Job roles, learning out comes and assessment criteria

Objectives: At the end of this lesson you shall be able to
- **define job role**
- **describe learning outcome**
- **explain the assessment criteria.**

Job role

Job role defines set of functions that together form a unique employment opportunity in an organisation.

In the trade syllabus job role at the trades are given.

For example, the job role of Electrician trade is given below.

Job role - Electrician trade

Electrician General: Installs, maintains and repairs electrical machinery equipment and fittings in factories, workshops power house, business and residential premises etc. Studies drawings and other specifications to determine electrical circuit, installation details etc. Positions and installs electrical motors, transformers, switchgears. Switchboards and other electrical equipment, fittings and lighting fixtures. Makes connections and solders terminals. Tests electrical installations and equipment and locates faults using megger, test lamps etc. Repairs or replaces defective wiring, burnt out fuses and defective parts and keeps fittings and fixtures in working order. May do armature winding, draw wires and cables and do simple cable jointing. May operate, attend and maintain electrical motors, pumps etc.

Electrical Fitter: Fits and assembles electrical machinery and equipment such as motors, transformers, generators, switchgears, fans etc., Studies drawings and wiring diagrams of fittings, wiring and assemblies to be made. Collects prefabricated electrical and mechanical components according to drawing and wiring diagrams and checks them with gauges, megger etc. to ensure proper function and accuracy. Fits mechanical components, resistance, insulators, etc., as per specifications, doing supplementary tooling where necessary. Follows wiring diagrams, makes electrical connections and solders points as specified. Checks for continuity, resistance, circuit shorting, leakage, earthing, etc. at each stage of assembly using megger, ammeter, voltmeter and other appliances and ensures stipulated performance of both mechanical and electrical components filled in assembly. Erects various equipment such as bus bars, panel boards, electrical posts, fuse boxes switch gears, meters, relays etc. using nonconductors, insulation hoisting equipment as necessary for receipt and distribution of electrical current to feeder lines. Installs motors, generators, transformer etc. as per drawings using lifting and hoisting equipment as necessary, does prescribed electrical wiring, and connects to supply line. Locates faults in case of breakdown and replaces blown out fuse, burnt coils, switches, conductors etc. as required. Checks, dismantles, repairs and overhauls electrical units periodically or as required according to scheduled procedure. May test coils. May specialize in repairs of particular equipment manufacturing, installation or power house work and be designated accordingly.

Learning outcome

Learning outcomes represent what a learner knows, understands and is able to do on completion of a learning process, and which would be expressed in terms of knowledge, skills and competence.

1 Generic learning outcome

Learning outcomes usually specific more general area of learning.

2 Specific learning outcome

Learning outcomes specific to the trade and must be achievable by student with in the time available.

In the every trade syllabus the learning outcome has mentioned as below:

Learning/Assessable outcome - Electrician trade

Generic learning outcome

- Apply safe working practices
- Comply environment regulation and housekeeping
- Interpret & use company and technical communication
- Demonstrate basic mathematical concept and principles to perform practical operations
- Understand and explain basic science in the field of study including simple machine

- Read and apply engineering drawing for different application in the field of work
- Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day to day work to improve productivity & quality
- Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources
- Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & social growth
- Utilize basic computer applications and internet to take benefit of IT developments in the industry.

Specific learning outcome - Electrician trade

- Prepare profile with an appropriate accuracy as per drawing
- Prepare electrical wire joints, carry out soldering, crimping and measure insulation resistance of underground cable
- Verify characteristics of electrical and magnetic circuits
- Install, test and maintenance of batteries and solar cell
- Estimate, Assemble, install and test wiring system
- Plan and prepare Earthing installation
- Plan and execute electrical illumination system and test
- Select and perform measurements using analog / digital instruments
- Perform testing, verify errors and calibrate instruments
- Plan and carry out installation, fault detection and repairing of domestic appliances
- Execute testing, evaluate performance and maintenance of transformer
- Plan, Execute commissioning and evaluate performance of DC machines
- Execute testing, and maintenance of DC machines and motor starters
- Plan, Execute commissioning and evaluate performance of AC motors
- Execute testing, and maintenance of AC motors and starters
- Plan, execute testing, evaluate performance and carry out maintenance of Alternator / MG set
- Execute parallel operation of alternators
- Distinguish, organise and perform motor winding
- Assemble simple electronic circuits and test for functioning
- Assemble accessories and carry out wiring of control cabinets and equipment
- Perform speed control of AC and DC motors by using solid state devices
- Detect the faults and troubleshoot inverter, stabilizer, battery charger, emergency light and UPS etc
- Plan, assemble and install solar panel
- Erect overhead domestic service line and outline various power plant layout
- Examine the faults and carry out repairing of circuit breakers.

Assessment criteria

The term assessment criteria specify how the student performance in respect of the trade's learning outcomes are to be recognised.

They are statements which specify the standards that must be met and what evidence will be taken to show achievement of learning outcomes.

For each trade learning outcome with assessment criteria is given in the trade syllabus.

For example the assessment criteria for electrician trade (1st semester) is given below.

Electrician trade - Generic learning outcome with assessment criteria

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 Productive 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. 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 viceversa, all other conversions.

Learning outcome	Assessment criteria
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.
8 Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	8.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution. 8.2 Explain standard procedure for disposal of waste.
9 Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	9.1 Explain personnel finance and entrepreneurship. 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. 9.3 Prepare a report to become an entrepreneur for submission to financial institutions.
10 Utilize basic computer applications and internet to take benefit of IT developments in the industry.	10.1 Explain the basic hardware of personal computer. 10.2 Use common application software viz., word, excel, power point etc., in day to day work. 10.3 Awareness about useful internet websites, search relevant information pertaining to the assigned tasks.

Electrician trade - 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 ø 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.