Model Curriculum

Junior Mechanic Engine

SECTOR: INFRASTRUCTURE EQUIPMENT
SUB-SECTOR: EQUIPMENT SERVICE AND SPARES
OCCUPATION: EQUIPMENT MAINTENANCE
REF ID: IES/Q1102, V1.0
NSQF LEVEL: 3

Skill India
IESC
Infrastructure Equipment Skill Council
N·S·D·C National Skill Development Corporation
Transforming the skill landscape

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 Engine**' QP No. '**IES/ Q 1102 NSQF Level 3**'

Date of Issuance: **December 30th, 2015**

Valid up to: **March 31st, 2017**

Authorised Signatory
(Infrastructure Equipment Skill Council)

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Junior Mechanic Engine

CURRICULUM / SYLLABUS

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

Program Name	**Junior Mechanic Engine**		
Qualification Pack Name & Reference ID	IES/Q1102		
Version No.	1.0	**Version Update Date**	
Pre-requisites to Training	Preferably Class 8th Standard		
Training Outcomes	**After completing this programme, participants will be able to:** • **Assist in carrying out repairs and maintenance of equipment's engine.** Basic working of engine & 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 Engine" Qualification Pack issued by "Infrastructure Equipment Skill Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Repairs & Maintenance of Equipment's Engine System** **Theory Duration** (hh:mm) 30:00 **Practical Duration** (hh:mm) 70:00 **Corresponding NOS Code** IES/N1102	**Organisational Context. Know the following:** • 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. **Technical Knowledge. Learn the following:** • Basic working of engine and sub systems fuel, lube, cooling, turbo charger • Manufacturer's tech specs and brief service procedures for engine in use. • Identification and use of various hand tools; and their calibration. • Procedure for removal of parts / engine from the 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. • Techniques of cleaning and servicing different parts of engine. • Procedure for re-fitment of engine/ part on the equipment **Skills - Core & Professional** • 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	• Lab/workshop • Diesel Engine 4/6 cylinder with Turbo charger & all related components /assemblies/ accessories • Should be a working engine with fuel tank, radiator, battery, alternator suitably mounted on a platform and connected; with proper ventilation for exhaust gases. • Standard tools and lab equipment for dis-assembly and assembly. • Cut-outs &models of major parts like filters and pumps • Class room with audio-video system • Manufacturers Engine Service /Repair Manual & Video • Safety video • PPE Items

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		tasks with all concerned in most efficient and cost effective way. **Performance Criteria. Execute the following:** **Breakdown Repair Assistance** • 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. Assist mechanic in preparing parts list for procurement • **Maintenance Work Assistance** • 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. • Perform/assist in visual inspection to check leakages and • Proper functioning of systems during post repair trials.	
2	**Maintain work area, tools and machinery** **Theory Duration** (hh:mm) 14:00 **Practical Duration** (hh:mm) 30:00 **Corresponding NOS Code** IES/N7801	**Organisational Context. Know the following:** • Location of tools and equipment; procedure for issue and return • Responsibilities & time frame for resolving problems. **Technical Knowledge. Learn the following:** • Besides technical knowledge related to repairs and maintenance should know. • Lifting and handling procedures	• Lab/workshop • 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
		• 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 **Skills - Core & Professional** • 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 **Performance Criteria. Execute the following:** **Work Area, Tools & Machinery Maintenance** • 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 • 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	**Comply with Workshop Health and Safety Guidelines** **Theory Duration** (hh:mm) 06:00 **Practical Duration** (hh:mm)	**Organisational Context. Know the following:** • 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.	• 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
	10:00 **Corresponding NOS Code** IES/N7602	• Location of workshop store, first aid station and assembly points **Technical Knowledge. Learn the following:** • 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 **Skills - Core & Professional** • In addition to the core and generic skills listed above • Use correct PPE and other safety gear while in the work shop. **Performance Criteria. Execute the following:** • 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.	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Record and report details as related to operations, incidents or accidents as applicable.	
	Total Duration **Theory Duration 50:00** **Practical Duration 110:00**	**Unique Equipment Required:** • Working Diesel Engine with all related components/assemblies. • Standard tools and equipment for dis-assembly & assembly. • Class room with audio-video projection system • Manufacturers Engine 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 • Lab/workshop fully equipped for engine service and repairs	

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 Engine" mapped to Qualification Pack: "IES/Q1102, 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 1102 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 Diesel Engine Mechanic
4a	**Domain Certification**	Certified for Job Role: "Junior Mechanic Engine" mapped to QP: "IES/Q 1102 – Version 1.0". Minimum accepted score 70%. Desired: Certification Training in Engine Maintenance and Repairs
4b	**Platform Certification**	Certified for Job Role: "Junior Mechanic Engine" mapped to Qualification Pack: SSC/1402. Minimum accepted score 70%.
5	**Experience**	• Around 3 to 4 years' experience in Engine service and repairs. • At least 1 to 2 years' experience in conducting engine service training programs.

Assessment Criteria	
Job Role	**Junior Mechanic Engine**
Qualification Pack	**IES/Q 1102 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.

				Marks Allocation	
NOS	**PC**	**Total Mark**	**Out of**	**Theory**	**Skills Practical**
1. IES/N1102 Assist in repair and maintenance of infrastructure equipment's engine parts	PC1. Ensure availability of tools, spare parts, equipment and supplies for repair work		5	5	0
	PC2. Carry out visual inspection for leakage as per the mechanic's instruction		5	0	5
	PC3. Disassemble broken or defective engine part to facilitate repair as per Standard Operating procedure		5	0	5
	PC4. Reassemble when repairs are complete as per Standard Operating procedure		5	0	5

	PC5. Ensure appropriate Positioning of equipment, machinery, physical structures, and other objects for assembly or installation, using hand tools, power tools, and moving equipment as per mechanic's instruction		5	0	5
	PC6. ensure appropriate condition of tools, equipment, and machines as per Standard Operating Procedure		0	0	0
	PC7. Ensure cleaning or lubrication of engine components, equipment, instruments, tools, work areas, and other objects, using hand tools, power tools, and cleaning equipment as per the manufacturer's manual		5	0	5
	PC8. Assist the mechanic in preparing parts list for procurement		0	0	0
	PC9. Work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines		5	5	0
	PC10. Handle and dispose waste based on environmental guidelines at the work place		0	0	0
	PC11. Follow the maintenance schedule as per manufacturer's manual		5	5	0
	PC12. Assist in replacing the scheduled spare parts as per mechanic's instruction		0	0	0
	PC13. Assist in Replenish / change the consumables		0	0	0
	PC14. Perform visual inspection to Verify in appropriate sequence, for the engine, as per service manual, the following • leakage from parts • breakage of parts • unusual noise • under-rated performance		5	0	5
	PC15. Check the engine indication as per manufacturer's manual		5	0	5

	PC16. Check Air Filter as per manufacturer's manual		5	0	5
	PC17. Clean Air Filter as per manufacturer's manual		5	0	5
	PC18. Check Engine oil & coolant level as per manufacturer's manual		5	0	5
	PC19. Report any instances where the parts need to be changed/repaired as per company's guidelines		5	5	0
	PC20. Assist to Change/Repair the defective part as per mechanic's instructions		0	0	0
	PC21. Assist in post repair trials as per mechanic's instructions		5	5	0
		Total	**75**	**25**	**50**
2. IES/N7801 Maintain the work area, tools and machine to support the operations	PC1. Ensure safe handling of materials, machinery, equipment and tools		10	5	5
	PC2. Assist in carrying out checks to ensure the environmental conditions required are met		0	0	0
	PC3. Follow correct lifting and handling procedures		5	0	5
	PC4. Follow instructions with regard to materials to minimize waste		0	0	0
	PC5. Ensure a clean and hazard free working area		5	5	0
	PC6. Maintain tools and equipment as per organization guidelines and manufacturer's instructions		5	0	5
	PC7. Report the need for maintenance and/or cleaning outside your area of responsibility		0	0	0
	PC8. Report unsafe equipment and other dangerous occurrences		5	0	5
	PC9. Ensure good condition of the appropriate machine guards for equipment		5	5	0

	PC10. Ensure use of appropriate cleaning equipment and methods appropriate for the work to be carried out		10	5	5
	PC11. Carry out cleaning according to schedules and limits of responsibility		0	0	0
	PC12. Ensure safe disposal of waste.		5	5	0
		Total	**50**	**25**	**25**
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		0	0	0
	PC2. Carry out maintenance operations as per the manufacturer's and workshop related health and safety guidelines/ standard operating procedures		10	5	5
	PC3. Follow safety regulations and procedures with regard to service workshop hazards and risks		0	0	0
	PC4. Use appropriate protective clothing/ equipment for specific tasks and work conditions as per service manual		10	5	5
	PC5. Lift and carry tools/equipment/components safely using correct procedure as per the service manual		10	5	5
	PC6. Use appropriate tools in a proper manner as given in the service manual		0	0	0
	PC7. Keep the work area free from clutter and spillage		0	0	0
	PC8. Store equipment and tools back at designated place post use and inspect to make sure they are not left behind		0	0	0
	PC9. Handle the storage and disposal of hazardous materials and waste in compliance with health, safety and environmental guidelines		10	5	5
	PC10. Operate various grades of fire extinguishers, as applicable		0	0	0

	PC11. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		5	5	0
	PC12. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility		0	0	0
	PC13. Record and report details related to operations, incidents or accidents, as applicable		5	0	5
		Total	**50**	**25**	**25**