DIPLOMA IN (ELECTRICAL/ ELECTRICAL & INSTRUMENTATION
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.   20%
Resistance, grouping of resistors, temperature coefficient of resistance. Work, Energy and Power.
Sample problems.

Unit-II   **MAGNETIC CIRCUITS, ELCTRO-MAGNETC INDUCTION AND CAPACITORS.**   20%
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.

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

Unit-IV   **POWER IN A SINGLE PHASE A.C. CIRCUIT.**   20%
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.

Unit-V   **THREE PHASE CIRCUITS**   20%
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.

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
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**   20%
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.

NETWORK THEOREMS
Unit-II   Superposition Theorem, Thevenin's Theorem, Norton's Theorem, and their application to 2   20%
terminal A.C & D.C Networks. Maximum power transfer theorem for D.C. Network matching.

Unit-III   **TWO PORT NETWORK**   20%
Various two port circuit parameter: their interrelationship, evaluation of Z,Y,h and transmission (ABCD) parameters, cascading of two port network.

Unit-IV   **A.C. CIRCUIT**   20%
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).

Unit-V   **RESONANCE**   20%
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).

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

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	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	100

CONTENTS

SYNCRONOUS GENERATOR

Unit-I   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.   20%

TRANSFORMERS

Unit-II   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.   20%

THREE PHASE INDUCTION MOTOR

Unit-III   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.   20%

D.C. MACHINES

Unit-IV   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.   20%

SINGLE PHASE MOTORS

Unit-V   Capacitor starts motor. Capacitor start capacitor runs motor. Shaded-pole motor. Single phase series motor.   20%

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 & INSTRUMENTATION ENGINEERING
III-SEMESTER
INSTRUMENTATION DEVICES & SYSTEMS
(COURSE NO: BIE-301)

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	**GENERALISED MEASUREMENT SYSTEM AND TRANDUCER BASICS:** Generalized measurement system functional units, static characteristics of measuring device- accuracy, precision, linearity, hysteresis, resolution threshold, repeatability, span, reliability, Errors(Basic concept only) Dynamic characteristics- time constant, damping co-efficient and natural frequency- Zero, first and second order systems, specifications and testing of dynamic response. Transducer, classification of transducer based on measurement, Active and passive transducer. **DISPLACEMENT MEASUREMENT:**	20%
Unit-II	Constructional features & operating principles of LVDT, Hall effect & Piezoelectric transducers & their use in linear displacement measurement, Digital Transducers used for the measurement of Linear & angular Displacement. Measurement of liquid level. Ultrasonic Sensor and their use in the measurement of thickness.	20%
Unit-III	**VELOCITY & FLOW MEASUREMENT:** Electromagnetic, moving coil & seismic Transducer & their applications in linear velocity measurements. Tachometers & digital devices for measurement of angular velocity. Flow ,measurement: Electromagnetic flow meter, hotwire anemometer & Ultrasonic Flow meter.	20%
Unit-IV	**STRAIN & PRESSURE MEASUREMENT:** Strain gauge, theory, types of strain gauges, strain measurement techniques (Static &Dynamic Measurement). Force summing devices used for the measurement of high pressure, Operating principle of pirani gauge, thermocouple vacuum gauge and ionization chamber.	20%
Unit-V	**UNIT-V TEMPERATURE & HUMIDITY MEASUREMENTS:** Measuring techniques for high medium & low temperature. Working principles, constructional features, circuitry and applications of thermocouple, resistance thermometers, thermisters, Radiation and optical pyrometers. Measurement of humidity- crystal hygrometer and microwave refrectrometer.	20%

BOOKS RECOMMENDED

Electrical & Electronics Measurements	A.K. Sawhney
Instrumentation	Cooper
Instrumentation Devices & systems	Rangan

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   **VOLTAGE AMPLIFIER:**   20%
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).

Unit-II   **FEED BACK IN AMPLIFIER:**   20%
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)

Unit-III   **TUNED AMPLIFIERS:**   20%
 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).

Unit-IV   **WAVE SHAPING AND PULSE CIRCUITS:**   20%
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.

Unit-V   **OPERATIONAL AMPLIFIER AND THEIR APPLICATION**   20%
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.
BOOKS RECOMMENDED:
    1.Basic Electronics & Linear circuits   by   N.N Bhargava
    2.Wave shapping & digital circuits   by Aggarwal & Rai
    3.Microelectronics   by   Millman

DIPLOMA IN ELECTRICAL & INSTRUMENTATION
IV-SEMESTER
ELECTRONIC INSTRUMENTATION-I
(COURSE NO: BIE-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

ELECTRONIC VOLT OHM METERS

Unit-I   Electronic (analog) voltmeter and multimeter block diagrams, principles of measurement of D.C.   20%
voltage, D.C. current, A.C. voltage, A.C. current and resistance, rms responding voltmeter , FET
input and chopper type EVMS, Typical specifications.

CATHODE RAY OSCILLOSCOPE

Unit-II   CRC-block diagram, CRT-associated circuits, vertical deflection system, delay line, Horizontal   20%
deflection system, Measurement of frequency, phase angle, special purpose CRCs- storage,
sampling Digital type,
Specifications of a typical CRO.

SIGNAL GENERATION AND ANALYSIS

Unit-III   Sine wave generator, sweep frequency generator, pulse and square wave generator , Function   20%
generator , AF signal generator specifications.
Wave analyzers, Harmonic distortion analyzers, Basic idea of spectrum analysis.

IMPEDANCE BRIDGES, Q-METERS AND VECTOR METERS

Unit-IV   Review of Wheatston's bridge principle and AC bridges (Induction, Capacitance, Comparison   20%
Bridge, Wein Bridge, Resonance bridge). Block diagram and working principle of Q-meter, vector
impedence meter, vector voltmeter.

DIGITAL INSTRUMENTS

Unit-V   Digital instruments versus Analog instruments Comparison of digital and analog meters, A/D   20%
converter s, D.V.M. Digital Multimeters- Typical specifications.
BOOKS RECOMMENDED
Electrical & Electronics Measurements   A.K. Sawhney
Electronics Measurementation & Measuring Tech.   Cooper   & Helfrick

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 **AMMETERS AND VOLTMETERS**   20%
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. Extention of range of voltmeter and ammeters.
Calibration of voltmeter and ammeter.

MEASUREMET OF POWR AND ENERGY

Unit-II Methods of measuring single phase and 3-phase power constructional features and working of   20%
dynamometer type wattmeter. Single phase and three phase energy meter. Energy meter Errors
and their adjustments. Calibration of single phase energy meter and wattmeter.

Unit-III **MEASUREMENT OF RESISTANCE**   20%
Measurement of low , medium and high resistances. Construction, working and applications of
ohm meter, and megger, Compton potential.

Unit-IV **DC & AC BRIDGES**   20%
Whetstones Bridge, carey faster bridge. Kelvin double bridge, Maxwell's bridge. Maxwell wein's
Bridge. Concept and uses of CT & PT.
 Construction and working of power factor meter, frequency meter, synchro scope and maximum
Unit-V demand indicator.   20%
The cathode ray Oscilloscope
Block diagram description and operating controls of a cathoderay oscilloscope (CRO)
Measurement of voltage, phase angle and frequency by means of a CRO.

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

Revised

Pds/week		Duration of Exam	Max Marks			
L	P	Hrs	Course Work	Mid-Sem Exam	End-Sem Exam	Total
4	-	3	10	15	75	00

CONTENTS

MESH NODAL ANALYSIS

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

NETWORK FUNCTIONS

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

INTRODUCTION TO FILTER CONCEPTS

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

FOURIER METHOD OF WAVEFORM ANALYSIS

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

STATE VARIABLE ANALYSIS

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

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)

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%
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).

NETWORK LAWS & THEOREMS

Unit-II Kirchhoff's voltage and current laws (with problems).Mesh Analysis, Superposition Theorem, 20%
Thevenin's Theorem, Norton's Theorem, Maximum power transfer Theorem for DC network.

MESH NODAL ANALYSIS

Unit-III Mesh Analysis for A.C Circuits, Nodal analogy for A.C Circuit, Choice between mesh and node 20%
analysis Mesh and Nodal analysis for frequency domain circuits.

FOURIER METHOD OF WAVEFORM ANALYSIS

Unit-IV Introduction, Trigonometric Fourier series, Waveform Symmetry, Effective values and power 20%
application in circuit analysis.

STATE VARIABLE ANALYSIS

Unit-V Introduction, Network Topology, State Equation, Choice of state Equations, Proceeding of 20%
Writing the State Equations of Simple Networks. Advantages of State Variables.

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
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   NUMBER SYSTEM   20%
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.

LOGIC GATE
Unit-II   Description and function of logic gates, AND, OR, NAND, and NOR. Realization of gates   20%
with the help of transistors. NOT circuit, EX-OR Gates.

SEQUENTIAL CIRCUITS
Unit-III   FLIP-FLOPS: Description of basic latch. R-S Flip-Flops, Jk, D, and T type Flip flops.   20%
Register: Description of Shift Registers.
Counters: Description of Asynchronous and Synchronous Counters.
ARITHEMATIC CIRCUITS
Unit-IV   Half and full adders: Application to addition, subtraction multiplication and division. Parity bit   20%
generator.
ENCODER DECODER AND MEMORY
Unit-V   Encoder: Description of decimal to binary encoder.   20%
Decoder: Description of binary decoder and its application.
Memories: elementary ideas of ROM, RAM and PROM. MASS   STORAGE DEVICE, Floppy disc and Hard Disc.
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.

FUNDAMENTALS OF 'C' LANGUAGE

Unit-II   20%

Introduction and important of C language., basic structure of a 'C' programme, editing, debugging a 'C' programme, some elementary 'C'programmes.

DATA TYPES VARIABLES AND CONSTANTS

Unit-III   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.

OPERATORS EXPRESSIONS AND INPUT OUTPUT

Unit-IV   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 & INSTRUMENTATION   ENGINEERING
V-SEMESTER
PROCESS ELECTRICAL & INSTRUMENTATION
(COURSE NO: BIE-501)

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   **PROCESS CONTROL PRINCIPLE**   20%
Terminology used in process control-stability, regulation, transient regulation, Time response control element. P to O and I to P- pressure to current and current to pressure convertors. Electrical- solenoid, stepper motor.

Unit-II   **CONTROL ACTIONS**   20%
Principle of ON-OFF fl0oating, proportional, Integral, (p + I), derivative, (P+D) proportional phase derivative, (P + I + D) controller.

Unit-III   **REALIZATION OF ELECTRONIC CONTROLLERS**   20%
Error detection in electronic controllers- Potential divider type, diff.-amp type single mode electronic controller-ON-OFF control action. Proportional control action, integral or reset control action, Derivative control action, using op-amps (P-I) (P-D).

DIGITAL CONTROLLERS-I

Unit-IV   Basic concept discrete state process controls, and programmable controllers, realization of   20%
controller modes using digital methods.

Unit-V   **DIGITAL CONTROLLER-II**   20%
Computer in process, Control programmable controllers, Data logging, DAS, alarm and computer hardware, Computer based controller and controller software.

BOOK RECOMMENDED
1-Process control instrumentation Technology Curtis Johnson
2- Electronic Instrumentation S. K. Khadekar
3- Industrial ELECTRICAL & INSTRUMENTATION   S. K. Singh

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
V-SEMESTER
POWER ELECTRONICS
(COURSE NO: BEE-501)

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

POWER SEMICONDUCTOR DEVICES

Unit-I   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%

TRIGGERING CIRCUIT

Unit-II   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%

AC-DC CONTROLLED CONVERTORS

Unit-III   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%

DC-DC CONVERTOR

Unit-IV   Types of commutation of SCR, Basic principle of D.C. Chopper TRC and CLC method, buck, and boost converters, Types of Chopper circuits.   20%

DC-AC CONVERTOR

Unit-V   Principle of inverter, series and parallel Inverter, Analysis of single phase **half wave and full wave bridge** inverter,   20%

BOOK RECOMMMENDED

     G.K.Dubey "Thyristorised power controlled "New Age Int.
     M.H. Rashid, "Power electronics" P.H.I.
     Subarmanayam"Power electronics" New Age.

DIPLOMA IN ELECTRICAL/ELECTRICAL & INSTRUMENTATION
ENGINEERING
V-SEMESTER
MICROPROCESS0R & APPLICATION
(COURSE NO: BEE-503)

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   **MICROPROCESSOR & ARCHITECTURE**   20%
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.

Unit-II   **INTERFACE OF MEMORY & PERIPHERAL DEVICES**   20%
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.
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.

Unit-III   **INSTRUCTION SET FOR INTEL 8085**   20%
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.

Unit-IV   **EXAMPLE OF ASSEMBLYU LANGUAGE PROGRAMMES**   20%
M/C Language programmes, demerits M/C language programmes, source language. Mnemonics Assembly language programmes. Assemble high level language. Interrupts, subroutines Editor, Monitor.
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.

APPLICATION OF MICROPROCESSOR & MICRO CONTROLLER

Unit-V   Analog to digital convertor ADC-800 S/H circuit, Analog multiplexers Interfacing of A/D   20%
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.

BOOK RECOMMENDED:
1-Fundamental of Microprocessor—Dr. BN. Ram & Microcomputer
2- Microprocessor, Micro-controller—A.K. Mukhopadhyay & their Applications
3- Microprocessor, applications – Dr Ajit Pal

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

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 **CONTROL SYSTEM – FUNCTIONAL ELEMENT & COMPONENTS**   20%
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.

Unit-II **BLOCK DIAGRAM AND TRANSFER FUNCTION**   20%
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.

Unit-III **STABILITY ANALYSIS OF CONTROL SYSTEMS**   20%
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.

Unit-IV **TIME AND FRQUENCY RESPONSE ANALYSIS**   20%
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.

Unit-V **COMPENSATION OF CONTROL SYSTEMS**   20%
Different types of compensators-phase lead, phase lag, phase lag-lead. Different types of
controllers used in process industries-PD, PI and PID.

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 ENGG. (ELECTRICAL & INSTRUMENTATION /ELECTRONICS)
VI-SEMESTER
ELECTRONICS INSTRUMENTATION II
(COURSE NO: BIE-606)

Annexure I
BOS 13.02.13

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

SIGNAL CONDITIONING

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%

Unit-II

DATA ACQUISITION SYSTEMS

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%

Unit-III

DATA TRANSMISSION AND TELEMETERING

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%

Unit-IV

DISPLSY DEVICE AND RECORDERS

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%

Unit-V

MISCELLANEOUS INSTRUMENTS

Digital measurement of frequency (mains), digital measurement of high frequency, digital pH meter, digital capacitance meter, digital tachometer, measurement of power using Bolometer.

20%

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

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%

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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.

DIPLOMA IN ELECTRICAL/ DIPLOMA IN ENGG. (ELECTRICAL & INSTRUMENTATION /ELECTRONICS)
VI-SEMESTER
ELECTRONICS INSTRUMENTATION II
(COURSE NO: BIE-606)

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

SIGNAL CONDITIONING
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%

Unit-II

DATA ACQUISITION SYSTEMS
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%

Unit-III

DATA TRANSMISSION AND TELEMETERING
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%

Unit-IV

DISPLSY DEVICE AND RECORDERS
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%

Unit-V

MISCELLANEOUS INSTRUMENTS
Digital measurement of frequency (mains), digital measurement of high frequency, digital pH meter, digital capacitance meter, digital tachometer, measurement of power using Bolometer.

20%

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

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

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

Introduction to Mechatronics:

Unit-I   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%

Transducers & Actuators:

Unit-II   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%

System Modeling:

Unit-III   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%

Computational Elements:

Unit-IV   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%

Design & Application:

Unit-V   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 RECOMMMENDED

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)

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. Impendence 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 & CONTROL ENGINEERING
VI-SEMESTER
UTILIZATION OF ELECTRICALENERGY
(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

ILLUMINATION

Unit-I   Laws of illumination. Illumination at a point due to one & several point sources. Design of   20%
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.

ELECTRIC HEATING

Unit-II   Advantages of electric heating. Direct & indirect resistance heating. Properties and design of   20%
heating elements. Electric ovens. Induction heating, core type & coreless induction furnaces.
electric arc heating. Dielectric heating.

ELECTRIC WELDING AND ELECTRIC- CHEMICAL PROCESSES

Unit-III   Electric arc welding. Arc welding equipments and circuitry. Laws of electrolysis. Equipments   20%
& process used for electroplating.

ELECTRIC DRIVES

Unit-IV   Advantages of electric drives. Characteristic of different types of loads. Electrical and mechanical   20%
characteristics of different types of motor speed control & braking. Selection of motors for
specific purposes

ELECTRIC TRACTION

Unit-V   Advantages and economical aspects of electric traction and diesel-electric traction. Supply   20%
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.

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