



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

INFRASTRUCTURE EQUIPMENT SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Junior Mechanic Electrical/Electronic/Instrumentation'
QP No. 'IES/ Q 1106 NSQF Level 3'

Date of Issuance: July 1st, 2016

Valid up to: March 31st, 2017



Authorized Signatory
(Infrastructure Equipment Skill Council)

TABLE OF CONTENTS

1. Curriculum	04
2. Trainer Prerequisites	10
3. Annexure: Assessment Criteria	11

Junior Mechanic Electrical/Electronics/Inst rumentation

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Junior Mechanic Electrical/Electronics/Instrumentation”, in the “Infrastructure Equipment” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Junior Mechanic Electrical/Electronic/Instrumentation		
Qualification Pack Name & Reference ID	IES/Q1106		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	Preferably Class 8th Standard		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Assist in carrying out repairs and maintenance of equipment’s electrical assemblies and sub-assemblies. Basic working of electrical assemblies & systems, identification and use of hand tools and equipment, techniques for removal of defective components and fitment after rectification. • Maintain the work area, tools and machine to support operations. Maintenance of work area, tools and equipment, various cleaning agents and their use, safety precautions & measures • Comply with workshop health and safety guidelines. Health, safety and environment policies; personal protective equipment, fire-fighting equipment, basic first aid for common injuries at work shop 		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Junior Mechanic Electrical/Electronics/Instrumentation” Qualification Pack issued by “Infrastructure Equipment Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Repairs & Maintenance of Equipment's Electrical System</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code IES/N1106</p>	<p>Organisational Context. Know the following:</p> <ul style="list-style-type: none"> • Organisation structure, reporting and escalation procedure and time line. • Performance standards and procedures in the company. • Work target and review mechanism / feedback with supervisor • Location and process for storage and disposal of waste. <p>Technical Knowledge. Learn the following:</p> <ul style="list-style-type: none"> • Fundamentals of Electricals. • Common symbols used in electrical circuit diagrams. • Methods to identify parts & components like fuses, relays, solenoids, bulbs and wirings. • Basic working of various electrical system parts like battery, starter motor, alternator, fuses, relays solenoids and other instruments • Manufacturer's tech specs and brief service procedures for electrical parts/ system in use. • Identification and use of various hand & power tools; and their calibration. • Specs and grade of lubricants; their identification & usage. • Procedure for removal of electrical parts / components from the system/equipment • Procedure for further removing sub-parts/ sub-components. • Technique of laying out removed parts in logical sequence to aid re-assembly • Methods of keeping components parts together after stripping. • Techniques used to diagnose faults through visual inspection. • Usage of tools in rectification ops like alignments tools, torque wrenches and presses. • Usage of sealants and lubricants of correct specs. 	<ul style="list-style-type: none"> • <u>Lab/workshop</u> • <u>Electrical/Electronic /Instrumentation System Assemblies and Sub - Assemblies /Parts & Components suitably mounted on a platform.</u> • Standard tools and lab eqpt for dis-assembly and assembly. • Cut-outs & models of major parts like battery, starter motor, alternator, control panel • Class room with audio-video system • Manufacturers Electrical System Service /Repair Manual & Video • Safety video • PPE Items

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Techniques of cleaning and servicing different parts/components of electrical system. • Procedure for re-fitment of part/component on the equipment <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> • Read & understand general instructions, maintenance manuals & work orders related to equipment. • Record and document basic details of repairs and maintenance carried out. • Interact with mechanic / supervisors as necessary to seek clarifications & understand issues. • Plan and organise repair tasks with all concerned in most efficient and cost effective way. <p>Performance Criteria. Execute the following:</p> <p>Breakdown Repair Assistance</p> <ul style="list-style-type: none"> • Ensure availability of all tools, spares, consumables and equipment for repairs. • Ensure tools and equipment are in appropriate condition & correctly positioned for ensuing repair task • Disassemble defective part / component safely for repairs as per SOP. • Assist as instructed in service / repair of defective part /component. • Ensure cleaning and lubrication of parts etc as per guidelines. • Reassemble the same when repairs are complete. <p>Assist mechanic in preparing parts list for procurement</p> <ul style="list-style-type: none"> • <p>Maintenance Work Assistance</p> <ul style="list-style-type: none"> • Follow maintenance schedule as per manufacturers manual • Assist replenish or change consumables as per manual • Assist in cleaning of filters and hose pipes. • Report if any part has to be changed or repaired as per guidelines. 	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Perform/assist in visual inspection to check leakages and Proper functioning of systems during post repair trials. 	
2	<p>Maintain work area, tools and machinery</p> <p>Theory Duration (hh:mm) 14:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code IES/N7801</p>	<p>Organisational Context. Know the following:</p> <ul style="list-style-type: none"> Location of tools and equipment; procedure for issue and return Responsibilities & time frame for resolving problems. <p>Technical Knowledge. Learn the following:</p> <ul style="list-style-type: none"> Besides technical knowledge related to repairs and maintenance should know. Lifting and handling procedures Different types of cleaning eqpt & their usage. Different types of machine guards for equipment Effects of contamination on products ie oil, dirt Different ways of minimising waste <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> In addition to core and generic skills listed above Interact with mechanics/ supervisors to seek clarifications and understand issues. Plan and organise work area, tools, equipment & material to minimise risks for health & safety <p>Performance Criteria. Execute the following:</p> <p>Work Area, Tools & Machinery Maintenance</p> <ul style="list-style-type: none"> Ensure a clean & hazard free work area Maintain tools and equipment as per guidelines Ensure good condition of machine safety guards. Ensure safe handling of tools, equipment and machinery Carry out cleaning as per schedule and limit of responsibility 	<ul style="list-style-type: none"> <u>Lab/workshop</u> Standard tools and lab eqpt for dis-assembly and assembly. Class room with audio-video system Safety video PPE Items

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Ensure use of right cleaning material/equipment & methods • Report the need for maintenance and/or cleaning outside area of responsibility • Follow instructions to minimise waste & ensure safe disposal of same • Assist in carrying out checks to ensure environmental conditions are met 	
3	<p>Comply with Workshop Health and Safety Guidelines</p> <p>Theory Duration (hh:mm) 06:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code IES/N7602</p>	<p>Organisational Context. Know the following:</p> <ul style="list-style-type: none"> • Health, safety, environmental (HSE) policies and guidelines of the company & their importance • Reporting channel and documentation procedure for all HSE related matters • Contact details of personnel responsible for HSE related matters & in case of emergencies. • Location of workshop store, first aid station and assembly points <p>Technical Knowledge. Learn the following:</p> <ul style="list-style-type: none"> • OEMs guidelines for health, safety and security requirements. • Types, use and importance of Personal Protective Equipment (PPE) • Types of common hazards and risks at workshop and preventive measures. • Safe practices when working with tools and machines • In case of emergencies procedure to stop/ shut down machinery. • Common injuries and appropriate basic first aid treatment. • Firefighting equipment: Basic knowledge of handling and using them. • Guidelines for transport, storage and disposal of hazardous materials and waste • Safety signs/symbols and warnings used in workshops and their meaning 	<ul style="list-style-type: none"> • Class room with audio-video system • Safety video • PPE Item • Firefighting equipment • First Aid Kit and Charts

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>Skills - Core & Professional</p> <ul style="list-style-type: none"> In addition to the core and generic skills listed above Use correct PPE and other safety gear while in the work shop. <p>Performance Criteria. Execute the following:</p> <ul style="list-style-type: none"> Comply with safety, health, environment and security related regulations & guidelines at work. Carry out maintenance operations as per manufacturers and workshop related procedures Correct use of Personal Protective Equipment (PPE) and other safety gear at work site. Lift and carry tools and equipment safely using correct procedures Keep work area free from clutter, waste and spillage Store tools & equipment at designated places only post use. Operate fire extinguishers as applicable. Support in administering basic first aid. Record and report details as related to operations, incidents or accidents as applicable. 	
	<p>Total Duration</p> <p>Theory Duration 50:00</p> <p>Practical Duration 110:00</p>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> <u>Electrical System with all related components/assemblies and wiring harness.</u> Standard tools and equipment for dis-assembly & assembly. Class room with audio-video projection system Manufacturers Electrical Service/Repair Manual & Video Safety video PPE Equipment: Helmet, gloves, earplugs, goggles, safety shoes Firefighting equipment and 'How to Use' Charts First Aid Box and 'How to Do' Charts <u>Lab/workshop fully equipped for hydraulic service and repairs</u> 	

Grand Total Course Duration: 160 Hours, 0 Minutes

*(This syllabus/ curriculum has been approved by **Infrastructure Equipment Skill Council**)*

Trainer Pre-requisites for Job role: “Junior Mechanic Electrical/ Electronic /Instrumentation” mapped to Qualification Pack: “IES/Q1106, v1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “IES/Q 1106 Version 1.0”.
2	Personal Attributes	Aptitude for conducting training, with strong communication and interpersonal skills. Passion for training and developing others; well-organised; and a team player. Eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	ITI / Diploma in Electrical/Electronic/Instrumentation
4a	Domain Certification	Certified for Job Role: “ <u>Junior Mechanic Electrical/Electronic/Instrumentation</u> ” mapped to QP: “ <u>IES/Q 1106 – Version 1.0</u> ”. Minimum accepted score 70%. Desired: Certification Training in Electrical System Maintenance and Repairs
4b	Platform Certification	Certified for Job Role: “ <u>Junior Mechanic Electrical/Electronic/Instrumentation</u> ” mapped to Qualification Pack: SSC/1402. Minimum accepted score 70%.
5	Experience	<ul style="list-style-type: none"> • Around 3 to 4 years’ experience in Electrical System maintenance and repairs. • Desirable: Should have conducted Electrical service training programs.

Assessment Criteria	
Job Role	Junior Mechanic Electrical/Electronics/Instrumentation
Qualification Pack	IES/Q 1106 Version 1.0
Sector Skill Council	Infrastructure Equipment

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has been laid down based on the NOS's. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly.
2	The assessment of the theory/knowledge will be based on written test/viva or both while skill test shall be hands on practical. Behaviour and attitude will be assessed while performing the assigned task.
3	The assessment shall be done as per the guidelines formulated by IESC. The assessment agencies in consultation with IESC will create unique question papers for theory/knowledge and practical skills at each IESC accredited testing centres (as per assessment criteria below)
4	To pass the Qualification Pack, every trainee should score a minimum of 40% in each NOS and 50% aggregate. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification pack.

NOS	Performance criteria	Total Mark	Out of	Marks Allocation	
				Theory	Skills Practical
1. IES/N1106 Assist in repair and maintenance of infrastructure equipment's	PC1. Assist in Inspecting and testing electrical systems and equipment as per mechanic's instructions	41	4	1	3
	PC2. Assist in Visual inspections as per mechanic's instruction		3	0	3
	PC3. Ensure availability of tools, spare parts, equipment and supplies for repair work		2	1	1
	PC4. Assist in Installing new fuses, electrical cables, or power sources as required as per manufacturer's manual		4	1	3

	PC5. Locate circuit defects such as blown fuses or malfunctioning transistors as per manufacturer's manual		4	1	3
	PC6. Remove or repair circuit defects such as blown fuses or malfunctioning transistors as per manufacturer's manual		4	1	3
	PC7. Assist to repair or replace defective wiring and relays in ignition, lighting, air-conditioning, and safety control systems, using electrician's tools as per manufacturer's manual		4	1	3
	PC8. Assist in preparing parts list for procurement		4	1	3
	PC9. Handle and dispose waste based on environmental guidelines at the work place		1	0	1
	PC10. Follow the maintenance schedule as per manufacturer's manual		1	0	1
	PC11. Assist in replacing the scheduled spare parts as per mechanic's instruction		2	1	1
	PC12. Replenish / change the consumables as per service manual		1	0	1
	PC13. Perform visual inspection to verify proper functioning of electronic/electrical components as per manufacturer's manual		1	0	1
	PC14. Check the Control Panel for warning as per manufacturer's manual		4	1	3
	PC15. Ensure cleaning of electronic components as per manufacturer's manual		2	1	1
		Total	41	10	31
2. IES/N7801 Maintain the work area, tools and machine to support the operations	PC1. Ensure safe handling of materials, machinery, equipment and tools	27	2	1	1
	PC2. Assist in carrying out checks to ensure the environmental conditions required are met		4	1	3

	PC3. Follow correct lifting and handling procedures		4	1	3
	PC4. Follow instructions with regard to materials to minimize waste		1	0	1
	PC5. Ensure a clean and hazard free working area		1	0	1
	PC6. Maintain tools and equipment as per organization guidelines and manufacturer's instructions		3	1	2
	PC7. Report the need for maintenance and/or cleaning outside your area of responsibility		2	1	1
	PC8. Report unsafe equipment and other dangerous occurrences		1	0	1
	PC9. Ensure good condition of the appropriate machine guards for equipment		2	1	1
	PC10. Ensure use of appropriate cleaning equipment and methods appropriate for the work to be carried out		4	1	3
	PC11. Carry out cleaning according to schedules and limits of responsibility		2	1	1
	PC12. Ensure safe disposal of waste		1	0	1
		Total	27	8	19
3. IES/N7602 Comply with workshop health and safety guidelines	PC1. Comply with safety, health, security and environment related regulations/ guidelines as per organizational/ manufacturer's policy	27	2	1	1
	PC2. Carry out maintenance operations as per the manufacturer's and workshop related health and safety guidelines/ standard operating procedures		4	1	3
	PC3. Follow safety regulations and procedures with regard to service workshop hazards and risks		2	1	1
	PC4. Use appropriate protective clothing/ equipment for specific tasks and work conditions as per service manual		4	1	3

	PC5. Lift and carry tools/equipment/components safely using correct procedure as per the service manual	4	1	3
	PC6. Use appropriate tools in a proper manner as given in the service manual	4	1	3
	PC7. Keep the work area free from clutter and spillage	1	0	1
	PC8. Store equipment and tools back at designated place post use and inspect to make sure they are not left behind	2	1	1
	PC9. Handle the storage and disposal of hazardous materials and waste in compliance with health, safety and environmental guidelines	1	0	1
	PC10. Operate various grades of fire extinguishers, as applicable	1	0	1
	PC11. Support in administering basic first aid and report to concerned team members, as required, in case of an accident	0	0	0
	PC12. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility	1	0	1
	PC13. Record and report details related to operations, incidents or accidents, as applicable	1	0	1
	Total	27	7	20