Third Year (Degree in Electrical Technology)						
Semester	**Paper Code**	**Title of the Paper**	**Credits**			**Marks**
			Total	**Theory**	**Practical**	
V	BVET51	Installation, Testing and maintenance of Electrical Equipment	4	4	-	100
	BVET52	Generation and transmission and Switchgear	4	4	-	100
	BVET53	Power Electronics & Drives	4	4	-	100
	BVET54	Lab Practical-1 (Based on BVET51)	6	-	6	150
	BVET55	Lab Practical-2 (Based on BVET52)	6	-	6	150
	BVET56	Lab Practical-3 (Based on BVET53)	6	-	6	150
		Total Credits	**30**	**12**	**18**	**750**
Semester	**Paper Code**	**Title**	**Credits**			**Marks**
			Total	**Theory**	**Practical**	
VI	BVET61	Utilization of Electrical Energy & Electrical Audit	4	4	-	100
	BVET62	New Trends in Electrical Engineering and Technology	4	4	-	100
	BVET63	Advanced Electrical Appliances and Equipments	4	4	-	100
	BVET64	Industrial Training	10	--	10	250
	BVET65	Project	8	--	8	200
		Total Credits	**30**	**12**	**18**	**750**

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET51 Title: Testing and Maintenance of Electrical Equipment

Credits: 4

Units	Name of Unit	Content
I	Maintenance and Condition Monitoring	Importance and necessity of maintenance, different maintenance strategies like Breakdown maintenance, planned maintenance and condition based maintenance. Planned and preventive maintenance of transformer, induction motor and alternators. Concept of condition monitoring of electrical equipments. Advanced tools and techniques of condition monitoring.
II	Condition Monitoring of Transformers	Testing and condition monitoring of oil as per the IS/IEC standards. Filtration/reconditioning of insulating oil. Failure modes of transformer. Condition monitoring of transformer bushings, On load tap changer, dissolved gas analysis, degree of polymerization. IS/Specifications for testing of transformer bushing and oil.
III	Condition Monitoring of Induction Motors	Parameters of induction motors, Induction motor fault diagnostic methods, the induction motor fault monitoring method and Remedies
IV	Testing of Electrical Equipments	i) Testing of Power cables – Causes of cable failure, fault location methods and Remedial actions. ii) Testing of Transformer - Type tests, Routine tests and Special tests. Various abnormal conditions, trouble shooting, faults, causes and remedies iii) Testing of Induction motor – Various abnormal conditions, trouble shooting, faults, causes and remedies. iv) Testing of Capacitor banks
V	Distribution Systems	Classification of Supply systems. i) DC 2-wire system ii)1 Phase 2 wire system iii) 3 Phase 3 wire systems iv) 3 Phase 4 wire systems. Comparison between overhead and underground systems
VI	Substation and Estimation	Classification and types of substation, Indoor and Outdoor substations: Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams. Substation earthing system i) Types of earthing (Equipment and Neutral), Maintenance free earthing system. ii) Different electrode configuration (Plate and Pipe Electrode) iii) Tolerable step and Touch Voltages. Methods of testing earth resistance.

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET52 **Title: Power System & Switchgear Protection**

Credits: 4

Units	Name of Unit	Content
I	**Electrical Equipment's in Power Stations**	Descriptive treatment of ratings of various equipment used in power station, Special features, field of use of equipment like alternators, necessity of exciters, various excitation systems such as dc excitation, ac excitation and static excitation systems, transformers, voltage regulators, bus-bars, current limiting reactors, circuit breakers, protective relays, current transformers, Potential transformers, Lightning arresters, Earthing switches, isolators, carrier current equipment (P.L.C.C.), Control panels, battery rooms, metering and other control room equipment in generating stations.
II	**Overhead line insulators**	Types of insulators & their applications such as pin type, suspension type, strain type, Silicon Rubber insulators, post insulators, Shackle insulators, bushings, voltage distribution along string of suspension insulators, insulator failure.
III	**Faults & protective relaying**	Need for protective system, nature and causes of fault, types of faults, effects of faults, evolution of protective relaying, classification of relays,
IV	**Circuit Breaker**	Trip circuit of circuit breaker, Different ratings of circuit breaker (like rated voltage, rated current, rated frequency, rated breaking capacity – symmetrical and unsymmetrical breaking,
V	**3 Phase Induction Motor Protection**	Abnormal conditions and causes of failures in 3 phase Induction motor, single phasing protection, Overload protection, Short circuit protection.
VI	**Transformer Protection**	Types of faults in transformer, Percentage differential protection in transformers, Restricted E/F protection, incipient faults, Buchholz relay, protection against over fluxing, protection against inrush current,

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET53 **Title: Power Electronics Drives**

Credits: 4

Units	Name of Unit	Content
I	**Electrical Drives**	Definition, Advantages of electrical drives, Components of Electric drive system, Types of Electrical Drives (DC and AC).
II	**DC Motor Drives**	Braking methods: Rheostatic, Plugging, and Regenerative. Single phase and three phase fully controlled converter drives and performance of Converter fed separately excited DC Motor for speed control operations.
III	**Induction motor Drives I**	Braking methods: DC Dynamic Braking, AC Rheostatic braking, Plugging, Regenerative Braking, V/f control and comparison with stator voltage control, voltage source inverter (VSI) control.
IV	**Induction Motor Drives II**	Thermal model of motor for heating and cooling, classes of motor duty, types of enclosures for motor.
V	**Synchronous motor Drives**	Types of motor, cylindrical rotor wound field motor, equivalent circuit, speed torque characteristics and effect of power factor, salient pole wound field motor, BLDC drives, block diagram
VI	**Industrial application**	1. Machine tools 2. Textile mills 3. Steel rolling mills 4. Sugar mills 5. Traction drives 6. Crane and hoist drives 7. Solar and battery powered drives

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET54 Title: Lab Practical-1 (Based on BVET51)

Credits: 6

Sr.No	Name of Practical
1	Single line diagram of 132 or 220 or 400 KV substation (based on actual field Visit) Symbols, Plate or Pipe earthling (Drawing Sheet)
2	Study of troubleshooting of electrical equipment based on actual visit to repair workshop i) Three phase induction motor
3	Study of troubleshooting of electrical equipment based on actual visit to repair workshop i) Transformer
4	Construction, working and troubleshooting of any two household Electrical equipments (Fan, Mixer, Electric Iron, Washing machines, Electric Oven, Microwave - Limited to electrical faults)
5	Study the various types of earthing for electrical appliances/systems, Practice of earthing and Measurement of Earth resistance of Campus premises.
6	Wiring of distribution box with MCB, ELCB, RCCB and MCCB.
7	Wiring of 40 W tube, T-5, LED, Metal Halide lamps and available latest luminaries.
8	Assembly of various types of contactors with wiring.
9	Assembly of DOL and 3 point starter with NVC connections and overload operation.
10	Start delta starter wiring for automatic and manual operation.
11	**Industrial Visit:** Visit to repair workshop (Any One). i) Three phase induction motor ii) Transformer iii) Power Cable.

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET55 Title: Lab Practical-2 (Based on BVET52)

Credits: 6

Sr.No	Name of Practical
1	Study of switchgear testing kit.
2	Study of bus-bar protection schemes.
3	Study of Fuse, MCB and MCCB
4	Testing of MCB and MCCB.
5	Study and testing of contactors.
6	Study and testing of thermal overload relay for Induction Motor protection.
7	Study and plot Characteristics of digital over current relay
8	Survey of different switchgear equipment used in electrical power system and their technical specification.
9	Test performance of an IDMT over current electromagnetic relay.
10	Study of various types of overload line insulators.
11	Minimum one industrial visit must be organized for switchgear industry.

B. Voc. in Electrical Technology

Third Year: Semester –I

Paper Code: BVET56 Title: Lab Practical-3 (Based on BVET53)

Credits: 6

Sr.No	Name of Practical
1	Study of Electrical braking of D.C. Shunt motor (Rheostatic).
2	Study of Electrical braking of D.C. Shunt motor (Plugging).
3	Study of electrical braking of 3 phases Induction Motor (DC Dynamic Braking).
4	Study of electrical braking of 3 phases Induction Motor (Plugging).
5	Study of VSI fed 3 phase Induction motor (using V/f control PWM inverter) speed control characteristics.
6	Study of different electric Breaking methods used for 3ph Induction motor.
7	Study of BLDC motor control used in electric Vehicles.
8	Study of Thyristor controlled D.C. Drive.
9	Survey of different electric drive used in the industry.
10	Minimum one industrial visit must be organized for drives application in industry such as railways, sugar mill, machine shop, textile mill, paper mill etc.