

Syllabus: B.Voc. : Electrical Technology

COURSE STRUCTURE

First Year (Diploma in Electrical Technology)						
Semester	Paper Code	Title of the Paper	Credits			Marks
			Total	Theory	Practical	
I	BVET11	Communication Skill	4	4	-	100
	BVET12	Basic Electrical Engg-I	4	4	-	100
	BVET13	Basic Electrical Engg-II	4	4	-	100
	BVET14	Lab Practical-1 (Based on BVET12)	6	-	6	150
	BVET15	Lab Practical-2 (Based on BVET13)	6	-	6	150
	BVET16	Lab Practical-3 (Based on Electrical Wiring)	6	-	6	150
Total Credits			30	12	18	750
Semester	Paper Code	Title	Credits			Marks
			Total	Theory	Practical	
II	BVET21	Applied Mathematics	4	4	-	100
	BVET22	Electrical Appliances-I	4	4	-	100
	BVET23	Electrical Machines-I	4	4	-	100
	BVET24	Lab Practical-1 (Based on BVET22)	6	-	6	150
	BVET25	Lab Practical-2 (Based on BVET23)	6	-	6	150
	BVET26	Lab Practical-(Based on Rewinding Motors)	6	-	6	150
Total Credits			30	12	18	750

B.Voc (Electrical Technology)

Diploma in Electrical Technology

Syllabus

First Year : Semester –I

Paper Code : BVET11

Title: Communication Skills

Credit : 4

A. Formal Communication in Marathi (मराठी):

१. प्रशानिक मराठी : प्रास्ताविका , अर्जलेखन, कार्यालयीन टिप्पणी लेखन, घोषणापत्र, निविदा. महितीपत्रक, निमंत्रणपत्रिका.
२. जाहिरात लेखन आणि जाहीर निवेदन: प्रास्ताविक, जाहिरात लेखन, जाहीर निवेदन, माध्यमे(लिखित, श्राव्य, द्रुकश्राव्य, जाहिरातीचा, आकृतिबंध प्रमाण भाषेचे लेखन.
३. व्यावहारिक संवाद कौशल्य: प्रस्तावना, व्याख्या, वैशिष्टे संवादाचे महत्व, विविध माध्यमांसाठी होणारे संवाद, संवादातील अडथळे, ई. मेल .

B. Formal Communication in English

1. **Office Correspondence:** Meaning, Importance, Types, Drafting Memo (Memorandums), Orders, Circulars, Letters, Press Releases.
2. **Appearance and Layout of Business Letters:** Enquiry letters, Replies to Enquiry letters, Order letters, Credit and Status Enquiries, Sale Letters, Complaint letters. **Business letters:** Meaning, Importance, Qualities or Essentials, Physical
3. **Writing and Comprehension:** Comprehension, Composition, Translation, Paraphrasing, Letter writing Unit 4:7 Cs of Communication Grice's Cooperative Principle; Group Discussions; Public Speaking; Facing Interviews
4. **Job Application Letter:** Meaning, Types and Drafting of Job Application Letters, Resume / Curriculum Vitae.

Diploma in Electrical Technology

First Year : Semester –I

Paper Code: BVET12

Title: Basic Electrical Technology-I

Credit : 4

Units	Name of Unit	Content
I	Safety Precautions & Electrical symbols	Electrical shocks and procedure for separating, person from contact with live wire, First Aid, different methods of artificial respiration, Electric fire, Fire Extinguishers, Importance of Fuse and Earthing for safety. Precautions while working on HT/LT lines, Electrical symbols.
II	Current Electricity	Atomic Structure, Generation of electricity, Types of electricity, Effects of electric current , Different energy sources, EMF, potential difference, current, voltage, resistance, conductance, power, energy, Resistance Laws, specific resistance, energy billing for a month, direct current and alternating current
III	Measuring Instruments	Introduction, types of measuring instruments, analog and digital, Connection and use of ammeter, voltmeter, wattmeter, energymeter, multimeter, Ohm-meter, frequency meter, clip on meter, tachometer, megger, earth resistance tester
IV	DC circuits and Network Theorems	Ohm's law, Series circuit, Parallel circuit & series and parallel combination, types of electrical circuit. Electrical Network-Classification. Theorems-KCL, KVL, Superposition, Thevenin's, Norton's, Maximum power transfer theorem, Star-Delta Transformation
V	Electric cells and Capacitors	Electric cells and Battery, primary and secondary cells, i.e. Volta's cell, Daniel's cell, Dry cell, Lead acid cell, Nickel iron, Nickel cadmium, Lithium cell, Charging and discharging of Battery, series and parallel cells. Capacitors- Energy stored in capacitor, capacitance, charging and discharging of capacitor, Combination of capacitor, series and parallel of capacitor, Types of capacitors.

Diploma in Electrical Technology

First Year : Semester –I

Paper Code: BVET13

Title: Basic Electrical Engineering-II

Credits: 4

Units	Name of Unit	Content
I	Electromagnetism	Introduction, types of magnets, basic magnetisms, electromagnet, difference between permanent and electromagnet, magnetic rules, right hand rule, cork screw rule, end rule, Electromagnetic Induction, Faradays Laws, Fleming Rules, Induced emf-statically and dynamically, self and mutual induction, Force produced on current carrying conductor in magnetic field.
II	AC Fundamental	AC circuits- Introduction, Generation of AC single phase and 3 phase, star delta connection, Understanding of different term-Average, Peak, instantaneous and RMS Value, Peak , form factor, power factor, Phase, Phase Diff., lag and lead, Inductance, Capacitance, Impedance, Reactance-Inductive and Capacitive, True & Apparent power
III	AC circuit	Diff AC circuits, Pure R, Pure L and Pure C circuits, Graphical and Phasor representation, Series R-L, R-C and R-L-C circuits, Parallel R-L, R-C and R-L-C circuits, Resonance circuits, Disadvantages of low power factor, Causes of low power factor, Improvement of pf. R-Z triangle, Power triangle
IV	Illumination	Lamps, Types-Incandescent, Tube light, Neon Lamp, CFL, LED, Mercury Vapors, Sodium Vapors, Hallogen lamp, LED based modern lighting fixtures, Decorating lighting. Important terms of illumination. Direct and indirect lighting scheme
V	Electrical Material	Conducting & Insulating material. Fuse, Soldering and Magnetic Material. Importance of Fuse, Types, Fusing current, Fuse rating, Fuse Material, Soldering, Soldering Method/Procedure, Soldering Tools, Soldering material, Soldering Flux Magnetic Material-Ferro, Para, Dia, Soft and hard magnetic material

Diploma in Electrical Technology

First Year : Semester –I

Paper Code: BVET14 Title: Lab Practical-1(Based on BVET12)

Credits: 6

Sr.No	Name of Practical
1	Demonstration of First Aid and Artificial respiration through video.
2	To remove person suffering from contact with live wire.
3	Study and use of Different types of Fire Extinguishers.
4	Drawing sheet on electrical symbol.
5	To Identify the alternating current (AC) and direct current. (DC)
6	To Study & Verify Resistance law.
7	To Study & Verify different effects of Electric current.
8	To Introduction of measuring instrument and their types.
9	To connect Ammeter, Voltmeter in the electrical circuit and measure the current & voltage.
10	To measure Resistance by V-I method, Multimeter method and Colour code method.
11	To measure the power by wattmeter method and V-I method.
12	To measure the energy by using single phase Energy meter and prepare one month electricity bill.
13	To Study & Verify ohm's law.
14	To Study and verify series and parallel Resistance circuit.
15	To Study and verify compound (series-parallel) Resistance circuit.
16	Verification of KCL & KVL for simple circuit.
17	Verification of temperature co-efficient of resistance.
18	Series & Parallel connection of cells.
19	Study the lead acid battery and measure the voltage & specific gravity of charge and discharge battery.
20	Study of series and parallel connection of capacitors.

Diploma in Electrical Technology

First Year : Semester –I

Paper Code: BVET15 Title: Lab Practical-2(Based on BVET13)

Credits: 6

Sr.No	Name of Practical
1	Verification of magnetic field of solenoid with air core and iron core.
2	Verification of torque development in current carrying conductor in magnetic field.
3	Verification of faraday's laws of Electromagnetic induction.
4	To Study & Observation of different magnetic rules.
5	To study Star and Delta circuit and calculate Voltage and current in line and phase.
6	To measure the RMS value and calculate the peak and Average value of AC.
7	To study & observe the self and mutually induced emf.
8	Study of R-L series and parallel circuit, calculation of Impedance & power factor. Draw vector diagram
9	Study of R-C series and parallel circuit, calculation of Impedance & power factor. Draw vector diagram
10	Draw R-Z diagram and power triangle.
11	Study of R- L-C series and parallel circuit, calculation of Impedance & power factor Draw vector diagram
12	To find relation between diameter of fuse wire and fusing current.
13	To study the operation of Fuse, MCB & ELCB
14	Soldering practice.
15	Study the different types of Lamp.
16	To Measure Illumination by luxmeter.
17	To Collect & Study Techo-commercial information of different lamps available in market (i. e. Lamp manufacture, technical specification, cost etc.)
18	Study the different lighting accessories required for various types of lamps.
19	Visit to nearby lamp manufacturing industry.
20	To Identify and rectify faults in lamps Fluorescent tube lights, Sodium/ Mercury vapour lamp and indoor outdoor LED lamps. (Any two)

Diploma in Electrical Technology

First Year : Semester –I

Paper Code: BVET16 Title: Lab Practical-3 (Electrical Wiring)

Credit: 6

Sr.No	Name of Practical
1	To Demonstrate types and use of various tools required for wiring installation/maintenance of electrical work.
2	To Demonstrate the use of safety devices and precaution while working on electrical installation
3	To study the all types of Electrical wiring accesories.
4	To study the all types of Electrical wiring .
5	To control one lamp by one way switch and two lamp and socket by Three one way switch.
6	To perform stair case wiring and Godown wiring.
7	To perform different type of Electrical wiring circuits.
8	To prepare and check the distribution switch board of minimum four point by using test lamp find the fault in electrical equipment.
9	To perform the coridoor (Varandha) wiring on demo-kit.
10	To perform the Hostel wiring on demo-kit.
11	To perform the Tunnel wiring on demo-kit.
12	To wire up the bell circuit and telephone point in casing caping wiring.
13	To trace the wiring daigram of any house and Estimate, costing & billing the wiring.
14	To test wiring of any house/ shop with help of Megger (Insulation Tester)
15	To wire up the dish antenna and intercom in casing caping wiring.
16	To wire up the CCTV in casing caping wiring.
17	To wire up the Three phase motor with DOL Starter in conduit wiring.
18	To Collect & Study Techo-commercial information of different wiring material available in market.
19	To visit the Shop/ Bungalow/ Building/ House where concealed wiring is in progress.
20	Design electrical installation scheme for Flat/Independent bungalow / House: and Draw Installation plan, single line diagram & wiring diagram. Prepare material schedule, detailed estimate & costing.

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET21

Title: Applied Mathematics

Credits:

4

1. Logic:

Introduction

Application of Logic

Application of Logic to switching circuit

2. Angles and its Measurements

Trigonometric Functions

Introduction Graphs for Trigonometric Functions

3. Linear Equations

Linear Equation in one and two variable

Solution system of Linear equation

4. Limit

Algebra of Limits

Limit of trigonometric function

5. Derivatives

Derivative of standard Function

Rules of Differentiation

Maxima, Minima, Approximation

Application of Derivatives

6. Integration

Definition, Integral of some standard function

Integration Rules

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET22

Title: Electrical Appliances-I

Credits: 4

Units	Name of Unit	Content
I	Tools and Basic Testing Equipments	Testing Equipments-Neon tester, electronic line tester, series test lamp for single phase, parallel test lamp for single phase, series test lamp for three phase, parallel test lamp for 3phase, multimeter, thermostat, bimetallic relay, electromagnetic relay , thermocouple, overload switch
II	Electric Iron	Electric iron, types of electric iron (ordinary, automatic, steam, spray, laundry), their construction and Working, Testing, Possible faults/causes/Remedies, Precautions while using iron.
III	Room Heater & Toaster	Room Heater & Toaster- their construction and working, Testing, Possible faults /causes /Remedies.
IV	Electric Kettle and coffee percolator	Electric kettle, coffee percolator, their construction and working, Testing, Possible faults /causes /Remedies.
V	Electric Stoves	Stoves-Types, Open type (shegdi), closed type (hot plate), Simple oven, OTG, their construction and Working, Testing, Possible faults /causes /Remedies.
VI	Water Heaters	Immersion Heater and Geyser, their types, Their construction and Working, Testing, Possible faults /causes /Remedies, Precautions while using water heaters.
VII	Water Purifiers	Importance of Water purifier, Types- UV type, RO type, Their construction and Working, Testing, Possible faults /causes /Remedies. Maintenance & Cleaning Schedule.

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET23

Title: Electrical Machines-I

Credits: 4

Units	Name of Unit	Content
I	Single phase ac motors	Introduction and working principle, Constructional details, Classification of Motors Single phase motor self Starting methods Types- Split phase, Capacitor, Shaded pole, AC series, universal. Characteristics of split phase, Capacitor, shaded pole, AC series, universal type single phase induction motor and their applications.
II	Single phase transformers	Introduction, Working principle of transformer, Constructional parts and their functions. Materials used for construction. Classification of transformer. EMF equation of transformer, Transformation ratio, KVA capacity of transformer. Equivalent circuit diagram of transformer. Efficiency & Losses of transformer. Regulation of transformer. Method to find losses and efficiency and regulation of Transformer (OC & SC test). All day efficiency of 1phase transformer. Single phase Autotransformer. principle, advantages and disadvantages Instrument Transformer (CT & PT)
III	DC motors	Definition, Necessity of DC machines Construction of DC machine. Working principle of DC motor. Types of DC motor. Concept and significance of back emf. Torque expression, voltage equation, speed regulation, Characteristics & applications of DC motor, (shunt, series & compound), Speed control of DC Motor, Losses & Efficiency. types of armature windings, difference between Lap & Wave winding. Starters of DC motor-Necessity, Two, Three & Four point starter,
IV	DC generators	Working principle of DC generator, Types of DC generator. E. M. F. equation & voltage, equation of DC generator. Characteristics of DC generators, Armature reaction, Commutation, methods to improve commutation. Losses in DC generator, Applications of shunt, series and compound generator.
V	Special Purpose Motors	Working principle, construction and applications of Reluctance Motor, Hysteresis motor. Construction and Working of linear induction motor. Construction and Working of Brushless DC Motors, PMDC motors, printed circuit (Disc) motor, Stepper motor. Applications of them.

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET24 Title: Lab Practical-1(Based on BVET22)

Credits: 6

Sr.No	Name of Practical
1	Study of line tester, continuity tester, series and parallel test lamp .
2	Study of Thermostatic and Electromagnetic Relay.
3	To study and Measure temperature using Thermocouple.
4	Testing of domestic appliances by using series test lamp and multimeter.
5	Dismantling, fault finding, trouble shooting and reassembling of Electric iron.
6	Dismantling, fault finding, trouble shooting and reassembling of Room Heater.
7	Dismantling, fault finding, trouble shooting and reassembling of Toaster.
8	Dismantling, fault finding, trouble shooting and reassembling of Electric Kettle.
9	Dismantling, fault finding, trouble shooting and reassembling of coffee percolator
10	Dismantling, fault finding, trouble shooting and reassembling of Immersion Heater.
11	Dismantling, fault finding, trouble shooting and reassembling of Geyser.
12	Dismantling, fault finding, trouble shooting and reassembling of Electric stove.
13	Dismantling, fault finding, trouble shooting and reassembling of Heating oven.
14	Dismantling, fault finding, trouble shooting and reassembling of O.T.G (Oven, Toaster, Griller).
15	Dismantling, fault finding, trouble shooting and reassembling of Roti maker.
16	Dismantling, fault finding, trouble shooting and reassembling of Tandoor maker.
17	Dismantling, fault finding, trouble shooting and reassembling of Door Bell.
18	Dismantling, fault finding, trouble shooting and reassembling of Table Lamp.
19	Dismantling, fault finding, trouble shooting and reassembling of UV water purifier.
20	Dismantling, fault finding, trouble shooting and reassembling of RO water purifier.

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET25 Title: Lab Practical-2(Based on BVET23)

Credits: 6

Sr.No	Name of Practical
1	To test the capacitor and centrifugal switch of single phase motor.
2	To find the winding terminal of split phase motor by multimeter and series test lamp method.
3	To measure the starting & running current, voltage and speed of single phase split phase motor in both direction.
4	To measure the starting & running current, voltage and speed of single phase capacitor motor in both direction.
5	To trace out the field connection of shaded pole motor. Connect it on supply and measure the current, voltage and speed.
6	Dismantling, fault finding, trouble shooting and reassembling of given single phase motor and test it by using series test lamp & multimeter.
7	To measure the starting & running current, voltage and speed of single phase universal motor in both direction.
8	To find out the terminal of a two winding transformer and calculate transformation ratio.
9	To conduct open circuit and short circuit test on single phase transformer.
10	Determination the efficiency of single phase transformer.
11	Study the construction & working of Auto transformer.
12	To study and measure the current and voltage with CT & PT.
13	To study the construction of DC Machine.
14	Speed control of DC shunt motor above normal speed control method ii) Below normal speed control method
15	To reverse rotating directions of DC shunt motor & Compound Motor also measure the voltage, current and speed.
16	Load test on DC shunt motor & calculation of efficiency, output, torque etc.
17	To plot Load characteristic of DC generator.
18	Study the different types of DC Motor Starters.
19	To study the construction working of Stepper motor.
20	To study the working of Permanent Magnet DC motor (PMDC) & Printed circuit (Disc) DC motor.

Diploma in Electrical Technology

First Year : Semester –II

Paper Code: BVET26 Title: Lab Practical-3 (Rewinding of Electrical Motors)

Credits: 6

Sr.No	Name of Practical
1	To note down the external & internal data of motor and remove the burnt coil from stator slot.
2	To clean the slot and prepare slot insulation.
3	To make new coils as per old coil data by using appropriate former.
4	To make the developed winding diagram for given single phase motor.
5	Insert the coils in the stator as per diagram.
6	To make the winding connection of coils as per developed diagram of winding and insert the wedges in the stator slots.
7	Taping and Binding of Rewounded stator of motor.
8	Varnishing and Baking of Rewounded stator of motor.
9	Reassembling, testing and running of single phase rewounded motor.
10	To rewind burnt split phase motor.
11	To rewind capacitor motor (ceiling fan, table fan).
12	To rewind Shaded Pole motor (toy motor).
13	To rewind the field winding of mixer/grinder (universal motor).
14	To rewind the basket winding of 24 slots, 2 pole motor.
15	To rewind the concentric winding of 24 slot, 4 pole motor.
16	To replace the grinding blade, bush bearing, and carbon brushes of mixer & grinder (universal motor).
17	Testing and Balancing of rewounded armature or Rotor of single phase motor.
18	To Estimate, Costing & Billing of single phase motor.
19	To note down the data of small transformer and remove the burnt coil from core. To rewind the small transformer (230V/12V).
20	To visit the motor manufacturing industry or Rewinding Shop.