



Model Curriculum

DISTRIBUTION LINEMAN

SECTOR: POWER
SUB-SECTOR: DISTRIBUTION
OCCUPATION: LINEMAN
REF ID: PSS/Q0102, VERSION 1.0
NSQF LEVEL: 4



**Certificate
COMPLIANCE TO
QUALIFICATION PACK- NATIONAL OCCUPATIONAL
STANDARDS**

is hereby issued by the

POWER SECTOR SKILL COUNCIL

for

MODEL CURRICULUM

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'Distribution Lineman'** QP No. **'PSS/ Q0102 NSQF Level 4'**

Date of Issuance :
Valid Up to* :

*Valid up to the next review date of the Qualification Pack or the
"Valid up to" date mentioned above (whichever is earlier)

**Authorised Signatory
(Power Sector Skill Council)**



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DISTRIBUTION LINEMAN

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Distribution Lineman”, in the “Power” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Distribution Lineman		
Qualification Pack Name & Reference ID.	Distribution Lineman		
Version No.	1.0	Version Update Date	26-03 -2017
Pre-requisites to Training	8th pass		
Training Outcomes	<ul style="list-style-type: none">• Gain familiarity with distribution Trade: General introduction to trade, basic unit of measurement, role of a lineman during maintenance activities.• Become well versed with Environment Health & Safety: Well versed with health and safety measures in terms of personal safety and equipment safety relevant to lineman maintenance occupation.• Identify and use basic tools, equipment & materials: Effectively identify, select & use the specified tools and equipment relevant to line and substation maintenance works. Standard Procedures for material handling.• Handle Material & Store rightly: Right method stacking of relevant materials used for pole, transformer and other substation activities.		



This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Distribution Lineman” Qualification Pack issued by “Power Sector Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 01:00</p> <p>Corresponding NOS Code PSS N 0105</p>	<ul style="list-style-type: none"> • Functions of Power Distribution Companies • Relevant Legislation, Electricity act 2003, CERC, SERC. • Job role and responsibilities, Employment Terms, Employment opportunities. 	
2	<p>Basic of Electricity</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 03:00</p> <p>Corresponding NOS Code PSS N 0105</p>	<ul style="list-style-type: none"> • Explain the basic key concepts of Voltage, Current, Capacitance, Resistance, KVA, KWh. • Elements of power systems, transmission, distribution and generations. 	<p>Voltmeter, Ammeter, Multimeter,</p> <p>Wattmeter, Resistor etc</p>
3	<p>Distribution Line Works (Materials and Accessories)</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 32:00</p> <p>Corresponding NOS Code PSS N 0105</p>	<ul style="list-style-type: none"> • To be able to identify material and accessories for the distribution lines. 	<p>Screw driver, combination plier, measuring tape, roller stool, chain pulley, come along clamp</p>
4	<p>11 KV Distribution Transformer Substation (Materials & Accessories)</p>	<ul style="list-style-type: none"> • To understand the functioning of 11Kv distribution transformer and various accessories including AB switches. 	<p>Distribution Transformer, Lightning Arrestors, AB Switch, Drop Out fuse</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 33:00</p> <p>Corresponding NOS Code PSS N 0107</p>		
5	<p>Tools & Equipments</p> <p>Theory Duration (hh:mm) 14:00</p> <p>Practical Duration (hh:mm) 34:00</p> <p>Corresponding NOS Code PSS N 0105</p>	<ul style="list-style-type: none"> Familiarity with usage of various kinds of tools and equipments used in distribution lines and 11Kv substation 	Screw driver, combination plier, measuring tape, roller stool, chain pulley, come along clamp
6	<p>11Kv Distribution line maintenance</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 40:00</p> <p>Corresponding NOS Code PSS/N0105</p>	<ul style="list-style-type: none"> To identify and adopt correct maintenance procedure for 11Kv distribution lines. To understand pole mounted substation and different equipments used. 	
7	<p>11Kv Distribution Transformer Maintenance</p> <p>Theory Duration (hh:mm) 15:00</p>	<ul style="list-style-type: none"> To identify and adopt correct maintenance procedure for distribution transformer. To identify different types of faults. 	Oil testing kits, Tripod, Chain pulley, Megger

	<p>Practical Duration (hh:mm) 40:00</p> <p>Corresponding NOS Code PSS N 0107</p>		
8	<p>Basic Health & Safety practices for power related work</p> <p>Theory Duration (hh:mm) 16:00</p> <p>Practical Duration (hh:mm) 36:00</p> <p>Corresponding NOS Code PSS N 2001</p>	<ul style="list-style-type: none"> To understand basic health and safety practices covering CEA safety regulations 2010, issue of permit to work etc. Usage of PPE Fire fighting, First-Aid 	<p>Helmet, Gloves, Discharge rod, Safety rope, rubber mat, fire extinguisher, ladder, Neon tester</p>
9	<p>Soft Skills</p> <p>Theory Duration (hh:mm) 21:00</p> <p>Practical Duration (hh:mm) 14:00</p> <p>Corresponding NOS Code CSC/N1336</p>	<ul style="list-style-type: none"> To work effectively in a team. Effective communication, good interpersonal relation, discipline behaviour, developing a positive attitude and building self-confidence. 	<p>Helmet, Gloves, Discharge rod, Safety rope, rubber mat, fire extinguisher, ladder, Neon tester</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Total Duration:</p> <p>Theory Duration 117:00</p> <p>Practical Duration 233:00</p>	<p>Megger, Multimeter, Come along clamp, portable electric drill machine, Tripod, Discharge rod, oil testing kit, discharge rod, Helmet, Gloves, Discharge rod, Safety rope, rubber mat, fire extinguisher, ladder, Neon tester. etc.</p>	

Grand Total Course Duration: 350 Hours 00 Minutes

(This syllabus/ curriculum has been approved by POWER SECTOR SKILL COUNCIL)

Trainer Prerequisites for Job role: “Distribution Lineman” mapped to

Qualification Pack: “PSSC/Q 0102”

1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>PSSC/Q 0102</u> ”
2	Personal Attributes	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	Minimum Educational Qualifications	ITI Electrician (Minimum) but preferably B.Tech(Electrical),3 year Diploma Electrical Engineering.
4a	Domain Certification	Certified for Job Role: “ <u>Distribution Lineman</u> ” mapped to QP: “ <u>PSSC/Q 0102</u> ”. Minimum accepted score as per PSSC guidelines – 70%.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “ <u>SSC/Q1402</u> ”. Minimum accepted score as per PSSC guidelines – 70%.
5	Experience	<p>Engineer B.Tech. (Electrical) with at least 1-year relevant experience in power distribution either in the Power Distribution utility or with the turnkey /EPC contractors of the power distribution companies carrying out the work of erection of power distribution lines and sub stations etc.</p> <p>3 years Diploma in Electrical Engineering with at least 2-3 years’ relevant experience in power distribution either in the Power Distribution utility or with the turnkey /EPC contractors of the power distribution companies carrying out the work of erection of power distribution lines and sub stations etc.</p> <p>ITI Electrician with at least five-year relevant experience in power distribution either in the Power Distribution utility or with the turnkey /EPC contractors of the power distribution companies carrying out the work of erection of power distribution lines and sub stations etc.</p>

Annexure: Assessment Criteria

Assessment Criteria for Consumer Energy Meter	
Job Role	Distribution Lineman
Qualification Pack	PSS/Q 0102
Sector Skill Council	Power SSC

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 this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 70% 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 (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
1. PSS/ N 0105: REPAIR AND MAINTENANCE OF SUB-STATION, POWER DISTRIBUTION LINES AND COMPONENTS	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
	PC2. adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for electrical and related operations		3	1	2
	PC3. work following laid down procedures and instructions		2	1	1
	PC4. ensure that all tools, equipment, etc. are in a safe and usable condition and are kept at secured location		1	0	1
	PC5. ensure work area is clean and safe from hazards before and after the job is completed		1	0	1
	PC6. access and survey area in accordance with established procedures		3	1	2
	PC7. assess and confirm condition of pole structure and components based on Distribution line standards		4	2	2
	PC8. perform load checks to identify imbalanced and overloaded circuits		2	0	2
	PC9. identify hazards of trimming trees such as limits of approach, public safety and step and touch potential prior to commencing work		2	0	2
	PC10. conduct site inspection for emergency cases following established procedures		3	1	2
	PC11. identify various types of circuits		1	0	1

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	PC12. identify and acquire correct tools, equipment and instruments required for Distribution line assessment and inspection		1	0	1
	PC13. ensure the tools and equipment is well maintained, calibrated and approved for use		1	0	1
	PC14. use Distribution line tools, equipment and hardware in line with job requirements for maintenance operations		2	1	1
	PC15. prepare and maintain the work area as per procedure or operation specification		2	1	1
	PC16. switch off, isolate, discharge and earth (side) line cables		2	0	2
	PC17. confirm and/or obtain PTW/work permit (shut down) is taken to proceed to work from appropriate personnel in accordance with standard procedure		3	1	2
	PC18. Safely operate switchgears eg. on/off, earth, etc.		2	0	2
	PC19. perform off-line overhead line maintenance procedure according to job specifications and requirements		4	2	2
	PC20. perform off-line underground line maintenance procedure according to job specifications and requirements		4	2	2
	PC21. perform stay wire assembly as per requirements and specifications, safely and efficiently		4	2	2
	PC22. ensure lines are properly aligned by tightening appropriate nuts and bolts		2	0	2
	PC23. ensure proper clearance of lowest		2	0	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	conductor from ground				
	PC24. ensure guy insulators are of suitable capacity to the stay sets		2	0	2
	PC25. select and use test equipment such as tong testers/clip-on meter, meggers and voltmeters to verify fault and integrity		2	0	2
	PC26. sectionalize circuit to determine location of fault		2	0	2
	PC27. isolate fault, damage or hazard and restore power to customers using equipment such as switches		2	0	2
	PC28. repair conductor by splicing, jointing, using armor rods, line guards, vibration dampers		2	0	2
	PC29. check work carried out by team members and ensure it is as per standard requirement		4	2	2
	PC30. provide useful feedback regarding work matter to team members in a timely, polite and supportive manner		2	0	2
	PC31. report trouble and required actions such as repairs or replacements, and estimated repair time to system authority		2	0	2
	PC32. ensure pole dismantling and re-setting procedure is carried out as per standard procedure, where required		4	2	2
	PC33. carry out conductor stringing procedures, paving conductor on the ground along the pole taking into account permissible span length and sagging		3	0	3
	PC34. replace components such as transformers, disconnects, conductors, poles, switches, elbows and terminations and insulators safely and as per company procedure		3	1	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	PC35. replace other line components due to damage or unsuitability as per standard procedure, where required		3	1	2
	PC36. make connections and energize replaced underground cables, as per standard procedures where required		4	2	2
	PC37. restore system to normal operating status by using switching procedures		3	1	2
	PC38. deal promptly and effectively with problems within control, and seek help and guidance from the relevant people for problems that cannot be resolved		2	0	2
	PC39. leave the work area in a safe and tidy condition on completion of the repair and maintenance activities		2	0	2
	PC40. refer unresolved job related problems to appropriate personnel for support		2	0	2
	PC41. monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem		2	0	2
		Total	100	25	75
PSS/ N 0107: OPERATION AND MAINTENANCE OF 11/0.433 KV DISTRIBUTION SUBSTATION	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
	PC2. adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for Electrical and related operations		3	1	2
	PC3. work following laid down procedures and instructions		2	1	1

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	PC4. ensure that all tools, equipment, power cables are in a safe and usable condition and are kept at secured location		2	0	2
	PC5. ensure work area is clean and safe from hazards before and after the job is completed		2	0	2
	PC6. inspect the component to check if it is as per specification and without defects		3	1	2
	PC7. identify job requirements for specific operations as per instructions given from valid sources		3	1	2
	PC8. identify various components of the power system		2	1	1
	PC9. ensure equipment and tools required for installation work are identified, acquired, calibrated, suitable and approved for use		2	0	2
	PC10. identify, estimate and acquire correct materials required for the Substation erection and installation work		2	0	2
	PC11. follow standard specifications and procedures for installing a pole mounted distribution transformer		5	2	3
	PC12. ensure poles set to proper depth, and properly aligned		2	0	2
	PC13. carry out erection of channel on the double pole for preparation of transformer bed as per requirement		5	2	3
	PC14. fix lightening arrester as per requirement and standard procedure		4	2	2
	PC15. install earth connection as per standard procedure		3	1	2
	PC16. install cross arm as per specifications and		3	1	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	requirement				
	PC17. provide anti-climbing device on poles		2	0	2
	PC18. arrange to lift the transformer and put it on the transformer bed in a safe and efficient manner		3	0	3
	PC19. fit the Gang operating (GO Switch) and dropout fuse as per standard procedure		5	2	3
	PC20. follow applicable construction standards eg. REC construction standards, for carrying out the erection procedures		4	2	2
	PC21. connect low voltage cables as per standard procedures in a safe and efficient manner		3	1	2
	PC22. carry out low voltage able joints as per standard procedures, safely and effectively		3	1	2
	PC23. perform post-installation procedures for ensuring clean and safe environment in the work and surrounding area		2	0	2
	PC24. check Oil level and ensure leakages are attended to and arrested		2	0	2
	PC25. check Oil BDV and acidity at regular intervals as per schedule and standard procedure		3	1	2
	PC26. checking for sludge, dust, dirt ,moisture ion in oil and address it effectively in a timely fashion		2	0	2
	PC27. clean bushings regularly and inspect for any cracks		2	0	2
	PC28. check, note and rectify dust & dirt deposition, salt or chemical deposition, cement or acid fumes depositions		2	0	2
	PC29. check tap position and gap of arching horn and tighten connection as requirement to address any issues		3	1	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	PC30. check neutral grounding and ensure it is maintained as per standard		3	1	2
	PC31. periodically check for any loose connections of the terminations of HV & LV side		2	0	2
	PC32. examine the breather through colour of silica gel , if pink heat it or replace if necessary		2	0	2
	PC33. ensure facility is locked and warning signs are displayed effectively		2	0	2
	PC34. deal promptly and effectively with problems within control, and seek help and guidance from the relevant people for problems that cannot be resolved		3	0	3
	PC35. leave the work area in a safe and tidy condition on completion of the substation construction and maintenance activities		2	0	2
	PC36. refer unresolved job related problems to appropriate personnel for support		2	0	2
	PC37. monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem		2	0	2
		Total	100	30	70
PSS/ N 2001: USE BASIC HEALTH AND SAFETY PRACTICES FOR POWER RELATED WORK	PC1. use protective clothing/equipment for specific tasks and work conditions	100	3	0	3
	PC2. state the name and location of people responsible for health and safety in the workplace		2	0	2
	PC3. state the names and location of documents		2	0	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	that refer to health and safety in the workplace				
	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace		3	1	2
	PC5. follow electrical safe working procedures such as Tag out/Lock out, PTW (Permit To Work),		3	1	2
	PC6. follow warning signs (danger, out of service, etc.) while working with electrical systems		3	1	2
	PC7. use standard safe working practices when working at heights, confined areas and trenches		3	1	2
	PC8. test any electrical equipment and system using insulated testing devices before touching them		3	1	2
	PC9. ensure positive isolation of electrical equipment & system as per given standards		3	1	2
	PC10. recognize any abnormalities in electrical equipment or system installed alarm annunciation and/or noticing parameters from gauge/ indicator installed		3	1	2
	PC11. carry out safe working practices while dealing with hazards to ensure the safety of self and others		3	1	2
	PC12. state methods of accident prevention in the work environment of the job role		2	0	2
	PC13. state location of general health and safety equipment in the workplace		2	0	2
	PC14. inspect for faults, set up and safely use of scaffolds and elevated platforms and ladders		2	0	2
	PC15. lift, carry and transport heavy objects & tools safely using correct procedures from storage to		3	1	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	workplace and vice versa				
	PC16. inspect power plant and its equipment routinely for any signs of oil, water and/or steam leakage		3	0	3
	PC17. store flammable materials and machine lubricating oil safely and correctly		2	0	2
	PC18. check that the emission and pollution control devices are working properly in line with environmental policy standards		5	2	3
	PC19. apply good housekeeping practices at all times		3	1	2
	PC20. identify common hazard signs displayed in various areas		2	0	2
	PC21. retrieve and/or point out documents that refer to health and safety in the workplace		2	0	2
	PC22. inform relevant authorities about any abnormal situation/behavior of any equipment/system promptly		2	0	2
	PC23. use the various appropriate fire extinguishers on different types of fires correctly		3	1	2
	PC24. demonstrate rescue techniques applied during fire hazard		3	1	2
	PC25. demonstrate good housekeeping in order to prevent fire hazards		3	1	2
	PC26. demonstrate the correct use of a fire extinguisher		3	1	2
	PC27. demonstrate how to free a person from electrocution		3	1	2
	PC28. administer appropriate first aid to victims where required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		2	0	2

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	TOTAL MARKS	OUT OF	MARKS ALLOCATION	
				THEORY	SKILLS PRACTICAL
	PC29. demonstrate basic techniques of bandaging		3	1	2
	PC30. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		3	1	2
	PC31. perform and organize loss minimization or rescue activity during an accident in real or simulated environments		3	1	2
	PC32. 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		3	1	2
	PC33. demonstrate the artificial respiration and the CPR Process		3	1	2
	PC34. participate in emergency procedures		3	1	2
	PC35. complete a written accident/incident report or dictate a report to another person, and send report to person responsible		3	1	2
	PC36. demonstrate correct method to move injured people and others during an emergency		3	1	2
		Total	100	25	75
PSS/ N 1336 (WORK EFFECTIVELY WITH OTHERS)	PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	3	7
	PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	3	7
	PC3. give information to others clearly, at a pace and in a manner that helps them to understand		10	3	7
	PC4. display helpful behavior by assisting others in performing tasks in a		10	3	7

ASSESSMENT OUTCOME (NOS CODE AND DESCRIPTION)	ASSESSMENT CRITERIA (PC)	MARKS ALLOCATION			
		TOTAL MARKS	OUT OF	THEORY	SKILLS PRACTICAL
	positive manner, where required and possible				
	PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	3	7
	PC6. display appropriate communication etiquette while working		10	3	7
	PC7. display active listening skills while interacting with others at work		10	3	7
	PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	3	7
	PC9. demonstrate responsible and disciplined behaviors at the workplace		10	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict		10	3	7
	Total		100	30	70
	QP Total		400	110	290



Power Sector Skill Council
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