

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 1/3	
Branch	MECHANICAL ENGINEERING			Semester		III	
Course Code		Course Name			BASIC ELECTRICAL AND ELECTRONICS		
Course Outcome 1		Calculate electrical quantity for given electrical circuit			Teach Hrs	Marks	
Learning Outcome 1		Define various terms used in electrical engineering. (Cognitive domain)			4	5	
Contents		<ul style="list-style-type: none"> ● Concept of electric current, potential and potential difference. ● Classification of D.C. and A.C. sources. ● Overview of AC voltage generation, transmission and distribution. ● Electrical Power, energy and their units. 					
Method of Assessment		Internal : Mid semester Test-1 (Pen paper test)					
Learning Outcome 2		Explain fundamentals of D.C. circuit and calculate electrical quantity. (Cognitive domain)			10	12	
Contents		<ul style="list-style-type: none"> ● Ohm's Law, Concept of resistance, conductance, resistivity, conductivity and their units. Effect of temperature on resistance, Temperature coefficient of resistance. ● Series, Parallel connections of resistance and their combinations, Simple Numerical. ● Kirchhoff's Voltage Law, Kirchhoff's Current Law, Simple Numerical 					
Method of Assessment		External : End semester theory examination (Pen paper test)					
Learning Outcome 3		Explain fundamentals of A.C. circuit and determine electrical quantity of single phase AC circuit. (Cognitive domain)			10	12	
Contents		<ul style="list-style-type: none"> ● Concept of Cycle, Frequency, time period, amplitude, phase and phase difference. ● Define Instantaneous value, average value, RMS value and peak value of sinusoidal electrical quantities, form factor and peak factor. ● Concept of reactance, impedance and power factor in AC circuit. ● Concept of current, voltage, power in purely resistive, inductive, capacitive, RL, RC and RLC Series circuit ● Active power, reactive power and apparent power. ● Three phase AC supply: three phase three wire and three phase four wire system, Relationship between line voltage, phase voltage, line current and phase current in star and delta connection . 					

Method of Assessment	External : End semester theory examination (Pen paper test)		
Learning Outcome 4	Verify Kirchhoff's laws and determine the electrical quantities for a given electrical circuit. (Psychomotor domain)	10	12
Contents	<ul style="list-style-type: none"> • Verification of Kirchhoff's current Law and Kirchhoff's voltage Law • Calculate Impedance, power and power factor by measuring voltage across each element and current for a given RLC series circuit. 		
Method of Assessment	External: End semester practical exam- Performance of task and viva voce		
Course Outcome 2	Select an appropriate electrical machine for particular application.	Teach Hrs	Marks
Learning Outcome 5	Describe various parts of the DC machines, explain the working principle and applications of DC generator (Cognitive domain)	8	10
Contents	<ul style="list-style-type: none"> • Concepts of Electromagnetism, Faraday's Law, Lenz's Law, Fleming's Left Hand and Right Hand Rule. • D.C. Machines: Construction, its main parts & their functions and classification. • D.C. Generator: Working principle, emf equation • Types and applications of DC Generators. 		
Method of Assessment	Internal : Mid semester-I theory examination (Pen paper test)		
Learning Outcome 6	Explain the working principle and choose a DC motor for particular application. (Cognitive domain)	4	6
Contents	<ul style="list-style-type: none"> • D.C. Motor: Working principle • Significance of back emf, torque equation • Types and applications of DC motors • Need of starter 		
Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 7	Describe various parts of the AC machine, explain its working principle and select the AC machine for particular application.(Cognitive domain)	12	12
Contents	<ul style="list-style-type: none"> • Single Phase Transformer: Construction, working principle, emf equation, transformation ratio, simple numerical. • Step up and step down transformers and their application. • Three-phase Induction motor: Construction, types, principle of operation, concept of Slip and applications. • Single-phase Induction motor: types of single phase induction motor- capacitor start, capacitor run, shaded pole and their applications. 		

Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 8	Apply field & armature control methods to vary speed of DC shunt motor and perform open circuit & short circuit test on single phase transformer to determine losses and efficiency (Psychomotor domain)	10	13
Contents	<ul style="list-style-type: none"> Field and armature control methods of DC shunt motor. Open circuit & short circuit test of single phase transformer. 		
Method of Assessment	External: End semester practical exam- Performance of task and viva voce		
Course Outcome 3	Use electrical measuring instruments and justify the need of the transducers. (Cognitive domain)	Teach Hrs	Marks
Learning Outcome 9	Select an appropriate instrument for measurement of electrical quantities (Cognitive domain)	10	12
Contents	<ul style="list-style-type: none"> Classification of Measuring Instruments: Absolute and secondary instruments. Indicating, Integrating and Recording instruments with examples. Working principle and construction of moving iron & moving coil type ammeter and voltmeter, electrodynamic type wattmeter, induction type and electronic energy meter. 		
Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 10	Classify different types of transducer. (Cognitive domain)	8	10
Contents	<ul style="list-style-type: none"> Transducer: Definition, primary and secondary transducers, active and passive transducers, analog and digital transducers. Principle and application of Strain gauge, LVDT, Thermocouple, Piezoelectric and Photoelectric Transducers. 		
Method of Assessment	Internal : Mid semester-II theory examination (Pen paper test)		
Learning Outcome 11	Measure various electrical quantities by using suitable measuring instruments. (Psychomotor and affective domain)	12	15
Contents	<ul style="list-style-type: none"> Measurement of insulation resistance by megger. Measurement of earth resistance by earth tester. Measurement of linear displacement by LVDT. 		
Method of Assessment	Internal: Performance of task, observation and viva voce		
Course Outcome 4	Analyze various electronic devices and circuits.	Teach Hrs	Marks
Learning Outcome 12	Explain concepts of various semiconductor devices and circuits.(Cognitive domain)	8	10

Contents	<ul style="list-style-type: none"> ● Semiconductor PN Junction Diode, Zener diode, PNP and NPN transistor ● Forward and reverse bias of semiconductor diode. ● Applications of semiconductor diode, zener diode and transistor ● Single phase half wave and full wave rectifier: Circuit diagram, working and input-output waveforms. 		
Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 13	Plot the V-I characteristics of semiconductor diode and measure output voltage of single phase rectifiers. (psychomotor domain)	8	10
Contents	<ul style="list-style-type: none"> ● V-I characteristics of semiconductor diodes. ● Measurement of output voltage in single phase half wave and full wave rectifier. 		
Method of Assessment	External : Performance of task and viva voce		
Course Outcome 5	Select electrical wiring material and apply electrical safety measures.	Teach Hrs	Marks
Learning Outcome 14	Choose electrical wiring materials. (Cognitive domain)	4	5
Contents	<ul style="list-style-type: none"> ● Types of Wiring and their Applications. ● Size of conductor, Standard Wire Gauge. ● Electrical Fixtures: switches, fuses, holders, sockets and MCB's. 		
Method of Assessment	Internal : Mid semester test II (Pen paper test)		
Learning Outcome 15	Identify electrical safety measures in various working conditions. (Cognitive domain)	4	6
Contents	<ul style="list-style-type: none"> ● Electric shock, its prevention, effect of electrical current on the human body and shock treatment. ● Earthing: Need and types of earthing. 		
Method of Assessment	External: End semester theory examination (Pen paper test)		

Reference books

1	Basic Electrical Engineering, McGraw Hill Education, Noida, ISBN: 978-00-705-9357-2	Mittle, V.N. and Mittle, Arvind
2	Electrical Circuits (Hindi), Satya Prakashan New Delhi	Suresh Kumar Soni and Umesh Kumar Soni
3	A Text Book of Electrical Technology Vol-I, Vol-II and Vol-IV, S. Chand & Co. Ram-nagar, New Delhi,	Theraja, B. L. and Theraja, A. K.,
4	Electrical Machines, Vol-I, II, Khanna Book Publishing House, New Delhi 2 (ISBN: 978-9386173-447, 978-93-86173-607)	Bimbhra, P.S.
5	Electrical Measurements and Measuring Instruments, S. K. Kataria and sons, Delhi, ISBN: 9788188458264	Gupta J. B.
6	Electrical Installation Estimating & Costing, S. K. Kataria and sons, Delhi	Gupta J. B.
7	Principles of Electronics, S. Chand Publications, Delhi	V K Mehta and Rohit Mehta