

# Model Curriculum

## Fitter-Electrical and Electronic Assembly

### Fitter-Electrical and Electronic Assembly

SECTOR: **CGSC**  
SUB-SECTOR: **Machine Tools**  
**Plastics Manufacturing Machinery**  
**Textile Manufacturing Machinery**  
**Process Plant Machinery**  
**Electrical And Power Machinery**  
OCCUPATION: **Fitter And Assembly**  
REFERENCE ID: **CSC/Q 0305**  
NSQF LEVEL: **3**



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# Fitter-Electrical and Electronic Assembly

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Fitter-Electrical and Electronic Assembly”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Fitter-Electrical And Electronic Assembly</b>		
<b>Qualification Pack Name &amp; Reference ID.</b>	CSC/Q 0305		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	25 – 12 – 2015
<b>Pre-requisites to Training</b>	Minimum qualification – Diploma(10 <sup>th</sup> +)- Electrical or Electronics		
<b>Training Outcomes</b>	<p><b>After completing this programme, participants will be able to:</b></p> <ul style="list-style-type: none"> <li>• <b>Assemble and wire up electrical components to mechanical components:</b> follow relevant instructions from assembly drawings etc and assemble electrical components on panels or in enclosure in compliance with national and international standards using appropriate methods and techniques.</li> <li>• <b>Assemble and wire up electronic equipment and systems to mechanical equipment:</b> follow relevant instructions from assembly drawings etc and assemble components in their correct position using appropriate techniques and software as per national and international standards.</li> <li>• <b>Work safely following health and safety standards:</b> check tools and equipment are in safe, tested, calibrated and usable condition. Take appropriate precautions to eliminate electrostatic discharge hazards.</li> </ul>		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “CSC/Q 0305” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Theory Duration (hh:mm)	Practical Duration (hh:mm)	Key Learning Outcomes	Corresponding NOS Code	Equipment Required
1	Perform Assemble and wire up electrical components to mechanical equipment	40:00	110:00	<ul style="list-style-type: none"> <li>• Understand main features and wire up electrical Components and accessories that can be used.</li> <li>• Identify and obtain job specifications from valid sources like</li> </ul>	CSC/N 0305	cable ties, clips, plastic strapping, lacing, harnessing, sleeves or grommets, spade end, loops, tags and pins single core, screened, twisted pair/ribbon,



				<p>approved sketches / illustrations, and identify raw material, measuring and cutting tools and their calibration, dimensions, limits and tolerances, surface finish, shapes, cycle time and production rates. Understand types of measurements and dimensions like lengths, depths, flatness, surface finish, squareness,, parallelism, hole size/fit, angles And recesses, runout and roundness .</p> <ul style="list-style-type: none"> <li>Preparation of work areas for insulation stripping; securing wires and cables (eg. cable ties, clips, plastic strapping, lacing, harnessing); cable routing; cable forming/bending; adding cable protection (eg. sleeves or grommets);drives and PLC , lamps, LEDs , insulated tools, rubber matting and isolating transformers making screwed/clamped connections; installing and terminating pre-formed looms,making crimped connections (eg. spade end, loops, tags and pins); marking or color coding wires/cables; applying sealants/adhesives; making soldered</li> </ul>	<p>multicore, fibre-optic, data/communication , laminated copper, braided copper, sensors; contactors; capacitors; plugs/sockets; overload and other relays; resistors; grommets/grommet strip ,Cutting tools measuring tools , Hand Tools , PPE , etc.</p>
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				<p>connections .</p> <ul style="list-style-type: none"> <li>• Basic daily maintenance of machine and good housekeeping activities like removing and disposing swarf, keeping work areas free from foreign objects and dirt, machine lubrication , transformers; rectifiers; generators; invertors .</li> <li>• Understand the different work holding devices like other tools datum/centre lines, lines (perpendicular, parallel), circles, profiles (square/rectangular, radial, angles/angular), hole positions (radial, linear), allowances for bending, simple pattern development Measuring and marking tools: rules/tapes, dividers/trammels, scribes, punches, scribing blocks, squares, protractor, depth/internal/external micrometers, calipers (vernier, inside and outside, depth), gauges (height Vernier, feeler, bore/hole, slip, radius/profile, thread, plug), stick micrometers, dial stand and comparator, vee block with u-clamp, optical instruments .</li> </ul>	
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				<ul style="list-style-type: none"> <li>• Fixing and unfixing the job piece using predetermined fixtures or work holding devices and measure the critical parameters of component after trial run. Correct the adjustment.(hacksaws; hammers; punches; screwdrivers; sockets; wrenches; spanners; scrapers; chisels; gouges; files; taps; vices and clamps etc)</li> <li>• Perform electrical Assembly operations using different components like national and international wiring regulations , Standards and procedures and company standards and procedures ,test operation, panels to mount electrical components , single core, screened , twisted pair /ribbon, multicore , fibre-optic, data communication , laminated copper , braided copper</li> <li>• Produce quality components using visual inspection for measuring and marking out tools and equipment , visual checking for completeness and freedom from damage</li> </ul>	
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				to conductors , security , electrical continuity and earth continuity , wiring activities , electrical assembly , range of variables.		
2	Assemble and wire up electronic equipment and systems to mechanical equipment	40:00	110:00	<ul style="list-style-type: none"> <li>• Understand main features and wire up electronic Components and accessories that can be used.</li> <li>• Identify and obtain job specifications from valid sources like approved sketches / illustrations, and identify raw material, measuring and cutting tools and their calibration, dimensions, limits and tolerances, surface finish, shapes, cycle time and production rates. Understand</li> <li>• length, area and volume; force, energy, power, pressure &amp; stress; electrical potential; capacitance, inductance; charge &amp; flux, magnetic flux, flux density; electrical resistance; frequency; temperature; current</li> <li>• Preparation of work areas for</li> <li>• insulation stripping; solder and any associated fluxes (eg. sufficient quantity, right type, good condition and shelf life assessment); wire strippers and cutters (eg. right size, good</li> </ul>	CSC/N 0306	Returning tools and equipment, in/lead soldering; lead-free soldering systems; no-wash fluxing; crimping, heat shrink sleeves, strapping, cable ties, p-clips), resistors, capacitors, diodes, integrated circuits , PCBs, transformers



				<p>condition); authorized crimp tooling and attachments (eg. checked for sizes, calibration and condition); cables and individual wiring/fibre optic links (eg. correct sizes and types, good condition); cable strapping obtained and cut to nominal length (eg. right sizes and sufficient quantities) .</p> <ul style="list-style-type: none"> <li>• Basic daily maintenance of machine and good housekeeping activities like removing and disposing swarf, keeping work areas free from foreign objects and dirt, machine lubrication , transformers; rectifiers; generators; invertors .</li> <li>• Understand the different work holding devices like other tools datum/centre lines, lines (perpendicular, parallel), circles, profiles (square/rectangular, radial, angles/angular), hole positions (radial, linear), allowances for bending, simple pattern development Measuring and marking tools: rules/tapes, dividers/trammels, scribes, punches, scribing blocks, squares, protractor,</li> </ul>	
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				<p>depth/internal/external micrometers, calipers (vernier, inside and outside, depth), gauges (height Vernier, feeler, bore/hole, slip, radius/profile, thread, plug), stick micrometers,.</p> <ul style="list-style-type: none"> <li>Fixing and unfixing the job piece using predetermined fixtures or work holding devices programmed and use automated wiring termination equipment (where appropriate); attach wire terminations by appropriate method/s (eg. soldering, crimping); set out/position interconnection wiring; bundle/strap/tie wiring looms and cables; cut wires to required length; set out and terminate any fibre optic links; strip insulation from ends of wires; termination identification (e.g. ferruling, transfer printing); tin/lead soldering; lead-free soldering systems; no-wash fluxing; crimping , use hand tools/automated tools for securing all fastenings; assemble sub-units to support housings/brackets; assemble connectors and allied devices</li> </ul>	
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				<ul style="list-style-type: none"> <li>• Perform electronic Assembly operations using different components like national and international wiring regulations , Standards and procedures and company standards and procedures ,test operation, panels to mount electrical components , single core, screened , twisted pair /ribbon, multicore , fibre-optic, data communication , laminated copper , braided copper ,</li> <li>• Produce quality components using visual inspection for measuring and marking out tools and equipment ,security of all assembled and interconnected items; insulation resistance between housing assembly and interconnection wiring; continuity of all interconnections; unwanted short circuits between wires, soldering tools and equipment, crimp tools, testing and checking equipment for continuity, short circuit testing, joint/crimp `pull-off' security, insulation resistance.</li> </ul>		
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3	Use basic health and safety practices at the workplace	30	70	<ul style="list-style-type: none"> <li>• Understand importance of complying health safety and environmental regulation at work place.</li> <li>• Understand check tools and equipment are in safe, tested, calibrated and usable condition. Take appropriate precautions to eliminate electrostatic discharge hazards.</li> <li>• Be able to identify job site hazards like sharp edged heavy tools, gas cylinders, welding radiations, chemicals, fumes, obstructions in corridors, naked wires / cables etc</li> <li>• Understand: Different types of fire; use of appropriate fire extinguishers risk and accidents; safe working practices and methods of accident prevention at work place</li> <li>• Importance of using protective clothing like leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuffless (without folds), trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs,</li> </ul>	CSC/ N 1335	Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.
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				<p>safety boots, knee pads, particle masks, glasses/goggles/visors ,hand shields, machine guards, residual current devices, shields, dust sheets, respirator etc.</p>		
4	Work effectively with others	40	60	<ul style="list-style-type: none"> <li>• Able to receive and pass information from and to authorised persons and seeking clarification from authorized persons where required.</li> <li>• Able to communicate by avoiding use of abusive language; display respect to others.</li> <li>• Respect others time by completing given task in time, avoiding gossip and avoid conflict.</li> </ul>	CSC/N 1336	

<b>Total Duration:</b> <b>500</b>	<b>Theory</b> <b><u>150</u></b>	<b>Practical</b> <b><u>350</u></b>	<p><b>Unique Equipment Required:</b></p> <p>cable ties, clips, plastic strapping, lacing, harnessing , sleeves or grommets , spade end, loops, tags and pins single core, screened, twisted pair/ribbon, multicore, fibre-optic, data/communication, laminated copper, braided copper, returning tools and equipment, in / lead soldering; lead-free soldering systems; no-wash fluxing; crimping, heat shrink sleeves, strapping, cable ties, p-clips), resistors, capacitors, diodes, integrated circuits , PCBs, transformers ,sensors; contactors; capacitors; plugs/sockets; overload and other relays; resistors; grommets/grommet strip ,Cutting tools measuring tools , Hand Tools , PPE , etc.</p> <p>Sample Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.</p>
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Grand Total Course Duration: **500 Hours 00 Minutes**

*(This syllabus/ curriculum has been approved by Capital Goods Sector Skill Council.*



### Annexure1: Assessment Criteria

<b>Assessment Criteria for Fitter-Electrical and Electronic Assembly</b>	
<b>Job Role</b>	<b>Fitter-Electrical and Electronic Assembly</b>
<b>Qualification Pack</b>	<b>CSC/Q 0305</b>
<b>Sector Skill Council</b>	<b>Capital Goods Skill Council (CGSC)</b>

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has been created based on the NOSs and performance criteria by CGSC. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly. CGSC has laid down the proportion of marks for Skills (Practical) , Theory/Knowledge and Behaviour for each PC.
2	The assessment of the theory/knowledge will be based on written test/viva-voce or both while skill test shall be hands on practical.
3	The assessment shall be done as per the assessment guides devised by CGSC in coordination with the assessment agencies. Assessment guides consists of a unique question papers for theory/knowledge and the method of assessments and evidence collection and detailed marking.
4	To pass the Qualification Pack, every trainee should score a minimum of 70% in Skill, 60% in Knowledge OR as per guidelines applicable from time to time.
5	.....
6	.....

Sr. No.	NOS No.	NOS Name	Total Marks	Marks Allocation: Skills	Marks Allocation: Knowledge	Marks Allocation: Behaviour
1	CSC/ N 0305	Assemble and wire up electrical components to mechanical equipment	100	77	23	..
2	CSC/N 0306	Assemble and wire up electronic equipment and systems to mechanical equipment	100	78	22	
3	CSC/N 1335	Use basic health and safety practices at the workplace	100	64	36	..
4	CSC/N 1336	Work effectively with others	100		30	70
	<b>Total:</b>		<b>400</b>	<b>219</b>	<b>111</b>	<b>70</b>
	<b>Percentage Weightage:</b>			<b>70</b>	<b>20</b>	<b>10</b>
	<b>Minimum Pass% to qualify:</b>			<b>70</b>	<b>60</b>	<b>60</b>



**Annexure2: Trainer Prerequisites for Job role: “Fitter-Electrical and Electronic Assembly ” mapped to Qualification Pack: “CSC /Q 03003”**

Sr. No.	Area	Details
1	<b>Job Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack <u>“CSC/Q 0305”</u> .
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>	Preferably Diploma/Degree in Mechanical Engineering
4a	<b>Domain Certification</b>	Certified for Job Role: “Fitter-Electrical and electronic assembly” mapped to QP: <u>“CSC /Q 0305”</u> with Minimum acceptance score of 85 %.
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402” with Minimum accepted score of 85%. Alternatively, must have successfully undergone a CGSC organized TOT workshop on “How to Trainer”.
5	<b>Experience</b>	Minimum 2 to 3 years of industry experience in relevant job role and a Minimum of 2 to 3 years and Training experience in relevant job role.



**Capital Goods Skill Council**

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