RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/5

Branch	Electrical Engineering	Semester	6
Course Code	601	Course Name	Installation Maintenance & Testing

Course Outcome 1	Plan the installation of heavy electrical equipments and machines based on standard procedures.	Teach Hrs.	Marks
Learning Outcome 1 E0160111	Describe requirements of foundations and methods for installation of heavy electrical machines. ***(Cognitive Domain)***	8	10
Contents	➢ Concept of foundation for installation of heavy electrical machinery. ➢ Requirements of Tools and Plants for installation, foundation for static/ rotating heavy electrical machinery. ➢ Types of foundation for installation of electrical machineries. ➢ Installation methods of Distribution and Power transformers.		
Method of Assessment	Internal: Mid semester-I theory examination (Pen paper test)		
Learning Outcome 2 E0160112	Select appropriate tools and accessories for installation of electrical equipments and machines. ***(Cognitive Domain)***	4	6
Contents	➢ Tools required for loading, unloading, lifting, carrying and installation of heavy electrical equipments. ➢ Precautions to be taken while handling the heavy electrical equipments.		
Method of Assessment	External: End semester Theory Exam (pen paper test)		
Learning Outcome3 E0160113	Explain the procedure for installation of static and rotating machines. ***(Cognitive Domain)***	4	5
Contents	➢ Installation of transformer as per B.I.S ➢ Materials and accessories required for installation of pole mounted transformer and foundation mounted transformer. ➢ Procedure for installation of pole mounted transformer and foundation mounted transformer. ➢ Installation of rotating electrical machines as per B.I.S.		
Method of Assessment	Internal : Assignment		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/5

Branch	Electrical Engineering	Semester	6

Course Code	601	Course Name	Installation Maintenance & Testing

Course Outcome 2	Examine commissioning and testing of heavy electrical equipments and machines.	Teach Hrs.	Marks
Learning Outcome 4 E0160121	Describe the various test on heavy electrical equipments and machines. ***(Cognitive Domain)***	4	5
Contents	➢ Necessity of testing ➢ Types of tests : Routine tests and type tests ➢ Methods of testing - Direct and Indirect test.		
Method of Assessment	Internal : Assignment		
Learning Outcome 5 E0160122	Explain commissioning of heavy electrical equipments and machines. ***(Cognitive Domain)***	8	10
Contents	➢ Concept of commissioning. ➢ Tests before Commissioning of transformer, induction motor and alternator ➢ Procedure to be adopted for commissioning the electrical equipment and machines in respect of (a) Mechanical fixture, alignment and rotor balancing. (b) Electrical tests. (c) Precautions to be taken before commissioning.		
Method of Assessment	External: End semester Theory Exam (pen paper test)		
Learning Outcome 6 E0160123	Prepare test reports of various electrical equipments and machines. ***(Psychomotor Domain)***	8	10
Contents	➢ Prepare test report of transformer after commissioning ➢ Prepare test report of three phase induction motor after commissioning ➢ Prepare test report for commissioning of SF6 gas circuit breaker. ➢ Visit to EHV Substation / Any industry		
Method of Assessment	Internal: Report submission and viva voce		

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Branch	Electrical Engineering	Semester	6
Course Code	601	Course Name	Installation Maintenance & Testing

Course Outcome 3	Develop the maintenance schedule for electrical equipments and machines.	Teach Hrs.	Marks
Learning Outcome 7 E0160131	Classify different types of maintenance required for electrical equipments and machines. ***(Cognitive Domain)***	8	10
Contents	➢ Causes of failure of electrical machines ➢ Reasons for deterioration of insulation resistance of various electrical equipments. ➢ Application of megger ➢ Properties of insulating oil ➢ Concept of maintenance ➢ Types of maintenance: preventive, routine, predictive and breakdown maintenance.		
Method of Assessment	Internal: Mid semester-II theory examination (Pen paper test)		
Learning Outcome 8 E0160132	Describe the procedure of maintenance necessary for electrical equipments and machines. ***(Cognitive Domain)***	8	10
Contents	➢ Necessity of preventive maintenance and its advantages ➢ Preventive maintenance schedule for transformer, induction motor, transmission line, circuit breaker and underground cable. ➢ Hot Line Maintenance and its importance ➢ Tools used for hot line maintenance: Materials and their functions.		
Method of Assessment	External: End semester Theory Exam (pen paper test)		
Learning Outcome 9 E0160133	Measure the insulation resistance of cable and prepare the maintenance schedule of various electrical machines. ***(Psychomotor and Affective Domain)***	12	15
Contents	➢ To measure the insulation resistance of underground cable using megger ➢ Prepare maintenance schedule for power transformer ➢ Prepare maintenance schedule for induction motor		
Method of Assessment	External: End semester practical exam (performance of task & viva voce)		

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Branch	Electrical Engineering	Semester	6

Course Code	601	Course Name	Installation Maintenance & Testing

Course Outcome 4	Recommend Troubleshooting methods suitable for electrical equipments and machines	Teach Hrs.	Marks
Learning Outcome 10 E0160141	Explain the various faults occur in electrical equipments and machines.***(Cognitive Domain)***	6	8
Contents	➢ Various abnormalities in electrical equipments and machines. ➢ Causes of faults in electrical equipments and machines. ➢ Internal and external faults. ➢ List of mechanical faults, electrical faults and magnetic faults in electrical equipments and machines.		
Method of Assessment	External: End semester Theory Exam (pen paper test)		
Learning Outcome 11 E0160142	Develop trouble shooting chart for given electrical equipments and machines. ***(Cognitive Domain)***	10	12
Contents	➢ Instruments and tools used for trouble shooting ➢ Common troubles in electrical equipments and machines –DC machine, AC machine, Transformer, Relay, Circuit-breaker and Under-ground cable. ➢ Trouble shooting chart for DC motor, DC generator, Distribution transformer, Induction motor and Circuit-breaker		
Method of Assessment	External: End semester Theory Exam (pen paper test)		
Learning Outcome 12 E0160143	Perform the dielectric strength test on transformer oil and prepare troubleshooting chart for given electrical machines.***(Psychomotor and Affective Domain)***	8	10
Contents	➢ To conduct dielectric strength test on sample of transformer oil ➢ Prepare troubleshooting chart of distribution transformer ➢ Prepare troubleshooting chart for 3 phase induction motor		
Method of Assessment	Internal: Performance of task, lab observation and viva voce		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5

Branch	Electrical Engineering	Semester	6
Course Code	601	Course Name	Installation Maintenance & Testing

Course Outcome 5	Apply electrical safety rules and regulations during installation, maintenance and testing of Electrical equipments and machines.	Teach Hrs.	Marks
Learning Outcome 13 E0160151	Explain the need of earthing and different methods of earthing. ***(Cognitive Domain)***	10	12
Contents	➢ Necessity of earthing ➢ Classification of earthing ➢ Earth lead and its size, permissible earth resistance for different installations ➢ Improvement of earth resistance, earth resistance measurement, ➢ Rules for earthing (I.E.R.)		
Method of Assessment	External: End semester theory Exam (pen paper test)		
Learning Outcome 14 E0160152	Outline the causes and remedies of electrical accidents ***(Cognitive Domain)***	10	12
Contents	➢ Electrical accidents, Causes of electrical accidents ➢ Factors affecting the severity of electrical shock ➢ Methods of shock treatment ➢ Safety regulations and safety measures ➢ Fire extinguishers: Fixed installation and portable devices ➢ Types of Fire extinguishers		
Method of Assessment	External: End semester theory Exam (pen paper test)		
Learning Outcome 15 E0160153	Measure the earth resistance and demonstrate the safety measures followed during electrical accidents ***(Psychomotor and Affective Domain)***	12	15
Contents	➢ To measure the earth resistance using earth tester. ➢ To operate portable fire extinguishers ➢ To demonstrate procedure for primary shock treatment.		
Method of Assessment	External: End semester practical exam (performance of task & viva voce)		

Reference Books:

S.N.	Title & Publication	Authors
1.	Testing, Commissioning ,Operation and Maintenance of electrical equipments Khanna publication	S Rao
2.	Installation, Commissioning and Maintenance of electrical equipments S.K. Kataria and sons	Tarlok Singh
3.	A Course in Electrical installation estimating & costing S. K. Kataria and sons	JB Gupta
4.	Installation, Maintenance and Repair of Electrical Machines and Equipments S.K. Kataria & Sons	Madhvi Gupta
5.	Field Work Hand Book For Construction of E.H.V. /H.V. /L.T. Lines and Sub Stations. Cooperative Stores S.V. Polytechnic College, Indore	Ashok Kumar Gupta & Hari Prasad Dishoriya
6.	Electrical Power Equipment Maintenance and Testing, CRC Press	Paul Gill
7.	Fundamentals Of Maintenance Of Electrical Equipments Khanna Publication	K.B. Bhatia
8.	वैद्युत संस्थापन तथा अनुरक्षण , दीपक प्रकाशन	डॉ ऍम एफ कुरैशी