operation.

   Instruction Set: Addressing modes, arithmetic, Logical. Data transfer. Boolean variable, program branch-ing instructions.

   Timer Operation: Timer Mode register, Timer Control register.

Timer modes & Overflow flag., clocking sources, Start, Stopping & controlling the timers. Programs for generating various frequecy. Square waves.

Serial Port Operation: Serial port control register, Modes & operation. Serial port band rate. Multoproc-essor communication. Initialization & programming of serial port.

Interrupt: Organization, processing interrupts, program design using interrupts. Serial port interrupts, Ex-ternal interrupts.

TEXT BOOKS:

1. The 8051 Microcontroller; 1. Scott Mackenizie, Prentice Hall, Eagle wood Cliff
2. Yu-Chang Liu & Glenn A Gibson Microcomputer systems: the 8086/8088 Family: architecture,Programming & Design.

REFERENCE BOOKS:

1. Brey, "Intel Microprocessors, 8086,8088,80186,80286/Pentium
2. Triekel & Singh,"The 8088 & 8086 Microprocessors -Programming, interfacing,
3. Bhupinder singh Chabra, "The Intel 8086/8088 Microprocessors architecture programming, design & interfacing," Dhanpat Rai & Sons.
4. Kenneth J. Ayala, "8051 Microcontroller Architecture, programming & Applications", 2nd edition 1996, Penram International Publishers, India.
5. Website: W W W at mel. Com.

EE-304-E **CONTROL SYSTEM ENGINEERING**

L T P **Class Work: 50 Marks**
3 1 0 **Exam : 100 Marks**
Total :150 Marks
Duration of Exam : 3 Hours

UNIT1. INTRODUCTORY CONCEPTS :

System/Plant model, types of models, illustrative examples of plants and their inputs and outputs, controller, servo-mechanism, regulating system, linear time-invariant (LTI) system, time-varying system, causal system, open loop control system, closed loop control system, illustrative examples of open-loop and feedback control systems, con-tinuous time and sampled data control systems. Effects of feedback on sensitivity (to parameter variations), stabil-ity, external disturbance (noise), overall gain etc. Introductory remarks about non-linear control systems.

UNIT2. MATHEMATICAL MODELLING :

Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs : Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems. Transfer functions of cascaded and non-loading cas-caded elements. Introduction to state variable analysis and design.

UNIT3. TIME DOMAIN ANALYSIS :

Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order sys-tem to step input, rela-

tionship between location of roots of characteristics equation, w and wn, time domain specifi-cations of a general and an under-damped 2nd order system, steady state error and error constants, dominant closed loop poles, concept of stability, pole zero configuration and sta-bility, necessary and sufficient conditions for stabil-ity, Hurwitz stabil-ity criterion, Routh stability criterion and relative stability.

UNIT4. ROOT LOCUS TECHNIQUE :

Root locus concept, development of root loci for various systems, sta-bility considerations.

UNIT5. FREQUENCY DOMAIN ANALYSIS :

Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stabil-ity, Gain-margin and Phase Margin, relative stability, frequency response specifications.

UNIT6. COMPENSATION :

Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feed-back control, proportional, integral and derivative controllers, illustrative examples.

UNIT7. CONTROL COMPONENTS :

Synchros, AC and DC techo-generators, servomotors, stepper motors, & their applications, magnetic amplifier.

TEXT BOOK :

1. Control System Engineering : I.J.Nagrath & M.Gopal; New Age

REFERENCE BOOKS :

1. Automatic Control Systems : B.C.Kuo, PHI.

2. Modern Control Engg : K.Ogata; PHI.

3. Control Systems - Principles & Design : Madan Gopal; Tata Mc Graw Hill.

4. Modern Control Engineering.R.C.Dorl & Bishop; Addison-Wesley

NOTE:

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

EE-318-E ELECTRICAL POWER GENERATION

L T P
3 1 0

Class Work: 50 Marks
Exam : 100 Marks
Total :150 Marks
Duration of Exam : 3 Hours

1. INTRODUCTION: Energy sources, their availability, Recent trends in Power Generation, Interconnected Gen-eration of Power Plants.

2. POWER GENERATION PLANNING: Load forecasting, load curves, load duration curve, Base load and Peak load Power Plants, connected Load, maximum demand, demand factor, Group diversity factor, load factor, sig-nificance of load factor, plant factor, capacity factor, selection of unit size, No. of Units, reserves, cost of power generation, Depreciation, tariff.

3. CONVENTIONAL ENERGY SOURCES: Selection of site, ca-pacity calculations, classification, Schematic diagram and work-ing of Thermal Power Stations, Hydro Electric Plant, Nuclear Power Plant and Diesel Power Stations.

4. NON-CONVENTIONAL ENERGY SOURCES: Wind, Solar, Tidal, Ocean, and Geothermal sources of En-ergy, fuel cell, Magneto Hydro Dynamic (MHD) system.

5. ELECTRIC ENERGY CONSERVATION & MANAGEMENT: Energy management, Energy Audit, Energy Efficient Motors, Co-generation.

TEXT BOOKS:

1. Electric Power Generation, B.R.Gupta

2. Power Generation, Operation and Control, Wood and Wollenberg, John Wiley & Sons,1984.

REF. BOOKS:

1. A Course in Electric Power System, Soni, Gupta, Bhatnagar, Dhanpat Rai & Sons

2. Power System Engineering, Nagrath & Kothari, Tata Mc-Graw Hill, New Delhi

3. Power Plant Engg: G.D. Rai

4. Electric Power: S.L. Uppal (Khanna Publishing)

NOTE:

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

EE-310-E **DIGITAL SYSTEM DESIGN**

L T P **Class Work: 50 Marks**
3 1 0 **Exam : 100 Marks**
Total :150 Marks
Duration of Exam : 3 Hours

UNIT 1. INTRODUCTION :

Introduction to Computer-aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, logical operators.Types of delays Entity and Architecture declaration. Introduction to behavioural, dataflow and structural models.

UNIT 2. VHDL STATEMENTS :

Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements.

Subprograms: Application of Functions and Procedures, Structural Modelling, component declaration, structural layout and generics.

UNIT 3. COMBINATIONAL CIRCUIT DESIGN:

VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

UNIT 4. SEQUENTIAL CIRCUITS DESIGN :

VHDL Models and Simulation of Sequential Circuits

Shift Registers, Counters etc.

UNIT 5. DESIGN OF MICROCOMPUTER :

Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL

UNIT 6. DESIGN WITH CPLDs AND FPGAs :

Progr ammable logic devices : ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs

REFERENCE BOOKS:

1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDL and Synthesis : KC Chang; IEEE Computer Society Press.
3. "A VHDL Primmer" : Bhasker; Prentice Hall 1995.
4. "Digital System Design using VHDL" : Charles. H.Roth ; PWS (1998).
5. "VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.
6. VHDL-IV Edition :Perry; TMH (2002)
7. "Introduction to Digital Systems" : Ercegovac. Lang & Moreno; John Wiley (1999).
8. Fundamentals of Digital Logic with VHDL Design : Brown and Vranesic; TMH (2000)
9. Modern Digital Electronics- III Edition: R.P Jain; TMH (2003).

NOTE :

Eight questions are to be set - at least one question from each unit. Students will be required to at-tempt five questions in all.

EE-324-E **CONTROL SYSTEM LAB**

L T P **Class Work: 25 Marks**
0 0 2 **Exam : 25 Marks**
Total :50 Marks
Duration of Exam : 3 Hours

LIST OF EXPERIMENTS :

1. To study A.C. servo motor and to plot its torque speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for :
   (a) series connected mode
   (b) parallel connected mode.
4. To plot the load current v/s control current characteristics for self exited mode of the magnetic amplifier.
5. To study the synchro & to:
   (a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.
   (b) Plot stator voltage v/s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque trans mitter.
7. (a) To demonstrate simple motor driven closed loop position control system.
   (b) To study and demonstrate simple closed loop speed control system.

8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots .
9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
10. To implement a PID controller for level control of a pilot plant.
11. To implement a PID controller for temperature control of a pilot plant.
12. To study the MATLAB package for simulation of control system design.

NOTE :

At least ten experiments have to be performed in the semester, at least seven experiments should be per-formed 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 of EE-304-C.

EE-320-E **ADVANCED MICROPROCESSOR & MICROCONTROLLER LAB**

L T P **Class Work: 25 Marks**
0 0 2 **Exam : 25 Marks**
Total :50 Marks
Duration of Exam : 3 Hours

LIST OF EXPERIMENTS:

1. Study of 8086 microprocessor kit, its operation & commands.
2. Write a well-documented program for copying 12 bytes from source to destination, on 8086 microprocessor kit.
3. Write a program for 8086 for division of a defined double word (stored in a data segment) by another dou-ble word and verify.
4. Write a well-documented program for finding the square root of a given number, on 8086, microprocessor kit.
5. Write a program using 8086 for finding the square of a given number and verify.
6. Write a program using 8086 and verify for:
   a. Finding the largest number from an array.
   b. Finding the smallest number from an array.
7. Write a program using 8086 for arranging an array of numbers in descending order and verify.
8. Write a program using 8086 for arranging an array of numbers in ascending order and verify.
9. Write a program for 8086 for finding square of a number using look-up table and verify. .

10. Write a program to interface a two digit number using seven-segment LEDs. Use 8086 microprocessor and 8255 PPI.
11. Write a program to control the operation of stepper motor using 8086 microprocessor and 8255 PPI.

NOTE:

At least 10 experiments are to be performed with atleast 7 from above list, remain-ing 3 may either be performed from the above list or de-signed & set by concerned institu-tion as per the scope of syllabus.

EE-326-E CONVENTIONAL AND CAD OF ELECTRIC MACHINES -LAB

L T P
0 0 2

Class Work: 25 Marks
Exam : 25 Marks
Total :50 Marks
Duration of Exam : 3 Hours

This will pertain the syllabus of theory Paper CONVENTIONAL AND CAD OF ELECTRIC MA-CHINES.

EE-328-E POWER SYSTEMS LAB

L T P
0 0 2

Class Work: 25 Marks
Exam : 25 Marks
Total :50 Marks
Duration of Exam : 3 Hours

1. To draw the operating characteristcs of IDMT relay.
2. To draw the operating characteristcs of differential relay.
3. To study Bucholtz relay.
4. Testing of transformer oil.
5. To find ABCD parameters of a model of transmission line.
6. To observe the Ferranti effect in a model of transmission line.
7. To study the plain impedance relay and plot its tripping characteristics.
8. To study the MHO relay and plot its tripping characteristics
9. To study the power control by phase shifting transformer.
10. To plot annual/monthly/daily load demand of nearby area.
11. To draw single line diagram of distribution system of HVPNL of near by area of the college concerned.
12. To design 11 KV substation.

NOTE :

At least 10 experiments have to be performed, with at least 7 from above list, remaining 3 may ei-ther be performed from above list or designed & set by the concerned institution as per latest developments/ advancements in Electrical Engg.

GPEE-302- E GENERAL FITNESS FOR THE PROFESSION

L	T	P
-	-	8

Class Work : 50 Marks
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/visits/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