

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)



SYLLABUS

For

**Diploma in Electrical Engg.
Semester -V**

**Swami Vivekanand University, Sironja Sagar
2014-2015**

PROGRAMME NAME :ELECTRICAL ENGG(DIPLOMA)

Scheme of Studies and Examinations for :FIFTH SEMESTER

COURSE CODE	COURSE TITLE	PAPER CODE	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDIT	ALOF MARKS		
			LECTURES	CONTINUOUS EVALUATION			END OF THE TERM/ SEMESTER EVALUATION		THEORY CREDIT PRACTICAL/SEMESTER Week	CONTINUOUS EVALUATION	END OF THE TERM/ SEMESTER EVALUATION		PRACTICAL CREDIT						
				Hrs. Per Week	TERM WORK QUIZ, ASSIGNMENT	MID TERM TEST (TWO)		THEORY PAPER			LAB. WORK QUIZ, ASSIGNMENT	PRACTICAL / ORAL EXAMINATION (VIVA)							
			I			II	III		IV	NO.		MARKS							
DEE501	ELECTRONIC MEASUREMENT AND MEASURING INSTRUMENTS	6259	04	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs2	06	150		
DEE502	ELETRONICS DEVICES AND CIRCUITS	6260	04	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs	2	06	150	
DEE503	DIGITAL ELECTRONICS	6061	04	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs	2	06	150	
DEE504	UTILIZATION OF ELECTRICAL ENERGY	6262	04	10	10	10	01	70	3 hrs	04	04		01		3hrs	2	06	100	
DEE 505	ENERGY CONSERVATION AND MANAGEMENT	6263	04	10	10	10	01	70	3 hrs	04	04		01		3hrs			100	
DEE506	PROJECT(SYNOPSIS)											50						50	
	Total			20	50	50	50		350		20	20	110		90		10	30	700

Theory Credits	: 20	Theory Marks	: 350
Practical Credits	:10	Practical Marks	: 90
Total Credits	:30	Quiz, Mid Term, Lab. Work	: 260
		Total	: 700

(Theory & Practical'D')
Minimum Pass Grade in

DEE 501-ELECTRONIC MEASUREMENT & MEASURING INSTRUMENTS

UNIT-I

Measuring System

Elements of a measuring system, Block diagram of system configuration, performance, standards, time lag, error, distortion and distortion meters, noise and noise factor.

UNIT-II

Transducers

Transducers definition and classification, Characteristic & choice of Transducers, Electrical transducers, Advantages of electric transducers, strain gauges, Gauge factor, applications. Thermistor, RTD, LVDT, RVDT and Capacitive transducers and their application. Thermocouples, Piezo-Electric transducers- principle, mode of operation and application. . Hall Effect transducers, Optoelectronic transducers such as photo voltaic, Photo conductive, and photo conductive cells, constructional details, characteristics and applications. Digital transducers.

UNIT-III

Signal Conditioners

Purpose of signal conditioning, Classification, Input modifier, Operational amplifiers circuits used in instrumentation, D.C. amplifier, chopper amplifier. Instrumentation amplifier, characteristics, three amplifier configuration. A/D and D/A converters.

UNIT-IV

Measurement of Physical Quantities:

Measurement of Pressure-Types of pressure measurement devices, Secondary transducers, Low pressure measurement, Resistive, Inductive and Capacitive pressure measuring devices.

Measurement of speed: Measurement of speed by stroboscope, photoelectric and reluctance pick-up devices for speed measurement. Measurement of Temperature-Temperature measuring devices, Resistance thermometers, Radiation and Optical Pyrometers. Measurement of Humidity-Humidity, absolute and relative humidity, Resistive and Capacitive hygrometers. Measurement of pH Value-Concept, pH scale, pH cell, pH meter. Measurement of Thermal Conductivity (gas analyzer).

UNIT-V

Display Devices and Recorders:

Digital display system and indicators like CRT, Seven Segment LED , LED, LCD. Analog and digital recorders, Strip and circular chart recorder and Magnetic tape recorder, X-Y recorders. Ultraviolet recorders, Frequency modulated (FM) recording. Digital tape recorders.

REFERENCES

- Electrical and Electronic Measurement and Instrumentation by A.K.
- Sawhney
- Instrumentation Devices and Systems by C S Rangan, G R Sharma and
- V S V Mani
- Digital Electronics By Malvino Leach
- Instrumentation By Cooper

DEE 502-Electronics Devices & Circuits

Unit I

Semiconductor device, theory of P-N junction, temperature dependence and break down characteristics, Zener diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principle, characteristics, and region of operation, load line biasing method. Transistor.

Unit II

Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback, L-C (Hartley-Colpitts) oscillators, RC phase shift and Crystal oscillators. Power amplifiers, class A, class B, class AB amplifiers, their efficiency and power Dissipation.

Unit III

Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Clippers and clampers, Differential amplifier, Darlington pair, Cascade amplifier.

Unit IV

Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias current, application, inverting, non inverting amplifier, summer, differentiator, integrator, differential amplifier, instrumentation amplifier, voltage to current and current to voltage converters, comparators, Schmitt trigger, 555 timer and its application.

Unit V

Regulated power supplies, Series and shunt regulators, current limiting circuits, fixed and adjustable switching regulators, SMPS, UPS.

References:

- Milliman Hallkias - Integrated Electronics; TMH Pub.
- Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
- Salivahanan; Electronic devices and circuits; TMH
- Salivahanan; Linear Integrated Circuits; TMH-
- Miliman Gabel; Micro electronics, TMH
- Robert Boylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.

DEE 503 – Digital Electronics & Logic Design

Unit I

Number System: Various number systems-decimal, Binary, Hex and Octal with mutual conversion, binary arithmetic in computers, addition, subtraction, multiplication and division.

Binary Codes: Weighted, non-weighted codes, error detecting and correcting codes, alphanumeric codes, ASCII codes

Unit II

Boolean Algebra & Logic Gates

Boolean Algebra: AND, OR, NOT, NAND, NOR, EXOR, operations and gates, laws of Boolean algebra, reduction of Boolean expression, logic diagram, universal building blocks, negative logic.

Unit III

Combinational circuits and system

(A) Combinational logic: Minterms and maxterms, Truth table and Karnaugh mapping, reduction of Boolean expression with SOP, POS and mixed terms, incompletely specified functions multiple output minimization, variable mapping, minimization by labular/ Quine Mc cluskey method.

(B) Encoders, Decoders, Multiplexers, Demultiplexers, code convertors, Binary address Digital comparator, parity checker/ generator, programming logic Array (PLA);

Unit IV

Sequential circuits

(A) State tables and diagrams, flip flop and its various types- JK, RS, T, D, pulse and edge triggered flip flops transition and excitation tables, timing diagrams.

(B) Shift registers: Series and parallel data transfer, ripple counters, synchronous counters, Modulo N counter design, Up down counters, Ring counter.

Unit V

Memory & A/D Conversion

(A) Semiconductor ROM, Bipolar and MOS RAM, organization of RAM memory subsystem. Timing circuit, clock circuit and IC Timer.

(B) Analog/ Digital conversion: Digital to analog conversion, dual slope integration successive approximation, parallel and parallel/ series conversion, converter specifications.

Reference Books:

- An Introduction to Digital Computer Design by V. rajaraman and T. Radhakrishnan, 3rd Edn. PHI.
- Digital Principles and Applications by A.P. Malvino and B.P. Leach, 4th Edn. McGraw Hill.. Digital computer Fundamentals by T.C. Bratee, 6th Edn. McGraw Hill.
- Pulse, Digital and switching circuits-Millman

DEE-504 - Utilization of Electrical Energy

Unit-I

Illumination Engineering

Nature of light, units, sensitivity of the eye, luminous efficiency, glare. Production of Light; arc lamps gas discharge lamps- fluorescent lamps, polar curves, effect of voltage variation on efficiency and life of lamps, Distribution and control of light, lighting calculations, solid angle, inverse square and cosine laws, methods of calculations, factory lighting.

Unit-II

Heating, Welding And Electrolysis

Electrical heating-advantages, methods and applications, resistance heating efficiency and losses control. Induction heating: core type furnaces, core less furnaces, dielectric heating: principle and special applications, arc furnaces: direct arc furnaces, Indirect arc furnaces. Different methods of electrical welding, resistance welding, arc welding, electro beam welding, and electrical equipment for them. Arc furnaces transformer and welding transformers. Review of electrolytic principles, laws of electrolysis.

Unit-III

Traction

Special features of Traction motors, selection of Traction Motor, Different system of electric traction and their Advantages and disadvantages, Mechanics of train movement: simplified speed time curves for different services, average and schedule speed, tractive effort, acceleration and braking retardation.

Unit-IV

Electric Drives

Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking load equalization use of fly wheel, criteria for selection of motors for various industrial drives, calculation of electrical loads for refrigeration and air-conditioning, intermittent loading and temperature rise curve.

Unit-V

Introduction to Electric and Hybrid Vehicles

Configuration and performance of electrical vehicles, traction motor characteristics, tractive effort, transmission requirement, vehicle performance and energy consumption.

References:

- _ Open Shaw ,Taylor, .Utilization of electrical energy., Orient Longmans, 1962.
- _ H. Pratap, Art and Science of Utilization of Electrical Energy.

- _ Gupta, J.B., Utilization of Elect. Energy ,Katariya and sons, New Delhi.
- _ Garg, G.C., Utilization of Elect. Power and Elect. Traction.
- _ N V Suryanarayan, Utilization of Elect. Power including Electric Drives and Elect.
- _ Hancock N N, Electric Power Utilisation, Wheeler Pub.
- _ Mehrdad,Ehsani,Yimin Gao,Sabastien.E. Gay,Ali Emadi, “Modern electric, hybrid electric and fuel cell vehicles”, CRC Press

DEE- 505 – Energy Conservation & Management

UNIT-I

General energy problem: Energy use patterns and scope for conservation. Energy audit: Energy monitoring, Energy accounting and analysis, Auditing and targeting. Energy conservation policy, Energy management & audit, Types of energy audit, qualities and function of energy managers, language of an energy manager, Loss of energy in material flow, energy performance, Maximizing system efficiency, Optimizing, input energy requirements, Energy auditing instruments.

Unit-II

Thermodynamics of Energy Conservation. Basic principle. efficiency analysis of systems. Primary energy sources, optimum use of prime-movers, energy efficient house keeping, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation. Thermal energy audit in heating, ventilation and air conditioning. Maintenance and Energy audit – friction, lubrication and tribo-logical innovations.

Unit-III

Load curve analysis & load management DSM, Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic) Economic analysis depreciation method, time value of money, Evaluation method of projects, replacement analysis, special problems inflation risk analysis. Pay back period, Energy economics, Cost Benefit Risk analysis.

UNIT-IV

Energy efficient electric drives, Energy efficient motors V.S.D. power factor improvement in power system. Energy Conservation in transportation system especially in electric vehicle. Energy flow networks, Simulation & modeling.

Unit-V

Energy conservation task before industry, Energy conservation equipments, Co-Generation, Energy conservation process, Industry Sugar, Textiles, Cement Industry etc Electrical Energy Conservation in building, heating and lighting. domestic gadgets.

References:

- Energy Management – W.R. Murphy & G. Mckey Butler worths.
- Energy Management Head Book- W.C. Turner, John Wiley
- Energy Management Principles- Craig B. Smith, Pergamon Press
- Energy Conservation- Paul O Callagan- Pergamon Press
- Design & Management of energy conservation. Callaghan,
- Elect, Energy Utilization & Conservation. Dr. Tripathi S.C