



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

ELECTRICIAN

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 5



SECTOR – ELECTRICAL

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOME	ASSESSMENT CRITERIA
1. Apply safe working practices	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1.4 Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1.8 Identify and observe site evacuation procedures according to site policy.
	1.9 Identify Personal Protective Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
2. Comply environment regulation and housekeeping	2.1 Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	2.2 Deploy environmental protection legislation & regulations
	2.3 Take opportunities to use energy and materials in an environmentally friendly manner.
	2.4 Avoid waste and dispose waste as per procedure
	2.5 Recognize different components of 5S and apply the same in the working environment.
3. Interpret & use company and technical	3.1 Obtain sources of information and recognize information.
	3.2 Use and draw up technical drawings and documents.

communication	3.3	Use documents and technical regulations and occupationally related provisions.
	3.4	Conduct appropriate and target oriented discussions with higher authority and within the team.
	3.5	Present facts and circumstances, possible solutions & use English special terminology.
	3.6	Resolve disputes within the team.
	3.7	Conduct written communication.
4. Demonstrate basic mathematical concept and principles to perform practical operations.	4.1	Solve different problems like phase angle, etc. with the help of a calculator.
	4.2	Demonstrate conversion of Fraction to Decimal and vice versa.
	4.3	Explain BCD code, conversion from decimal to binary and vice-versa, all other conversions.
5. Understand and explain basic science in the field of study including simple machine.	5.1	Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.
	5.2	Explain levers and its types.
	5.3	Explain relationship between Efficiency, velocity ratio and Mechanical Advantage.
	5.4	Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	5.5	Solve simple problems on lifting tackles like crane-Solution of problems with the aid of vectors.
6. Read and apply engineering drawing for different application in the field of work.	6.1	Read & interpret the information on drawings and apply in executing practical work.
	6.2	Read & analyse the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	6.3	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
7. Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day to day work to improve productivity & quality.	7.1	Explain the concept of productivity and quality tools and apply during execution of job.
	7.2	Explain basic concept of labour welfare legislation, adhere to responsibilities and remain sensitive towards such laws.
	7.3	Knows benefits guaranteed under various acts.

<p>8. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.</p>	<p>8.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.</p>
	<p>8.2 Explain standard procedure for disposal of waste.</p>
<p>9. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.</p>	<p>9.1 Explain personnel finance and entrepreneurship.</p>
	<p>9.2 Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme.</p>
	<p>9.3 Prepare a report to become an entrepreneur for submission to financial institutions.</p>
<p>10. Utilize basic computer applications and internet to take benefit of IT developments in the industry.</p>	<p>10.1 Explain the basic hardware of personal computer.</p>
	<p>10.2 Use common application software viz., word, excel, power point etc., in day to day work.</p>
	<p>10.3 Awareness about useful internet websites, search relevant information pertaining to the assigned tasks.</p>

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SPECIFIC LEARNING OUTCOME	
LEARNING OUTCOME	ASSESSMENT CRITERIA
SEMESTER-I	
11. Prepare profile with an appropriate accuracy as per drawing.	11.1 Identify the trade tools; demonstrate their uses with safety, care & maintenance.
	11.2 Prepare a simple half lap joint using firmer chisel with safety.
	11.3 Prepare tray using sheet metal with the safety.
	11.4 Demonstrate fixing of surface mounting type of accessories.
	11.5 Perform connections of electrical accessories.
	11.6 Make and wire up of a test board and test it.
12. Prepare electrical wire joints, carry out soldering, crimping and measure insulation resistance of underground cable.	12.1 Observe safety/ precaution during joints & soldering.
	12.2 Make simple straight twist and rat-tail joints in single strand conductors.
	12.3 Make married and 'T' (Tee) joint in stranded conductors.
	12.4 Prepare a Britannia straight and 'T' (Tee) joint in bare conductors.
	12.5 Prepare western union joint in bare conductor.
	12.6 Solder the finished copper conductor joints with precaution.
	12.7 Prepare termination of cable lugs by using crimping tool.
	12.8 Make straight joint in different types of underground cables.
	12.9 Measure insulation resistance of underground cable.
13. Verify characteristics of electrical and magnetic circuits.	13.1 Identify types of wires, cables and verify their specifications.
	13.2 Verify the characteristics of series, parallel and its combination circuit.
	13.3 Analyze the effect of the short and open in series and parallel circuits.
	13.4 Verify the relation of voltage components of RLC series circuit in AC.
	13.5 Determine the power factor by direct and indirect methods in an AC single phase RLC parallel circuit.
	13.6 Identify the phase sequence of a 3 ϕ supply using a phase-sequence meter.
	13.7 Prepare/ connect a lamp load in star and delta and determine relationship between line and phase values with precaution.
	13.8 Connect balanced and unbalanced loads in 3 phase star system and measure the power of 3 phase loads.
	13.9 Make the solenoid and determine its polarity for the given direction of current.

	13.10 Group the given capacitors to get the required capacity and voltage rating.
<u>SEMESTER-II</u>	
14. Install, test and maintenance of batteries and solar cell.	14.1 Assemble a DC source 6V/500 mA using 1.5V cells.
	14.2 Determine the internal resistance of cell and make grouping of cells.
	14.3 Explain charging of battery and test for its condition with safety/ precaution.
	14.4 Carry out installation and maintenance of batteries.
	14.5 Determine total number of cells required for a given power requirement.
15. Estimate, Assemble, install and test wiring system.	15.1 Comply with safety & IE rules when performing the wiring.
	15.2 Prepare and mount the energy meter board.
	15.3 Draw and wire up the consumers main board with ICDP switch and distribution fuse box.
	15.4 Draw and wire up a bank/hostel/jail in PVC conduit.
	15.5 Identify the types of fuses their ratings and applications.
	15.6 Identify the parts of a relay, MCB & ELCB and check its operation.
	15.7 Estimate the cost of material for wiring in PVC channel for an office room having 2 lamps, 1 Fan, one 6A socket outlet and wire up.
	15.8 Estimate the requirement for conduit wiring (3 phase) and wire up.
	15.9 Estimate the materials and wire up the lighting circuit for a godown.
	15.10 Estimate the materials and wire up a lighting circuit for a corridor in conduit.
	15.11 Test, locate the fault and repair a domestic wiring installation.
16. Plan and prepare Earthing installation.	16.1 Plan work in compliance with standard safety norms related with earthing installation.
	16.2 Install the pipe earthing and test it.
	16.3 Install the plate earthing and test it.
	16.4 Measure the earth electrode resistance using earth tester.
	16.5 Carry out earth resistance improvement.
17. Plan and execute electrical illumination	17.1 Plan work in compliance with standard safety norms related with electrical illumination system.

system and test.	17.2	Install light fitting with reflectors for direct and indirect lighting.
	17.3	Assemble and connect a & single twin tube fluorescent light.
	17.4	Connect, install and test the HPMV & HPSV lamp with accessories.
	17.5	Prepare and test a decorative serial lamp set for 240 V using 6V bulb and flasher.
	17.6	Install light fitting for show case window lighting.
18. Select and perform measurements using analog / digital instruments	18.1	Identify the type of electrical instruments.
	18.2	Extend the range of MC voltmeter and ammeter.
	18.3	Measure the frequency by frequency meter.
	18.4	Measure the power and energy in a single & three phase circuit using wattmeter and energy meter with CT and PT.
	18.5	Measure the value of resistance, voltage and current using digital multimeter.
	18.6	Measure the power factor in poly-phase circuit and verify the same with voltmeter, ammeter, watt-meter readings.
19. Perform testing, verify errors and calibrate instruments.	19.1	Test single phase energy meter for its errors.
	19.2	Determine the measurement errors while measuring resistance by voltage drop method.
	19.3	Calibrate the analog multimeter.
20. Plan and carry out installation, fault detection and repairing of domestic appliances.	20.1	Plan work in compliance with standard safety norms related with domestic appliances.
	20.2	Service and Repair of calling bell/ buzzer/ Alarm.
	20.3	Service and repair an automatic iron.
	20.4	Repair and service of oven having multi-range heat control.
	20.5	Replace the heating element in a kettle and test.
	20.6	Service and repair an induction heater.
	20.7	Service and repair a geyser.
	20.8	Service and repair a mixer.
	20.9	Service and repair of washing machine.
	20.10	Install a pump set.
	20.11	Service and repair of table fan.
	20.12	Service, repair and install a ceiling fan.
21. Execute testing, evaluate performance and maintenance of	21.1	Plan work in compliance with standard safety norms related with transformer.
	21.2	Identify the types of transformers and their specifications.
	21.3	Identify the terminals; verify the transformation ratio of a

transformer.	single phase transformer.
	21.4 Connect and test a single phase auto- transformer.
	21.5 Determine the losses (iron loss and copper loss) and the regulation of a single phase transformer at different loads.
	21.6 Measure the current and voltage using CT and PT.
	21.7 Carry out winding for small transformer of 1KVA rating.
	21.8 Test the transformer oil with oil testing kit.
	21.9 Connect 3 single phase transformers for 3 phase operation of delta-delta /delta-star /star-star /star-delta.
	21.10 Connect the given two single phase transformers in parallel /series (secondary only) and measure voltage.
21.11 Connect & test 3 phase transformer in parallel.	
<u>SEMESTER-III</u>	
22. Plan, Execute commissioning and evaluate performance of DC machines.	22.1 Plan work in compliance with standard safety norms related with DC machines.
	22.2 Determine the load performance of a different type of DC generator on load.
	22.3 Connect, start, run and reverse direction of rotation of different types of DC motors.
	22.4 Conduct the load performance tests on different type of DC motor.
	22.5 Control the speed of a DC motor by different method.
23. Execute testing, and maintenance of DC machines and motor starters.	23.1 Test a DC machine for continuity and insulation resistance.
	23.2 Maintenance, troubleshooting & servicing of DC machines.
	23.3 Test armature by using growler.
	23.4 Maintain, service and troubleshoot the DC motor starter.
24. Plan, Execute commissioning and evaluate performance of AC motors.	24.1 Plan work in compliance with standard safety norms related with AC motors.
	24.2 Draw circuit diagram and connect forward & reverse a 3 phase squirrel cage induction motor.
	24.3 Start, run and reverse an AC 3 phase squirrel cage induction motor by different type of starters.
	24.4 Measure the slip of 3 phase squirrel cage induction motor by tachometer for different output. Draw slip/ load characteristics of the motor.
	24.5 Determine the efficiency of 3 phase squirrel cage induction motor by no load test/ blocked rotor test and brake test.
	24.6 Plot the speed torque (Slip/Torque) characteristics of slip ring induction motor.
	24.7 Demonstrate speed control of 3 phase induction motor.
	24.8 Connect, start and run a 3 phase synchronous motor.