



# GUJARAT TECHNOLOGICAL UNIVERSITY

## Syllabus for Bachelor of Vocation (B.Voc.), 1<sup>st</sup> Semester

**Branch: Solar & Renewable Energy**

**Subject Name: Assistant Electrician**

**On Job Training (Elective)**

**Subject Code: 1110707**

**Type of course:** Elective

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical		
			ESE (E)	PA(M)	ESE (V)	PA (I)		
0	0	15	15	0	0	100	100	200

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

### Content:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	<p><b>Select and use hand, power tools and electrical devices relevant to construction electrical works:</b></p> <p>Selection and use of hand and power tools for tightening electrical fixtures, electrical termination at power outlets, Selection of electrical devices such as starters, circuit breakers for installing them to circuits as per power rating , Selection of PPEs for general and electrical safety,</p> <p>Use of measuring instruments and hand/ power tools for measuring, cutting, bending, threading conduits/ cables, Use of wire stripping and joining tools to strip, joining/ splicing tools, Use of electrical devices to carry out basic inspections on electrical circuits like checking voltage, current flow, voltage drop, leakage through conductor etc. Maintain/ upkeep electrical tools, devices post using as per manufacturers guidelines</p>	25	15
2	<p><b>Install temporary lighting arrangement at construction sites</b></p> <p>Demonstrate and understand the principles of resistance, Explain series and parallel circuits, Visual checking to be carried out to electrical fixtures and materials related to lighting units to ascertain their usability as per specified acceptance criteria, Reading of electrical wiring symbols for single and three phase circuits, specifications to obtain required information for a given electrical circuit, Reading of electrical and general safety norms and guidelines and its implementation in electrical works,</p> <p>Assessment of risk involved in installation of lighting arrangements and its accessories at construction sites, Selection of cables, lights and electrical fixtures depending upon electrical load requirement, Selection of PPEs for general and electrical safety, Use of hand and power tools to fix cables, light units and its accessories, Practice of cable laying using conduits, casings</p>	60	30



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	<p>and its necessity at construction sites, Joining of cable in straight through joint method and use of PVC insulation tapes at broken insulation, joints as per applicability,</p> <p>Determination of live/ dead electrical circuits by using appropriate tools and devices, Determination of voltage, current at power outlets by using appropriate tools and devices, Method of tagging electrical cables, underground electrical conduits by standard method, Determination of power rating of electrical fixtures to be used for repairing to the electrical arrangement,</p> <p>Repairing of electrical lighting arrangements by undertaking tests, replacement of electrical fixtures/ materials, Methods of trace out short circuits, power interruptions/ continuity using appropriate electrical devices, Electrical principles like ohms law, amperes law, electromagnetic field and its effects</p>		
3	<p><b>Install LV electrical wiring at permanent structures</b></p> <p>Visual checking to be carried out to electrical fixtures and materials related to domestic wiring such as conduits, raceways, wires to ascertain their usability as per specified acceptance criteria.</p> <p>Use of measuring instruments and cutting tools such as measuring tapes, markers, cutters to cut and bend conduits ,Use of hand and power tools for cutting drilling works for proper fixing of conduits and raceways, Laying electrical wires through conduits and raceways, Selection and use general and electrical safety gears</p> <p>Practice electrical tests like voltage drop, continuity of current flow and resistance in insulations, Practice handling and storing electrical fixtures and materials used for domestic wiring, practice of placing electrical earthing pipes and plates in to the ground, Select and use PPEs as per electrical work requirement</p>	50	25
4	<p><b>Assemble, install and maintain temporary LV electrical panels (distribution boards) at construction site</b></p> <p>Visual checking to be carried out to electrical fixtures and materials such as cabinet/ frame, switches, sockets, circuit breakers, wires to be used for assembling temporary panel/ distribution board (DB) to ascertain their usability as per specified acceptance criteria,</p> <p>Selection and use of general and electrical safety gears, Determining power rating of fixtures to be used in panel/ DB, Installing electrical fixtures such as switches, sockets etc. to the panel/ DB as per their provision, Carry out connection electrical</p>	40	15



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	<p>fixtures by wires within the panel/DB, Selection of cable- single/ three phase for connecting the panel to the main power source.</p> <p>Practice of electrical earthing of panel/DB, Connecting panel/ DB to main power source Method of termination at power source, Practice of electrical tests to be carried out to inspect proper function of panel/DB using appropriate devices.</p> <p>Repairing and replacement of faulty parts with respect to technical specification and power rating of the same, Preparation of reports, documents regarding repairing/ maintenance at specified formats.</p>		
5	<p><b>Work effectively in a team to deliver desired results at the workplace</b></p> <p>The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition, Selection of materials, tools or devices for defined purpose under, Handling electrical material, fixtures and device.</p> <p>Carrying out conduit laying and cable laying, Carrying out assembling of temporary panel/ distribution board, Undertaking electrical tests by using measuring devices, Selection and handing over of desired/ appropriate tools/ materials while assisting trade senior.</p>	8	5
6	<p><b>Plan and organize work to meet expected outcomes</b></p> <p>The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition, Selection of materials, tools or devices for defined purpose in an optimum manner, Handling electrical tools, material, fixtures and device, Prioritize all works/ activities.</p> <p>Planning conduit laying and cable laying as per scope, Carrying out assembling of temporary panel/ distribution board, Optimum use of resources while performing task, Adherence to stipulated timelines for completion of electrical, activities/ tasks.</p>	8	5
7	<p><b>Work according to personal health, safety and environment protocol at construction site</b></p> <p>The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition., Selection of PPEs and use them appropriately as per working need of electrical operations, handling, storing, stacking and shifting of electrical fixtures, light units, tools and devices.</p> <p>Selection of PPEs and use them appropriately as per working need of cutting conduit, drilling in walls, termination at the main power source, Analysis of hazards involved to electrical circuits/ connections by external effects and taking necessary steps or informing to seniors, Identification of locations, situations/</p>	9	5



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	circumstances, malpractices which can be hazardous for general or electrical works. Selection of fire extinguisher based on classification of fire, standard practice of storing & stacking firefighting equipment/materials at work locations, Disposal of waste materials as per their nature and effects on weather		
	<b>Total</b>	<b>200</b>	<b>100</b>

#### Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Proficiently select, use, and maintain hand tools, power tools, and electrical devices required for construction electrical works, ensuring safety and adherence to manufacturers' guidelines.	25
CO-2	Demonstrate competency in installing, inspecting, and maintaining temporary lighting arrangements at construction sites, following industry standards and safety protocols.	30
CO-3	Apply electrical principles and interpret electrical wiring symbols to effectively install and repair low voltage (LV) electrical wiring in permanent structures, ensuring compliance with safety norms and guidelines.	30
CO-4	Work collaboratively in a team, demonstrating effective communication, organization, and adherence to personal health, safety, and environmental protocols at construction sites, contributing to the successful completion of electrical tasks.	15

#### Reference Books:

1. "Electrical Wiring Residential" by Ray C. Mullin and Phil Simmons (Publisher: Cengage Learning)
2. "Electricity for the Trades" by Frank Petruzella (Publisher: McGraw-Hill Education)
3. "Ugly's Electrical References" by George V. Hart (Publisher: Jones & Bartlett Learning)
4. "Electrical Systems Based on the 2020 NEC" by P. Hartwell and F. Holzman (Publisher: Delmar Cengage Learning)
5. "Practical Electrical Wiring: Residential, Farm, Commercial, and Industrial" by Frederic P. Hartwell (Publisher: McGraw-Hill Education)