



# Model Curriculum

## Fitter: Electronics Assembly

**SECTOR: IRON & STEEL**  
**SUB-SECTOR: STEEL, SPONGE – IRON, FERRO ALLOYS,  
RE ROLLERS, REFRACTORY**  
**OCCUPATION: Electronics & Instrumentation  
Maintenance**  
**REF ID: ISC/Q1101**  
**NSQF LEVEL: 3**



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## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

INDIAN IRON AND STEEL SECTOR SKILL COUNCIL

for the

**MODEL CURRICULUM**

Complying to National Occupational Standards of

Job Role/ Qualification Pack: 'Iron & Steel – Fitter Electronic Assembly' QP No. 'ISC/Q1101NSQF Level 3'

Date of Issuance: December 22nd, 2015

Valid up to: December 21st, 2016

\* Valid up to the next review date of the Qualification Pack

  
Authorized Signatory  
(Indian Iron and Steel Sector Skill Council)



## TABLE OF CONTENTS

<b>1. Curriculum</b>	<b>04</b>
<b>2. Trainer Prerequisites</b>	<b>07</b>
<b>3. Annexure: Assessment Criteria</b>	<b>08</b>

# Fitter: Electronics Assembly

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Fitter Electronics assembly”, in the “Iron & Steel” Sector/Industry and aims at building the following key competencies amongst the learner.

<b>Program Name</b>	<b>Fitter Electronics assembly</b>		
<b>Qualification Pack Name &amp; Reference ID.</b>	<b>Iron &amp; Steel – Fitter Electronics assembly ISC/Q1101</b>		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	30-12-2015
<b>Pre-requisites to Training</b>	Minimum qualification – 12 <sup>th</sup> standard (Science)/ITI Pass		
<b>Training Outcomes</b>	<b>After completing this programme, participants will be able to:</b> <ul style="list-style-type: none"> <li>Assemble and wire up electronic equipment and systems to mechanical equipment</li> <li>Use basic health and safety practices at the workplace</li> <li>Work effectively with others</li> </ul>		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Fitter Electronics assembly” Qualification Pack issued by “Indian Iron & Steel Sector Skill Corporation”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<b>Over view of Iron &amp; Steel Industry</b>  <b>Theory Duration</b> (hh:mm) 08:00 <b>Practical Duration</b> (hh:mm) 00:00  <b>Corresponding NOS Code</b>	<ul style="list-style-type: none"> <li>Understanding Iron &amp; steel industry</li> <li>Understanding types of Iron &amp; Steel Industry</li> <li>Understanding products of Iron &amp; Steel industry</li> <li>Activities in Iron &amp; Steel Industry</li> </ul>	PPTs of Iron and steel manufacturing, Charts showing the same
2	<b>Occupational, Health and Safety (OHAS)</b>  <b>Theory Duration</b> (hh:mm) 08:00 <b>Practical Duration</b> (hh:mm) 16:00	<ul style="list-style-type: none"> <li>Understanding the Occupational health &amp; Safety</li> <li>Understanding of work related hazards.</li> <li>Documentation for Health and safety</li> <li>Working at Heights, confined spaces</li> <li>Solutions for fire at work place</li> </ul>	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety Material



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<b>Corresponding NOS Code</b> ISC/N0008		
3	<b>Understanding job requirements</b>  <b>Theory Duration</b> (hh:mm) 30:00  <b>Practical Duration</b> (hh:mm) 96:00  <b>Corresponding NOS Code</b> ISC/N1101	<ul style="list-style-type: none"> <li>• Understand about basics of electricity.</li> <li>• Knowledge of electronics machines</li> <li>• Know about electronics components</li> <li>• Reading values of electronics components</li> <li>• Functions and applications of electronics components</li> <li>• Polarity of electronic components</li> <li>• Accessories required for assembly i.e. cables, fasteners, connectors etc</li> <li>• Using of hand tools</li> <li>• Using of measuring instruments</li> <li>• Understanding engineering drawing</li> <li>• Reading electronic symbols</li> </ul>	PPTs of various hand tools and measuring instruments, Electronic components – resistor, capacitor, diode, IC etc., cables, fasteners, connectors, mechanical drawings
4	<b>Assemble and wire up electronic equipment and systems to mechanical equipment</b>  <b>Theory Duration</b> (hh:mm) 27:00  <b>Practical Duration</b> (hh:mm) 95:00  <b>Corresponding NOS Code</b> ISC/N1101	<ul style="list-style-type: none"> <li>• Reading wiring diagram</li> <li>• Making cable assembly</li> <li>• Stripping and crimping of cable</li> <li>• Marking on cable</li> <li>• How to do soldering</li> <li>• PCB assembly</li> <li>• Assembling PCB board with mechanical equipment</li> <li>• Loading software in the equipment</li> <li>• Testing measure and control equipment</li> <li>• Analysing and reporting test results</li> <li>• Calibrating measure and control equipment</li> <li>• Escalating unsolved problem as per protocol</li> <li>• Process compliances</li> </ul>	PPTs of wiring diagrams, cable assembly procedure, stripping and crimping, soldering, electronic components assembly with mechanical equipment
5	<b>Use basic health and safety practices at the workplace</b>  <b>Duration</b> (hh:mm) 04:00  <b>Practical Duration</b> (hh:mm) 08:00  <b>Corresponding NOS Code</b> ISC/N0008	<ul style="list-style-type: none"> <li>• Health and safety procedures</li> <li>• Fire safety procedures</li> <li>• Emergencies, rescue and first aid procedures</li> </ul>	PPE, Different Type of Safety Sign, First Aid Box, Safety instrument and clothing, Step Ladder, Sample Accident reports, Fire Extinguishers, Items required for fire extinguisher and fire Safety
6	<b>Work effectively with others</b>	<ul style="list-style-type: none"> <li>• Ensure appropriate communication with superiors, peers and others as applicable at work place</li> <li>• Demonstrate appropriate behaviour and</li> </ul>	Communication skills PPTs, Posters Team management



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<b>Theory Duration</b> (hh:mm) 03:00 <b>Practical Duration</b> (hh:mm) 05:00  <b>Corresponding NOS Code</b> ISC/N0009	etiquette at work place	posters
	<b>Total Duration</b>  <b>Theory Duration</b> 80:00  <b>Practical Duration</b> 220:00	<b>Unique Equipment Required:</b> <ul style="list-style-type: none"> <li>• Sample Electrical Drawing, Blueprints,</li> <li>• Basic Electrician Tools and Equipment's,</li> <li>• Hand tools such as wire stripper, crimper, soldering iron etc.</li> <li>• Precessions measuring instruments such as ammeter, voltmeter calliper &amp; various gauges</li> <li>• Different types of cables, connectors, fasteners etc.</li> <li>• Different types of electronic components such as resistor, capacitor, diode, transistor, PCB etc.</li> <li>• Temperature (e.g. bi-metallic, thermocouples, resistance, infra-red, thermal imaging)</li> <li>• Detection and alarm (e.g. smoke, heat, gas, chemical, water, metal)</li> <li>• speed controller, AC motor control systems, stepper motors, invertors)</li> <li>• Vibration monitoring (e.g. vibration switches, proximity probes, seismic velocity transducer, linear variable differential transformers, portable data collectors)</li> <li>• Sample Documents,</li> <li>• Sample quality Controlling formats</li> <li>• Personal protective Equipment's and clothes</li> <li>• Different Type of Safety Sign, First Aid Box, Safety instrument and clothing,</li> <li>• Step Ladder, Sample Accident reports ,</li> <li>• Fire Extinguishers,</li> <li>• Items required for fire extinguisher and fire Safety</li> </ul>	

Grand Total Course Duration: **300Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Indian Iron and Steel Sector Skills Council](#))



## Trainer Prerequisites for Job role: “Fitter Electronics assembly” mapped to Qualification Pack: “ISC/Q1101”

Sr. No.	Area	Details
1	<b>Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q1101”.
2	<b>Personal Attributes</b>	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	<b>Minimum Educational Qualifications</b>	Min. ITI Electrical pass and preferably passed from Craftsman Training Institute/Advanced Training Institute or Diploma Electrical
4a	<b>Domain Certification</b>	Certified for Job Role: “Fitter –Electronics assembly” mapped to QP: “ISC/Q1101”. Minimum accepted score as per respective IISSC guidelines.
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1101”. Minimum accepted score as per respective IISSC guidelines
5	<b>Experience</b>	Min. 5 years industry experience and minimum 2 years’ experience as Trained or untrained for same Job Role/ Trade



## Annexure: Assessment Criteria

<b>Assessment Criteria</b>	
<b>Job Role</b>	<b>Iron &amp; Steel - Fitter Electronics assembly</b>
<b>Qualification Pack</b>	<b>ISC/Q1101</b>
<b>Sector Skill Council</b>	<b>Indian Iron &amp; Steel Sector Skill Council</b>

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.
5	To pass the Qualification Pack , every trainee should score a minimum of 60% in every NOS.
6	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.

Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
<b>ISC/N1101: Understanding job requirements</b>	PC1. Adhere to procedures or systems in place for safety, including personal protective equipment (PPE), other relevant health and safety regulations and guidelines	<b>250</b>	15	6	9
	PC2. Ensure that the components are free from damage, foreign objects, dirt or other contamination		15	6	9
	PC3. Check that tools and equipment to be used are in a safe, tested, calibrated and usable condition		20	8	12
	PC4. Where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (e.g. the use of grounded wrist straps and mats)		20	8	12





Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	<p>PC5. Follow the relevant instructions, assembly drawings and any other specifications. Documents during the assembly activities:</p> <ul style="list-style-type: none"> <li>• Assembly drawings and charts</li> <li>• Interconnection net diagrams</li> <li>• Schedules of specified components</li> <li>• Wiring specifications</li> <li>• Wire running lists</li> </ul>		50	20	30
	<p>PC6. Ensure that the specified components are available and that they are in a usable condition. Prepare components and complete the preparatory assembly:</p> <ul style="list-style-type: none"> <li>• Use hand tools/automated tools for securing all fastenings</li> <li>• Assemble sub-units to support housings</li> <li>• Assemble connectors and allied devices</li> </ul>		60	24	36
	<p>PC7. Obtain, check and prepare consumables and specialized tools to be used for the wiring and interconnections. Check and prepare consumables and tools:</p> <ul style="list-style-type: none"> <li>• Older and any associated fluxes (e.g. Sufficient quantity, right type, good condition)</li> <li>• Wire strippers and cutters (e.g. Right size, good condition)</li> <li>• Authorized crimp tooling and attachments (e.g. Checked for sizes,</li> </ul>		70	28	42



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	calibration and condition) <ul style="list-style-type: none"> <li>• Cables and individual wiring/fibre optic links (e.g. Correct sizes and types, good condition)</li> <li>• Cable strapping obtained and cut to nominal length (e.g. Right sizes and sufficient quantities)</li> </ul>				
	<b>NOS Total Marks</b>	<b>Total</b>	<b>250</b>	<b>100</b>	<b>150</b>
<b>ISC/N1101: Assemble and wire up electronic equipment and systems to mechanical equipment</b>	PC8. Use the appropriate methods and techniques to assemble the components in their correct positions. <p>Methods and techniques:</p> <ul style="list-style-type: none"> <li>• Set up, programme and use automated wiring termination equipment (where appropriate)</li> <li>• Attach wire terminations by appropriate method/s (e.g. Soldering, crimping)</li> <li>• Set out/position interconnection wiring</li> <li>• Bundle/strap/tie wiring looms and cables</li> <li>• Cut wires to required length</li> <li>• Set out and terminate any fibre optic links</li> <li>• Strip insulation from ends of wires assemble electronic equipment or systems, in compliance with one or more of the following:               <ul style="list-style-type: none"> <li>○ National and international wiring regulations</li> <li>○ National and international standards</li> <li>○ Company standards and procedures</li> </ul> </li> </ul>	<b>400</b>	80	27	53



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC9. Secure the components using the specified connectors and securing devices		30	12	18
	PC10. Obtain, check and prepare components, and complete the preparatory assembly		30	12	18
	PC11. Check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification. Preliminary checks on the completed work for the following: <ul style="list-style-type: none"> <li>• Security of all assembled and interconnected items</li> <li>• Insulation resistance between housing assembly and interconnection wiring</li> <li>• Continuity of all interconnections</li> <li>• Unwanted short circuits between wires</li> </ul>		80	27	53
	PC12. Select the appropriate software		20	8	12
	PC13. Load appropriate software on electronic components in accordance with laid down procedures		25	9	16
	PC14. Check the output of software as per procedure		25	9	16
	PC15. Check the functionality of the completed electronic assembly		25	9	16
	PC16. Leave the work area in a safe and tidy condition on completion of the electrical equipment assembly activities use the correct issue of drawings, job		20	8	12



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	instructions and specifications.				
	PC17. Follow risk assessment procedures and regulations		15	6	9
	PC18. Follow clean work area protocols		15	6	9
	PC19. Carry out the assembling and wiring activities in line with organizational procedures		15	6	9
	PC20. Create and store records of the activities, in accordance with appropriate procedures		20	8	12
	<b>NOS Total Marks</b>	<b>Total</b>	<b>400</b>	<b>147</b>	<b>253</b>
<b>ISC/N0008: Use basic health and safety practices at the workplace</b>	PC1. Use protective clothing/equipment for specific tasks and work conditions	<b>200</b>	10	3	7
	PC2. State the name and location of people responsible for health and safety in the workplace		10	3	7
	PC3. State the names and location of documents that refer to health and safety in the workplace		12	5	7
	PC4. Identify and rectify the problem areas during the functional tests		10	3	7
	Identify job-site hazardous work and state possible causes of risk or accident in the workplace		16	7	9
	PC5. Carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		10	3	7
	PC6. State location of general health and safety equipment in the workplace		10	3	7



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		12	5	7
	PC8. Work safely in and around trenches, elevated places and confined areas		10	3	7
	PC9. Lift heavy objects safely using correct procedures		10	3	7
	PC10. Apply good housekeeping practices at all times		12	5	7
	PC11. Identify common hazard signs displayed in various areas		5	2	3
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		10	3	7
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		5	2	3
	PC14. Demonstrate rescue techniques applied during fire hazard		10	3	7
	PC15. Demonstrate good housekeeping in order to prevent fire hazards		5	2	3
	PC16. Demonstrate the correct use of a fire extinguisher		5	2	3
	PC17. Demonstrate how to free a person from electrocution		5	2	3
	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		5	2	3
	PC19. Demonstrate basic techniques of		5	2	3
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		5	2	3
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated		4	2	2



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	environments				
	PC22. Administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		4	2	2
	PC23. Demonstrate the artificial respiration and the CPR Process		10	3	7
	PC24. Participate in emergency procedures				
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible				
	PC26. Demonstrate correct method to move injured people and others during an emergency				
	<b>NOS Total Marks</b>	<b>Total</b>	<b>200</b>	<b>72</b>	<b>128</b>
<b>ISC/N0009: Work effectively with others</b>	PC1. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	<b>100</b>	10	5	5
	PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	5	5
	PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand		10	0	10
	PC4. Display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	5	5
	PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	5	5



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC6. Display appropriate communication etiquette while working		10	0	10
	PC7. Display active listening skills while interacting with others at work		10	0	10
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	5	5
	PC9. Demonstrate responsible and disciplined behaviors at the workplace		15	5	10
	PC10. Escalate grievances and problems to		5	0	5
	<b>NOS Total Marks</b>		<b>100</b>	<b>30</b>	<b>70</b>
	<b>Grand Total</b>		<b>1000</b>	<b>344</b>	<b>656</b>
	<b>Percentage Weightage:</b>			<b>50%</b>	<b>50%</b>
	<b>Minimum Pass% to qualify (aggregate):</b>			<b>60%</b>	