

**DIPLOMA IN (ELECTRICAL/ ELECTRICAL & INSTRUMENTATION ENGG
I-SEMESTER
ELECTRICAL ENGINEERING
(COURSE NO: BEE-101)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

D.C FUNDAMENTAL AND CIRCUITS.

Unit-I Ampere Volt and Ohm. Kirchoff's Laws, analysis of D.C. circuits with KCL and KVL. Resistance, grouping of resistors, temperature coefficient of resistance. Work, Energy and Power. Sample problems. 20%

MAGNETIC CIRCUITS, ELCTRO-MAGNETC INDUCTION AND CAPACITORS.

Unit-II Faraday's & lenz's law of electromagnetic induction. Induced and generated voltages. Inductance and its units, self and mutual inductances, energy stored in an inductor, capacitance and it's unit, grouping of capacitors, energy stored in a capacitor. Magnetic Circuit: associated terms and their units, simple problems on series and parallel Magnetic circuits. 20%

ALTERNATING CURRENTS FUNDAMENTALS

Unit-III Concept of alternating quantities, instantaneous, Average & R.M.S value. nature of alternating voltage and current. Sinusoidal equation, phasor diagram, lagging,leading quantities. 20%

POWER IN A SINGLE PHASE A.C. CIRCUIT.

Unit-IV Power in an a.c circuit, power factor, active and reactive currents. Relationship between current and voltage in purely resistive, inductive and capacitive circuits, inductive and capacitive reactance. 20%

THREE PHASE CIRCUITS

Unit-V Generation of three phase voltages, phase sequence, star and delta connections, line and phase values, phasor diagrams, power in a three phase balanced and Solution of three phase balanced circuits. 20%

Recommended Books:

1. Fundamental of Electrical Engg.....Ashfaq Husain
2. Electrical Engg. Principles..... Ashfaq Husain
3. Principles of Electrical Engg.....V.K. Mehta
4. A Text of Electrical Tech.....B.L.Tharaja
A.K.Tharaja

**DIPLOMA IN ELECTRICAL/ ELECTRICAL & INSTRUMENTATION
ENGINEERING
II-SEMESTER
ELECTRONICS ENGINEERING
(COURSE NO: BEE-201)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	SEMICONDUCTOR PHYSICS AND DIODE	20%
	Atomic structure and elementary concept of energy bands, conduction in crystal-absolute zero and above, intrinsic semiconductor, doping and extrinsic semiconductor, P-type and N-type semiconductor, PN junction, depletion layer, barrier potential, PN-Junction biasing, characteristics and break down mechanism (avalanche's and zener), working, characteristics and applications of LED and Zener diode.	
Unit-II	RECTIFIERS AND FILTERS	20%
	Concept of rectification, specification of a rectifier diode, single phase- half wave, full wave rectifiers: bridge and centre tap, circuits and their operations, calculation of ripple factor, efficiency of half wave and full wave rectifiers, concept of filtering and smoothing, filter circuits.	
Unit-III	ELECTRONIC COMPONENTS	20%
	Active and passive components, resistors and their types: fixed value and variable resistors, resistor colour coding, capacitors and their types: fixed value and variable capacitors, inductors, types of inductors: filter chokes, radio frequency chokes and variable inductors.	
Unit-IV	TRANSISTORS	20%
	Bipolar Junction Transistors: construction, types and operation, Basic BJT amplifier configuration: common emitter, common base and common collector, input and output characteristics, current amplification factor for different configurations. Field - Effect Transistors: structure, principle of operation and V-I characteristics of JFET and MOSFET, voltage transfer characteristics.	
Unit-V	TRANSISTOR AMPLIFIERS	20%
	Class of operation: A, B, AB and C, small signal operation, operating point and load line, biasing and stabilization of transistor, Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias.	

Books Recommended:

1. Electronic Devices and Circuit Theory - by Rober L. Boylestad, Eight Edition, PHI.
2. Electronics Devices & circuits by Bogart.
3. Basic Electronics and Linear circuits -by N. N Bhargava.
4. Principles of Electronics - by V.K Mehta.

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING**

**III-SEMESTER
ELECTRICAL MACHINE-1
(COURSE NO: BEE-301)**

Annexure: I
BOS : 13.02.2013

Pds/week		Duration of Exam Hrs	Max Marks			
L	P		Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I SYNCHRONOUS GENERATOR 20%

Construction of synchronous generator. Rotating field versus rotating armature. Salient pole and cylindrical rotor construction. Speed frequency relationship. Excitation system of rotating fields. EMF equation. Coil span factor and distribution factor.

Unit-II TRANSFORMERS 20%

Construction of single phase transformer. Principle of operation. EMF equation. Phasor diagram on no-load and on load. Equivalent circuit. Voltage regulation. Transformer losses and efficiency. Maximum efficiency. Open circuit and short circuit tests. Single phase autotransformer: Construction, advantages and applications.

Unit-III THREE PHASE INDUCTION MOTOR 20%

Construction of squirrel cage and slip ring induction motor. Production of rotating magnetic field. Principle of operation of a three phase induction motor. Synchronous speed. Slip. Rotor EMF and currents.

Unit-IV D.C. MACHINES 20%

Construction of D.C. machines. EMF Equation of D.C. generator. Types of D.C generator. Principle of operation of D.C. motors and their characteristics, speed control of D.C motors.

Unit-V SINGLE PHASE MOTORS 20%

Capacitor starts motor. Capacitor start capacitor runs motor. Shaded-pole motor. Single phase series motor.

BOOKS RECOMMENDED:

Electrical Machines BY Ashfaq Hussain.
Electrical Machines BY Nagarath & Kothari.
Electrical Technology VOL.2 BY B.L. Theraja.
Electrical Machines BY Samarjit Ghosh.

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
III-SEMESTER
ELECTRONIC DEVICES AND CIRCUITS
(COURSE NO: BEE-302)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>VOLTAGE AMPLIFIER:</p> <p>General classification of amplifiers, R.C. coupled amplifier (circuit diagram and operation), frequency response of R.C. coupled amplifier (at low, mid and high frequencies), advantages and disadvantages. Transformer coupled amplifier (circuit, frequency response). Power Amplifiers (Classification), class A power amplifier with direct coupled resistive load and with transformer coupled resistive load. Class B push pull amplifier (operating conditions, characteristics), Complementary Symmetry Amplifier (circuit, Principle of Operation).</p>	20%						
Unit-II	<p>FEED BACK IN AMPLIFIER:</p> <p>Definition of positive feed back and negative feed back, Effect of negative feed back on the performance of the amplifiers, Negative feedback circuits Types of negative feed back (negative voltage feed back and negative current feed back). Emitter follower (characteristic and applications)</p>	20%						
Unit-III	<p>TUNED AMPLIFIERS:</p> <p>Tank circuit. Analysis. Single tuned transistor amplifier (coupling method, operation, gain selectivity and band width). Double tuned amplifier (circuit diagram, characteristic). R.F. class C amplifier (circuit, Operation, efficiency, output power and distortion).</p>	20%						
Unit-IV	<p>WAVE SHAPING AND PULSE CIRCUITS:</p> <p>Introduction, Response of R.C. network for step, pulse, ramp wave forms (MATHEMATICAL ANALYSIS). Clipping and clamping circuits. One level clipping . Two level clipping. Diode clamping.</p>	20%						
Unit-V	<p>OPERATIONAL AMPLIFIER AND THEIR APPLICATION</p> <p>Operational amplifier (Block Diagram And characteristics of an ideal OP-AMP). Definition of various parameters (voltage gain, output and input voltage and currents, CMRR, slew rate). Techniques of off set removal. Application of Op-Amp (integrator, adder, differentiator and Schmitt trigger). Active filters (frequency response)- low pass, high pass and band pass.</p> <p>BOOKS RECOMMENDED:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1.Basic Electronics & Linear circuits</td> <td style="width: 50%;">by N.N Bhargava</td> </tr> <tr> <td>2.Wave shapping & digital circuits</td> <td>by Aggarwal & Rai</td> </tr> <tr> <td>3.Microelectronics</td> <td>by Millman</td> </tr> </table>	1.Basic Electronics & Linear circuits	by N.N Bhargava	2.Wave shapping & digital circuits	by Aggarwal & Rai	3.Microelectronics	by Millman	20%
1.Basic Electronics & Linear circuits	by N.N Bhargava							
2.Wave shapping & digital circuits	by Aggarwal & Rai							
3.Microelectronics	by Millman							

DIPLOMA IN ELECTRICAL / ELECTRICAL & INSTRUMENTATION
III-SEMESTER
CIRCUIT THEORY-I
(COURSE NO: BEE-303)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	CIRCUIT ANALYSIS & D.C TRANSIENTS Ideal and practical voltage and current sources. Source transformation Voltage sources to Current Source and Vice versa. Mesh and Nodal Analysis of DC Circuits with voltage sources, current sources and combination of these two. Growth of current in an Inductive circuit, Time constant of R L circuit, Decay of current in an Inductive circuit. Charging of a capacitor, Time constant of R.C. circuit, Initial and final values. Discharge of a capacitor.	20%
Unit-II	NETWORK THEOREMS Superposition Theorem, Thevenin's Theorem, Norton's Theorem, and their application to 2 terminal A.C & D.C Networks. Maximum power transfer theorem for D.C. Network matching.	20%
Unit-III	TWO PORT NETWORK Various two port circuit parameter: their interrelationship, evaluation of Z,Y,h and transmission (ABCD) parameters, cascading of two port network.	20%
Unit-IV	A.C. CIRCUIT Definition and explanation of alternating current, voltage and their relative terms, Phasor diagrams of alternating current and voltage in Series and Parallel A.C. Circuit containing Purely Resistive, Capacitive, Inductive elements (a combination of two elements and a combination of all three elements).	20%
Unit-V	RESONANCE Series resonance definition, derivation of expressions for resonant frequency, quality factor, voltage and current, resonance curve, lower and upper half power frequency, bandwidth and selectivity dependence of bandwidth and selectivity on Quality factor (problems based on the above). Parallel resonance circuit (same as for series resonance).	20%

BOOKS:

Electrical Technology By R.L Thereja
Fundamentals of Electrical Engineering. By Ashfaq Hussain, Dhanpat Rai & Co

DIPLOMA IN ELECTRICAL ENGINEERING
III-SEMESTER
GENERATION OF ELECTRICAL ENERGY
(COURSE NO: BEE-304)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>THERMAL GENERATING STATIONS</p> <p>Generation of electrical energy in thermal plants. Important components such as steam generators, prime movers, drought coal handling and ash, disposal systems, simple numerical problems based on calorific value and output electrical power.</p>	20%
Unit-II	<p>HYDRO- ELECTRIC GENERATING STATIONS</p> <p>Classifications of hydel plants. Salient features of a hydel power generation plant such as catchment areas, dams, reservoirs, surge tank and prime-movers. Simple numerical problems based on water calculations.</p>	20%
Unit-III	<p>ATOMIC GENERATING STATIONS</p> <p>Nuclear fuels and Nuclear fusion. Construction, working, process involved in nuclear reactor. Reactoraccessiries. Generation of Electrical Energy in a nuclear power plant. Important components such as coolants, heat exchanger, prime-movers, condensers, cooling water systems, feed water storage. Relative merits.</p>	20%
Unit-IV	<p>DIESEL POWER PLANTS</p> <p>Advantages & disadvantages of Diesel power plants, diesel plant layout & Diesel plant equipment, Principle of gas turbine Power plant, closed cycle gas turbine plant.</p>	20%
Unit-V	<p>ECONOMICAL ASPECTS</p> <p>Load curves, load factor, diversity factor and demand factor. Numerical problems based on load curves. Calculation of generation cost, fixed and running cost. Various systems of Tariff Interconnection of power stations and its advantages.</p>	20%

BOOKS RECOMMENDED

- | | |
|------------------------------------|-----------------|
| 1. Generation of Electrical Energy | By, B.R. Gupta. |
| 2. Power Station Practice, | By Deshpande. |

DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION ENGG
IV-SEMESTER
ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS
(COURSE NO: BEE-401)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>AMMETERS AND VOLTMETERS</p> <p>Classification of instruments, Operating forces, Deflecting , controlling, Damping Torque. Principle Constructional features and working of moving coil and moving iron instruments. Rectifier type voltmeter, Electrostatic voltmeter. Extension of range of voltmeter and ammeters. Calibration of voltmeter and ammeter.</p>	20%
Unit-II	<p>MEASUREMENT OF POWER AND ENERGY</p> <p>Methods of measuring single phase and 3-phase power constructional features and working of dynamometer type wattmeter. Single phase and three phase energy meter. Energy meter Errors and their adjustments. Calibration of single phase energy meter and wattmeter.</p>	20%
Unit-III	<p>MEASUREMENT OF RESISTANCE</p> <p>Measurement of low , medium and high resistances. Construction, working and applications of ohm meter, and megger, Compton potential.</p>	20%
Unit-IV	<p>DC & AC BRIDGES</p> <p>Wheatstones Bridge, Carey Foster bridge. Kelvin double bridge, Maxwell's bridge. Maxwell Wein's Bridge. Concept and uses of CT & PT.</p> <p>Construction and working of power factor meter, frequency meter, synchro scope and maximum demand indicator.</p>	20%
Unit-V	<p>The cathode ray Oscilloscope</p> <p>Block diagram description and operating controls of a cathode ray oscilloscope (CRO)</p> <p>Measurement of voltage, phase angle and frequency by means of a CRO.</p>	20%

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
IV-SEMESTER
CIRCUIT THEORY-II
(COURSE NO: BEE-402)**

Revised

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

MESH NODAL ANALYSIS

Unit-I Mesh Analysis for A.C Circuits, Nodal analysis for A.C Circuit, Choice between mesh and node analysis Mesh and Nodal analysis for frequency domain circuits. 0%

NETWORK FUNCTIONS

Unit-II Network functions, properties of driving point functions, properties of transfer functions, poles and zeros, time response, frequency response, magnitude and phase plots of network functions. 0%

INTRODUCTION TO FILTER CONCEPTS

Unit-III Classification of filters: Low pass, High pass, Band pass, Band reject, All pass filters Solution of Problems 0%

FOURIER METHOD OF WAVEFORM ANALYSIS

Unit-IV Introduction, Trigonometric Fourier series, Waveform Symmetry, Effective values and power application in circuit analysis. 0%

STATE VARIABLE ANALYSIS

Unit-V Introduction, Network Topology, State Equation, Choice of state Equations, Proceeding of Writing the State Equations of Simple Networks. Advantages of State Variables. 0%

BOOKS RECOMMENDED

Ashfaq Husain,	Networks and Systems	Khanna publisher
A Chakrabarti	Introduction to Network	Dhanpat Rai & Sons
	Filters and Transmission Lines	

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
IV-SEMESTER
CIRCUIT THEORY-II
(COURSE NO: BEE-402)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	INTRODUCTION SI units, Definition of various electrical quantities: such as charge, current, voltage, resistance, power, work, energy potential and potential difference their units and relationship with each other. The three basic parameters of electric circuit: resistance, capacitance and inductance, definition, current-voltage relation. Ohm's law, simple circuits: series, parallel and series-parallel connection of resistors, capacitors and inductors (simple problems).	20%
Unit-II	NETWORK LAWS & THEOREMS Kirchhoff's voltage and current laws (with problems). Mesh Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum power transfer Theorem for DC network.	20%
Unit-III	MESH NODAL ANALYSIS Mesh Analysis for A.C Circuits, Nodal analogy for A.C Circuit, Choice between mesh and node analysis Mesh and Nodal analysis for frequency domain circuits.	20%
Unit-IV	FOURIER METHOD OF WAVEFORM ANALYSIS Introduction, Trigonometric Fourier series, Waveform Symmetry, Effective values and power application in circuit analysis.	20%
Unit-V	STATE VARIABLE ANALYSIS Introduction, Network Topology, State Equation, Choice of state Equations, Proceeding of Writing the State Equations of Simple Networks. Advantages of State Variables.	20%

BOOKS RECOMMENDED

Ashfaq Husain,	Networks and Systems	Khanna publisher
A Chakrabarti	Introduction to Network Filters and Transmission Lines	Dhanpat Rai & Sons

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
IV-SEMESTER
DIGITAL ELECTRONICS
(COURSE NO: BEE-403)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>NUMBER SYSTEM Description of different numbers, decimal, octal, and hexa decimal.conversion of one number system to other. Codes; 8421 BCD , Excess-3 code and gray code . addition and subtraction of binary number including 1's and 2's compliment.</p>	20%
Unit-II	<p>LOGIC GATE Description and function of logic gates, AND, OR, NAND, and NOR. Realization of gates with the help of transistors. NOT circuit, EX-OR Gates.</p>	20%
Unit-III	<p>SEQUENTIAL CIRCUITS FLIP-FLOPS: Description of basic latch. R-S Flip-Flops, Jk, D, and T type Flip flops. Register: Description of Shift Registers. Counters: Description of Asynchronous and Synchronous Counters.</p>	20%
Unit-IV	<p>ARITHMETIC CIRCUITS Half and full adders: Application to addition, subtraction multiplication and division. Parity bit generator.</p>	20%
Unit-V	<p>ENCODER DECODER AND MEMORY Encoder: Description of decimal to binary encoder. Decoder: Description of binary decoder and its application. Memories: elementary ideas of ROM, RAM and PROM. MASS STORAGE DEVICE, Floppy disc and Hard Disc.</p>	20%
BOOKS RECOMMENDED		
	Digital principles & Application	Malvino AP
	Digital Electronics	Mano
	Digital Electronics	Anok singh
	Digital circuit & Logic Gates	Tossi

**DIPLOMA IN ELECTRICAL/ ELECTRICAL & INSTRUMENTATION
ENGINEERING**

**IV-SEMESTER
COMPUTER PROGRAMMING
(COURSE NO: BLC-404)**

Annexure: I
BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	INTRODUCTION	20%
	Machine language, assembly language and high level language, language introduction to Algorithm and flowchart.	
Unit-II	FUNDAMENTALS OF 'C' LANGUAGE	20%
	Introduction and important of C language., basic structure of a 'C' programme, editing, debugging a 'C' programme, some elementary 'C' programmes.	
Unit-III	DATA TYPES VARIABLES AND CONSTANTS	20%
	Basic data types (Integer, floating point and characters), 'C' character set keywords and identifiers, basic ideas of 'C' Constant and variables, assigning values to variables, reading data from keyboard, overflow and underflow of data, definition of constant identifier.	
Unit-IV	OPERATORS EXPRESSIONS AND INPUT OUTPUT	20%
	Arithmetic relational and logical operators, some simple problems based on 'C' operators, Operator precedence and associativity, sequence of Colum to evaluate expressions, mathematical functions, formatted input and output.	
Unit-V	UNIT-5 CONTROL STATEMENT	20%
	Decision making with 'if' statement and conditional operator (?), Switch statement, Simple problems based on loops.	
	BOOKS RECOMMENDED	
	1. Let us 'C' by Yaswant Kanetkar	
	2. Programming in 'C' schaum series	
	3. fundamentals of Computers by peterNortons	
	4. Learn Dos in a day by Russell A. Stultz	

DIPLOMA IN ELECTRICAL ENGINEERING
IV-SEMESTER
ELECTRICAL ENGG. MATERIALS
(COURSE NO: BEE-404)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	CLASSIFICATION OF MATERIALS Classification of materials into conductors, semi-conductors, and insulators on the basis of valance band theory. Properties and uses of silicon and germanium semiconductors. General properties of conducting materials, resistivity, Factors affecting resistivity of conductors. Classification of conducting materials into low and high resistivity materials. Basic concept of super conductivity.	20%
Unit-II	CONDUCTING MATERIALS (a) Low resistivities materials: general properties and uses of copper, aluminium, brass and steel. (b) High resistivities materials: properties of and uses of tungsten, platinum, mercury, carbon, composition, properties and uses of copper base alloys, iron base alloys and nickel-base alloys.	20%
Unit-III	INSULATING MATERIALS Purpose of insulation. Electrical, visual mechanical, thermal & chemical properties of insulating materials. Classification of insulating materials of the basis of operating temperature. Classification of insulating materials into solid, liquid & gas. a. Gaseous Insulation: Properties and applications of air , nitrogen and sulphur hexafluoride(SF-6) gases. b. Liquid Insulation: Properties and applications transformer oil (mineral oil) synthetic insulating oil and silicon liquid. c. Solid Insulation: Purpose of impregnation. Application of impregnated paper and textile. Properties and applications of wood, bakelite, poly-vinyle chloride (PVC). Rubber, mica glass porcelain, waxes, asphalts and bitumen's.	20%
Unit-IV	SPECIAL PURPOSE MATERIALS Working principle , construction and applications of thermocouple and bimetals. Important application of lead, soldering fuse, fluorescent and contact materials.	20%
Unit-V	MAGNETIC MATERIALS Residual magnetism, coercive force, curie-point, magnetostriction. Applications of silicon steel, alloying silicon steel, alloying silicon to steel, important applications of tungsten-steel, cobalt steel, chrome steel , Alnico and hypernic.	20%

BOOKS RECOMMENDED

A text book of Elect. Engg. Materials By. P.L. Kapoor
 Elect. Engg. Materials By K.B. Raina, S.K. Bhattacharya, Tilak Joneja

**DIPLOMA IN ELECTRICAL/ ELECTRICAL & INSTRUMENTATION
ENGINEERING
V-SEMESTER
POWER ELECTRONICS
(COURSE NO: BEE-501)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	POWER SEMICONDUCTOR DEVICES Application of power electronics. Types of converters. Ideal switch, characteristics of power diode. SCR, Diac, Triac, GTO, rating, di/dt and dv/dt Limitations, snubber circuits.	20%
Unit-II	TRIGGERING CIRCUIT Method of turning ON, gate characteristics, Simple R based triggering circuits, Principle of cosine and ramp control circuit, Driver and isolation circuit for thyristers.	20%
Unit-III	AC-DC CONTROLLED CONVERTORS Principle of AC phase control, Classification of converters , half wave & full wave control, full convertor with R, RL loads, and action of free wheeling diode, voltage /current waveform and expression 3-Phase fully controlled converter with R load waveforms.	20%
Unit-IV	DC-DC CONVERTOR Types of commutation of SCR, Basic principle of D.C. Chopper TRC and CLC method, buck, and boost converters, Types of Chopper circuits.	20%
Unit-V	DC-AC CONVERTOR Principle of inverter, series and parallel Inverter, Analysis of single phase half wave and full wave bridge inverter, BOOK RECOMMENDED G.K.Dubey “Thyristorised power controlled “New Age Int. M.H. Rashid, “Power electronics” P.H.I. Subarmanayam”Power electronics” New Age.	20%

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
V-SEMESTER
MICROPROCESSOR & APPLICATION
(COURSE NO: BEE-503)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>MICROPROCESSOR & ARCHITECTURE</p> <p>Intel 8085-ALU. Timing and control unit, Registers, Data and Address bus, P Configuration, Intel 8085 instructions. One byte, two byte & three byte instruction. Timing and control signals fetch operation, execute operation.</p>	20%
Unit-II	<p>INTERFACE OF MEMORY & PERIPHERAL DEVICES</p> <p>Address space partitioning- Memory mopped, I/O mopped I/O scheme, I/O interfacing- Data transfer scheme. Synchronous data transfer, Asynchronous data transfer, Interrupts driven data transfer, multiple, interrupts, interrupts of 8085.</p> <p>Interfacing devices. I/O parts. Programmable Peripheral interface (PPI), 8255- Operating mode of 8255 Control word. Programmable interrupt controller Intel 8259, Programmable timer, Intel 8253.</p>	20%
Unit-III	<p>INSTRUCTION SET FOR INTEL 8085</p> <p>Instruction and data format- single byte, two byte and three byte instruction. Addressing mode. Direct addressing register addressing, Register indirect addressing, Intermediate addressing, Implicit addressing, status flag, Intel m8085 Instructions-m Data transfer group. Arithmetic group, Logical group, Stack, I/OI and machine group.</p>	20%
Unit-IV	<p>EXAMPLE OF ASSEMBLY LANGUAGE PROGRAMMES</p> <p>M/C Language programmes, demerits M/C language programmes, source language. Mnemonics Assembly language programmes. Assemble high level language. Interrupts, subroutines Editor, Monitor.</p> <p>Programmes examples: Addition of two 8-bit numbers, 8-bit subtraction, I' compliment of 8 bit number, 2's compliment. Masking off, least & significant bits of an 8 bit number. Masking off, 4A.m. S.B. of a 8bit number and other.</p> <p>APPLICATION OF MICROPROCESSOR & MICRO CONTROLLER</p>	20%
Unit-V	<p>Analog to digital convertor ADC-800 S/H circuit, Analog multiplexers Interfacing of A/D convertor. (Assembly language programmed, Interfacing of ADC 800& Analog multiplexer AM 3705, DDC-800(programmed)Delay subroutine using one register, two Register and three register 7 segment display. FND-500/503 MAN 74A programmed). Application of Microprocessor and Microcontroller with specific examples.</p> <p>BOOK RECOMMENDED:</p> <p>1-Fundamental of Microprocessor—Dr. BN. Ram & Microcomputer 2- Microprocessor, Micro-controller—A.K. Mukhopadhyay & their Applications 3- Microprocessor, applications – Dr Ajit Pal</p>	20%

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
V-SEMESTER
AUTOMATIC CONTROL SYSTEMS
(COURSE NO: BEE-502)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>CONTROL SYSTEM – FUNCTIONAL ELEMENT & COMPONENTS Terminology, functional block diagram of open loop and closed loop control system - examples, effect of feedback on system performance, servomechanism, Modelling of a control system components-dc and ac tachometers, ac and dc servomotor.</p>	20%
Unit-II	<p>BLOCK DIAGRAM AND TRANSFER FUNCTION Transfer function of Physical systems, Block diagram algebra, block diagram reduction technique, Signal flow graphs, Rules for drawing Signal flow graphs, Mason's gain formula, Drawing signal flow graph from given block diagram, Order and type of the control systems.</p>	20%
Unit-III	<p>STABILITY ANALYSIS OF CONTROL SYSTEMS Basic concept and definition of stability, location of roots of characteristic equation, Routh-Hurwitz stability criterion, special cases for Routh-Hurwitz criterion, applications of Routh-Hurwitz criterion.</p>	20%
Unit-IV	<p>TIME AND FRQUENCY RESPONSE ANALYSIS Transient and steady-state response, Standard test signals, time response specifications of second order system, frequency response specifications, Bode plot, Procedure for drawing Bode plot and determination of gain margin, phase margin and stability.</p>	20%
Unit-V	<p>COMPENSATION OF CONTROL SYSTEMS Different types of compensators-phase lead, phase lag, phase lag-lead. Different types of controllers used in process industries-PD, PI and PID.</p>	20%

Recommended Books:

1. B.S. Manke. "Linear Control Systems" Khanna Publishers, Delhi, Eight edition: 2005
2. I.J. Nagrath ,M. Gopal, "Control Systems Engineering" New Age International Publishers, New Delhi

DIPLOMA IN ELECTRICAL ENGINEERING
V-SEMESTER
ELECTRICAL MACHINE-II
(COURSE NO: BEE-504)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	<p>THREE PHASE SYNCHRONOUS GENERATOR</p> <p>Armature reaction. synchronous impedance, circuit model, phasor diagram, voltage regulation and its determination by synchronous impedance (EMF) & Ampere turn (MMF) methods. Power angle characteristic.</p>	20%
Unit-II	<p>PARALLEL OPERATION OF THREE-PHASE SYNCHRONOUS GENERATORS</p> <p>Conditions and Advantages of parallel operation, load sharing between two alternators, effects of change of excitation and prime mover input on parallel connected alternators. Cooling of alternators.</p>	20%
Unit-III	<p>THREE PHASE SYNCHRONOUS MOTOR</p> <p>Construction, principle of operation. Method of starting. Effect of change of excitation, Power developed. Synchronous phase modifiers.</p>	20%
Unit-IV	<p>THREE PHASE TRANSFORMERS</p> <p>Three phase transformer connections, Parallel operation of three phase & single phase transformers, related problems. Transformation from three to two phase and vice-versa using Scott connection, related problems.</p>	20%
Unit-V	<p>THREE PHASE INDUCTION MOTORS</p> <p>Different operating torques of an induction motor and related problems, Torque-slip and torque-speed curves. Methods of starting Speed control of induction motors, power stages of an induction motor, losses and efficiency, related problems.</p>	20%

Books:

Electrical Machines BY Ashfaq Hussain.
 Electrical Machines BY Nagarath & Kothari.
 Electrical Technology VOL.2 BY B.L. Theraja.

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
V-SEMESTER**

**Environmental Studies
(COURSE NO: BCE-507)**

Annexure: I BOS :

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	Definitions of Environmental Science, Environmental Engineering and Environmental Management, Concepts of Ecology, Food chain, Food Web.	20%
Unit-II	Types of Pollutants, Air Pollution, Water Pollution, Land Pollution: Classification, sources, effects and control measures, Noise Pollution, Odor Pollution. Water conservation and reuse	20%
Unit-III	Composition of atmosphere, Hydrological cycle, Green House Effect, Global Warming, Acid Rain, Ozone depletion, deforestation and desertification.	20%
Unit-IV	Role of Non- Conventional sources of energy for environmental pollution control. Composition of atmosphere, Hydrological cycle, Global Warming, Acid Rain, Ozone depletion, deforestation and desertification.	20%
Unit-V	Basic concepts of Environmental Impact Assessment (EIA), EIA Objectives. Environmental awareness, public participation, Environmental case studies	20%

Recommended Books:

1. Benny Joseph, 2009, Environmental Studies, Tata McGraw Hill Companies, New Delhi.
2. Suresh K. Dhameja, 2012, Environmental Studies, Katson books, New Delhi.
3. Masters, G.M., 1991, *Introduction to Environmental Engineering and Science*, Prentice-Hall International, Inc., Englewood Cliffs, NJ.

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
VI-SEMESTER
Mechatronics
(COURSE NO: BEE-601)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	Introduction to Mechatronics: Background, Mechatronics as integration of various disciplines, scope & its importance with respect to interdisciplinary approach, components of a mechatronic system, Role of electronics in mechatronics, Response of systems.	20%
Unit-II	Transducers & Actuators: Transducers: LVDT, force summing devices, Thermocouple, electromagnetic flow meter, & fiber optic based transducers. Actuators: Pneumatic Actuators-Linear single-rod single acting, linear single-rod double acting, linear double-rod double acting, and linear rod less double acting. Hydraulic Actuators: Single acting spring return type, double acting cylinder type, and ram type.	20%
Unit-III	System Modeling: Introduction, system, Modeling, Mechanical systems: Basic modeling elements such as spring, damper, mass/inertia. Electrical Systems: Basic elements such as inductor, resistor & capacitor. Hydraulic systems: Basic elements such as Inertance, fluid resistance & Fluid capacitance.	20%
Unit-IV	Computational Elements: Micro controller, difference between microprocessor & micro controller, general requirements for control & their implementation in micro controllers. Classification of micro controllers, Intel's 8XC196KC / KD micro controllers.	20%
Unit-V	Design & Application: Difference between traditional & Mechatronic design, Fault detection techniques: Watch dog timer, common hardware faults with specific types of components & systems such as sensors, switches& relays, motors, hydraulic & pneumatic systems. Fault finding techniques used with microprocessor based systems such as visual inspection, multimeter, oscilloscope, logic probe, current tracer, logic clip, logic comparator, signature analyzer, logic analyzer. Case studies: Strain gauge/ LVDT based weighing machines, Rotary optical encoder.	20%
BOOK RECOMMENDED		
Mechatronics: N.P. Mahalik, Tata Mcgraw Hill		
Mechatronics: W. Bolton, Pearson Education.		
Mechatronics: V.S. Bagad, Technical publications Pune.		

**DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING**

**VI-SEMESTER
SWITCHGEAR & PROTECTION
(COURSE NO: BEE-602)**

Annexure: I
BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	SWITCHGEAR ARRANGMENT	20%
	Bus bar arrangement, current limiting reactors, station auxiliaries, Unit system and its importance. Switchgear equipment and Layout for power station and substance.	
Unit-II	CIRCUIT INTERRUPTION DEVICES	20%
	Fuse isolator & circuit breakers. Arc extinction principle. Circuit breaker classification. Constructional feature & operating principle of modern circuit breaker ratings.	
Unit-III	RELAY RELAYING CIRCUITORY	20%
	Faults: types: nature. Causes & consequences: Requisite of protective scheme Relay & their classification. Induction type over current & reverse power relays. Over current. Ground fault. Directional & Directional- over current relaying circuitry. Different types of static relay & relaying circuitry for over current & ground fall protection.	
Unit-IV	SYSTEM PROTECTION	20%
	Principle of distance protection. Impedence relaying scheme for protection of feeders. Principle of differential protection. Merz system price system for protection of electrical machines. General scheme for power protection system components.	
Unit-V	SURGE PROTECTION & SYSTEM GROUNDING	20%
	Production & consequence of surge. Modern surge diverters. Protection against surges. Grounding & its methods. Grounding of dead metallic parts & neutral.	
	BOOK RECOMMENDED	
	Art & Science of protective Relaying Mason.	

**DIPLOMA IN ELECTRICAL/ ELECTRICAL & INSTRUMENTATION
ENGINEERING
VI-SEMESTER**

**UTILIZATION OF ELECTRICAL ENERGY
(COURSE NO: BEE-603)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

Unit-I	ILLUMINATION Laws of illumination. Illumination at a point due to one & several point sources. Design of lighting schemes. Associated terms, number and location of sources. Street lighting & area lighting. Construction, working & circuitry of different types of lamps and their relative merits.	20%
Unit-II	ELECTRIC HEATING Advantages of electric heating. Direct & indirect resistance heating. Properties and design of heating elements. Electric ovens. Induction heating, core type & coreless induction furnaces. electric arc heating. Dielectric heating.	20%
Unit-III	ELECTRIC WELDING AND ELECTRIC-CHEMICAL PROCESSES Electric arc welding. Arc welding equipments and circuitry. Laws of electrolysis. Equipments & process used for electroplating.	20%
Unit-IV	ELECTRIC DRIVES Advantages of electric drives. Characteristic of different types of loads. Electrical and mechanical characteristics of different types of motor speed control & braking. Selection of motors for specific purposes	20%
Unit-V	ELECTRIC TRACTION Advantages and economical aspects of electric traction and diesel-electric traction. Supply system and supply voltages. Methods of feeding and current collection of O.H structure. Characteristic of traction motors. Series parallel method of speed control and braking, speed-time curves. Power and energy calculations, specific energy assumptions & efficiency.	20%

BOOK RECOMMENDED

- | | |
|----------------------------------|---------------|
| 1-Utilization of Electric Energy | By H. Partab |
| 2. Electric Technology | By J.B. Gupta |

DIPLOMA IN ELECTRICAL ENGINEERING
VI-SEMESTER
ELECTRICAL POWER SYSTEM
(COURSE NO: BEE-604)

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

SUPPLY SYSTEM

Unit-I Component of electrical energy system from generating station to consumers. Comparison of conductor cost in various systems. Advantages of high voltage transmission. Advantages of interconnection. Economic of power improvement. **20%**

CONDUCTOR AND POWER CABLES

Unit-II Types of conductors. Equivalent copper section. Kelvin's law. Comparison of overhead/under-ground systems. Power cable construction. Oil-filled, gas-pressure and SF6 gas cables. **20%**

MECHANICAL CHARACTERISTICS

Unit-III Types of insulators. Voltage distribution & string efficiency. Improvement of voltage distribution. Line supports. Parabolic method of sag calculation at level supports. Ice and wind loading of conductors. Factors affecting sag. **20%**

PERFORMANCE OF LINES

Unit-IV Line parameters. Expression for line inductance and line capacitance. Performance of short and medium lines. Nominal Tee and π -methods of calculation of voltage regulation and efficiency. Elementary idea of Long Transmission Line. **20%**

CORONA AND H.V.D.C. TRANSMISSION

Unit-V Phenomena of corona. Factor affecting corona. Disruptive Critical and visual critical voltages. Corona power loss. Minimizing corona. Component of an HVDC transmission system. D.C. systems. Applications of HVDC systems. Limitation of A.C. transmission. Economic Comparison. Advantages and limitation of HVDC transmission. Classification of HVDC links. **20%**

BOOK RECOMMENDED

Electrical power system by Ashfaq Hussain
 Electrical power system Analysis by Nagrath & Kothari

**DIPLOMA IN ELECTRICAL & INSTRUMENTATION
/ELECTRONICS/ELECTRICAL ENGINEERING
VI-SEMESTER
ELECTRONIC INSTRUMENTATION-II
(COURSE NO: BIE-601)**

Annexure: I BOS : 13.02.2013

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

SIGNAL CONDITIONING

Unit-I Signal conditioning- ac and dc signal conditioning, comparators, current-to-voltage and voltage-to-current converter, attenuators, A to D and D to A converters, instrumentation amplifiers(IA)-single op-amp and three op-amp configuration, IA specifications, application of instrumentation amplifier using transducer bridge as temp indicator. 20%

DATA ACQUISITION SYSTEMS

Unit-II Sample-Hold circuits, multiplexing-time division and frequency division, de-multiplexing, objective of a DAS, single-channel and multi-channel DAS and their configurations, Data Loggers- basic operation and block diagram. 20%

DATA TRANSMISSION AND TELEMETERING

Unit-III Data transmission systems, advantage and disadvantages of digital transmission, pulse modulation, digital modulation, and pulse code format, modems, IEEE-488 bus, RS-232 interface, opto-isolator 20%

DISPLAY DEVICE AND RECORDERS

Unit-IV LEDs, LCDs, seven segment and dot matrix displays, Electro luminescent, electrophoretic image and liquid vapour displays, printers- dot matrix, ink-jet, laser jet printer, recorders-Potentiometric, X-Y recorders. 20%

MISCELLANEOUS INSTRUMENTS

Unit-V Digital measurement of frequency (mains), digital measurement of high frequency, digital pH meter, digital capacitance meter, digital tachometer, measurement of power using Bolometer. 20%

BOOK RECOMMENDED

- HS Kalsi, "Electronic Instrumentation," TMH, New Delhi, 1995.
- AK Sawhney, "A Course in Electrical and Electronics Measurement and Instrumentation," Dhanpat Rai and Company, New Delhi
- A K Ghosh, "Introduction to Instrumentation and Control," PHI, New Delhi, 2000.