



Model Curriculum

QP Name: Tractor Service Mechanic

QP Code: AGR/Q1108

Version: 3.0

NSQF Level: 4

Model Curriculum Version: 2.0

Agriculture Skill Council of India || Agriculture Skill Council of India (ASCI), 6th Floor, GNG Tower, Plot No. 10, Sector - 44

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Training Parameters

| | |
|---|--|
| Sector | Agriculture |
| Sub-Sector | Agriculture Crop Production |
| Occupation | Farm Machinery, Equipment Operation and maintenance |
| Country | India |
| NSQF Level | 4 |
| Aligned to NCO/ISCO/ISIC Code | NC0-2015/7231.0300 |
| Minimum Educational Qualification and Experience | <p>Minimum Educational Qualification: 12th grade pass OR Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR 10th grade pass plus 2-year NTC OR 10th grade pass plus 1-year NTC plus 1 year NAC OR 8th pass plus 2-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th Grade Pass with 2-year relevant experience OR Previous relevant Qualification of NSQF Level 3.0 with minimum education as 8th Grade pass with 3- year relevant experience OR Previous relevant Qualification of NSQF Level 3.5 with 1.5- year relevant experience</p> |
| Pre-Requisite License or Training | NA |
| Minimum Job Entry Age | 18 Years |
| Last Reviewed On | 25/11/2021 |
| Next Review Date | 25/11/2024 |
| NSQC Approval Date | 25/11/2021 |
| QP Version | 3.0 |
| Model Curriculum Creation Date | 25/11/2021 |

| | |
|--|------------|
| Model Curriculum Valid Up to Date | 25/11/2024 |
| Model Curriculum Version | 2.0 |
| Minimum Duration of the Course | 390 Hours |
| Maximum Duration of the Course | 450 Hours |

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Describe the process of preparing for the tractor's repair and maintenance
- Demonstrate the process of performing routine checks on the tractor
- Demonstrate the process of carrying out repair and maintenance of the tractor's transmission, hydraulic and electrical systems
- Demonstrate the process of assembling various tractor engine parts and performing pre-start checks
- Explain the importance of practising inclusion and gender equality at the workplace
- Demonstrate various practices to maintain personal hygiene, cleanliness and safety at the workplace
- Demonstrate the process of carrying out repair and maintenance of moldboard plough, disc plough, disc harrow and cultivator

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|--|-----------------|--------------------|--|--|----------------|
| Bridge Module | 5:00 | 0:00 | 0:00 | 0:00 | 5:00 |
| Module 1: Introduction and Orientation to the Role of a Tractor Service Mechanic | 5:00 | 0:00 | 0:00 | 0:00 | 5:00 |
| AGR/N1126 Prepare for carry out tractor's repair and maintenance NOS Version 2.0 NSQF Level-4 | 15:00 | 10:00 | 0:00 | 0:00 | 25:00 |
| Module 2: Preparation for carrying out tractor's repair and maintenance | 15:00 | 10:00 | 0:00 | 0:00 | 25:00 |
| AGR/N1127 Perform routine checks and maintenance of tractor NOS Version 2.0 | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |

| | | | | | |
|--|--------------|--------------|-------------|-------------|--------------|
| NSQF Level-4 | | | | | |
| Module 3: Routine checks on the tractor | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |
| AGR/N1128 Carry out maintenance and repair of engine parts NOS Version 2.0 NSQF Level-4 | 15:00 | 45:00 | 0:00 | 0:00 | 60:00 |
| Module 4: Repair and maintenance of the engine parts | 15:00 | 45:00 | 0:00 | 0:00 | 60:00 |
| AGR/N1129 Carry out maintenance and repair of transmission, hydraulic and electrical systems NOS Version 2.0 NSQF Level-4 | 20:00 | 70:00 | 0:00 | 0:00 | 90:00 |
| Module 5: Repair and maintenance of the transmission hydraulic and electrical systems | 20:00 | 70:00 | 0:00 | 0:00 | 90:00 |
| AGR/N1130 Assemble the repaired and serviced parts NOS Version 2.0 NSQF Level-4 | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |
| Module 6: Assembly of the repaired and serviced engine parts | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |
| AGR/N9903 Maintain health and safety at the workplace NOS Version 3.0 NSQF Level-4 | 15:00 | 15:00 | 0:00 | 0:00 | 30:00 |
| Module 7: Hygiene and cleanliness | 3:00 | 3:00 | 0:00 | 0:00 | 6:00 |
| Module 8: Safety and emergency procedures | 12:00 | 12:00 | 0:00 | 0:00 | 24:00 |
| DGT/VSQ/N0102 Employability Skills NOS Version-1.0 NSQF Level-4 | 60:00 | 00:00 | 0:00 | 0:00 | 60:00 |

| | | | | | |
|-----------------------------------|---------------|---------------|-------------|-------------|---------------|
| Module 9: Employability Skills | 60:00 | 00:00 | 0:00 | 0:00 | 60:00 |
| Total Duration | 150:00 | 180:00 | 0:00 | 0:00 | 330:00 |
| OJT: 60 hours | | | | | |

Optional Modules

The table lists the modules and their duration corresponding to the Optional NOS of the QP.

Optional 1: Repair and maintenance of farm implements

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|-----------------|--------------------|--|--|----------------|
| AGR/N1119 Carry out maintenance and repair of farm implements NOS Version 2.0 NSQF Level-4 | 10:00 | 50:00 | 0:00 | 0:00 | 60:00 |
| Module 10: Repair and maintenance of farm implements | 10:00 | 50:00 | 0:00 | 0:00 | 60:00 |
| Total Duration | 10:00 | 50:00 | 0:00 | 0:00 | 60:00 |

Module Details

Module 1: Introduction and Orientation to the role of a Tractor Service Mechanic *Bridge Module*

Terminal Outcomes:

- State the role and responsibilities of a Tractor Service Mechanic.

| Duration: 5:00 | Duration: 0:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the size and scope of the agriculture industry and its sub-sectors. • State the role and responsibilities of a Tractor Service Mechanic. • Identify various employment opportunities for a Tractor Service Mechanic in the Agriculture industry. • Explain the importance of the individual's role in the workflow. | NA |
| Classroom Aids | |
| Training kit - Trainer guide, presentations, whiteboard, marker, projector, laptop, video films | |
| Tools, Equipment and Other Requirements | |
| NA | |

Module 2: Preparation for carrying out tractor's repair and maintenance

Mapped to AGR/N1126 v2.0

Terminal Outcomes:

- Identify the tools and equipment required for the repair and maintenance of a tractor.
- Describe the pre-repair and maintenance activities to be undertaken.

| Duration: 15:00 | Duration: 10:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the design and functions of different types of tractor. • Explain the basic terminology used for various tractor components and systems. • Explain the Dangerous Machines (Regulation) Act 1983. • State the importance of checking the previous repair and maintenance records. • List the tools and equipment required for the repair and maintenance of a tractor. • Explain the importance of using the manufacturer-approved tools and equipment for the repair and maintenance of a tractor. • Identify the appropriate conditions to carry out repair and maintenance of a tractor. | <ul style="list-style-type: none"> • Identify the given tractor's manufacturer and model correctly. • Demonstrate the activities involved in the preparation for the repair and maintenance of the tractor. • Demonstrate the correct use of the relevant tools, equipment and Personal Protective Equipment (PPE). |
| Classroom Aids | |
| Training kit (trainer guide, presentations), whiteboard, marker, projector, laptop | |
| Tools, Equipment and Other Requirements | |
| <p>Outside the classroom/workshop – Tractor, Major implements- Cultivator, Harrow, Rotary tiller, MB plough or Disc plough. General tools set – Ring spanner set, Open-end spanner set, socket spanner set, T handle, speed handle, Different size extensions, Screwdrivers, Allen key set, Mallet, Hammer set, Chisel, Different pliers –Circlip plier (Inner & outer), nose plier, Cutting plier, grip plier. Special service tools set –Pullers, Replacer, Drift and other tools recommended by manufacturer Machining tools –File set –Round, square (Rough & smooth), Drill bits, taps Equipment - machine vice, Air compressor, washing machine, power cutter, hand drilling machine, hydraulic jack, welding machine & pneumatic tools.</p> | |

Module 3: Routine checks on the tractor

Mapped to ARG/N1127 v2.0

Terminal Outcomes:

- Describe the process of conducting routine checks on a tractor.
- Demonstrate the process of conducting routine checks on a tractor.

| Duration: 10:00 | Duration: 20:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the process of performing routine checks on a tractor. • Explain different systems of a tractor and common faults experienced with them. • Explain the process of identifying faults with clutch, gears, breaks, steering and various tractor implements. • State the recommended level of engine oil, hydraulic oil, transmission oil, steering box oil, coolant and fuel. • Identify different types of breaks, electrical systems, clutches and steering systems. • Describe the process of checking for bleeding or airlocks in the fuel system. | <ul style="list-style-type: none"> • Demonstrate the process of examining the clutch, gears, brakes and steering for correct functioning. • Assess the fan belt for the prescribed level of tension. • Assess the engine oil, hydraulic oil, transmission oil, coolant and fuel for the prescribed levels. • Analyse the transmission, hydraulic and steering system for leakage. • Demonstrate the process of examining the tractor implements such as harrow, rotavator, seed drills for correct functioning. • Evaluate the performance of temperature gauge, low oil pressure warning lamp and hour meter. |
| Classroom Aids | |
| Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop | |
| Tools, Equipment and Other Requirements | |
| Tractor, General toolset, Operator’s manual, maintenance schedule chart, Service specifications, lubrication chart, Lubricant oil, grease, Filters Measuring Tools-Steel rule, measuring tape, Torque wrench, feeler gauge, tyre pressure gauge, Dial gauge, Hydrometer, Multimeter. Equipment: Water Washing unit, Greasing gun, Air compressor, Hydraulic or mechanical jack. | |

Module 4: Repair and maintenance of the engine parts

Mapped to AGR/N1128 v2.0

Terminal Outcomes:

- Describe the process of identifying malfunctions, wear and tear or damage in various tractor engine parts.
- Demonstrate the process of carrying out repair and maintenance of various tractor engine parts.
- Demonstrate the process of identifying and rectifying various issues in a diesel engine with the common rail fuel system.

| Duration: 15:00 | Duration: 45:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain various safety precautions to be undertaken during tractor repair and maintenance activities. • Explain the design and working principle of various tractor engine parts. • Describe the process of dismantling and re-assembling various tractor engine parts. • Identify various critical settings such as valve clearance, timing gears and Fuel Injection Pump (FIP) timing, etc. • Describe the repair and maintenance procedure for different components of a tractor engine. • Describe the procedure for the repair and maintenance a diesel engine with the common rail fuel system. • Explain the importance of maintaining the record of repair and maintenance activities. | <ul style="list-style-type: none"> • Identify the type of given tractor engine, its components and working mechanism. • Demonstrate the use of relevant tools, equipment and PPE for dismantling the tractor engine parts. • Analyse the dismantled parts for any malfunctions, wear and tear or damage such as the water temperature gauge, sensors, thermostat, valves, crankshaft/bearings, oil rings, etc. • Demonstrate the process of carrying out repair, maintenance and replacement of various engine parts. • Demonstrate the process of carrying out repair and maintenance of a diesel engine with the common rail fuel system. |
| Classroom Aids | |
| Training kit (Trainer guide, Presentations) | |
| Tools, Equipment and Other Requirements | |
| In the workshop: Tractor, engines with the stands, General tools set, Special service tools set, Measuring tools set, Service manual. Equipment like Water Washing unit, Greasing gun, Air compressor, Hydraulic or mechanical jack. | |

Module 5: Repair and maintenance of the transmission hydraulic and electrical systems

Mapped to AGR/N1129 v2.0

Terminal Outcomes:

- Describe the process of identifying the repair and maintenance needs of a tractor’s transmission, hydraulic and electrical systems.
- Demonstrate the process of carrying out repair and maintenance of the transmission, hydraulic and electrical systems.

| Duration: 20:00 | Duration: 70:00 |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the types and functions of hydraulic, transmission and electrical systems of a tractor. • Describe the sequence of checking a tractor’s transmission, hydraulic and electrical systems. • Identify different types of gear and power flow systems. • Explain the functioning of differential steering and power-take-off systems. • Identify different types of hydraulic pump, valve and cylinder. • Explain the functioning of different types of brakes and their functions. • Explain the working principle of the 3-point linkage system in a tractor. • Explain Pascal’s law of hydraulics. | <ul style="list-style-type: none"> • Demonstrate the process of disassembling and assembling the transmission, hydraulic and electrical systems in a tractor. • Evaluate the performance of the transmission, hydraulic and electrical systems. • Analyse various components of the transmission, hydraulic and electrical systems such as the gearbox, rear axle, hydraulic distributor, pipes, cylinder, RPM gauge, hour meter and fuel gauge for wear and tear or damage. • Demonstrate the process of carrying out repair and maintenance of the transmission, hydraulic and electrical systems in a tractor. • Demonstrate the use of relevant tools such as the multimeter and hydrometer. |
| Classroom Aids | |
| Training kit (Trainer guide, Presentations) | |
| Tools, Equipment and Other Requirements | |
| In the workshop: Tractor, Tractor aggregates with the stands 1. Clutch –Single, Dual & Independent, 2.Gear box, 3.Rear axle, 4.Hydraulics, 5.Steering – Mechanical & power steering units, 6. Hydraulic power lift unit Service manual or Training handout for reference General tools set, Special service tools set, Measuring tools set Equipment mechanical jack, Tractor splitting rail, hydraulic pressure gauge, Jib crane | |

Module 6: Assembly of the repaired and serviced engine parts

Mapped to AGR/N1130 v2.0

Terminal Outcomes:

- Demonstrate the process of carrying out cleaning of the tractor engine parts and assembling them.
- Demonstrate the process of performing pre-start checks on the tractor.

| Duration: 10:00 | Duration: 20:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the process of assembling various tractor parts after carrying out repair and maintenance. • Explain the process of cleaning various components of a tractor. • Describe the process of performing pre-start checks. • Explain the process of setting the draft control levers in the correct position. • Explain the importance of maintaining the correct air pressure in the tyres for various operations. • Describe the process of fitting the cage wheel and adjusting the track. | <ul style="list-style-type: none"> • Demonstrate the process of cleaning various tractor parts, shafts and bearings and applying lubricant. • Demonstrate the process of assembling various tractor parts after carrying out repair and maintenance. • Evaluate the tractor performance by performing the pre-start checks. • Demonstrate the process of carrying out repair and maintenance for the common faults identified during the pre-start checks. |
| Classroom Aids | |
| Training kit (Trainer guide, Presentations) | |
| Tools, Equipment and Other Requirements | |
| General service toolset, Special service tools set, Washing machine, Diesel, Grease. | |

Module 7: Hygiene and cleanliness

Mapped to NOS AGR/N9903 v3.0

Terminal Outcomes:

- Discuss how to adhere to personal hygiene practices.
- Demonstrate ways to ensure cleanliness around the workplace.

| | |
|--|--|
| Duration: 03:00 | Duration: 03:00 |
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the requirements of personal health, hygiene and fitness at work. • Describe common health-related guidelines laid down by the organizations/ Government at the workplace • Explain the importance of good housekeeping at the workplace. • Explain the importance of informing the designated authority on personal health issues related to injuries and infectious diseases. | <ul style="list-style-type: none"> • Demonstrate personal hygiene practices to be followed at the workplace. • Demonstrate the correct way of washing hands using soap and water, and alcohol-based hand rubs. • Demonstrate the steps to follow to put on and take off a mask safely. • Show how to sanitize and disinfect one's work area regularly. • Demonstrate adherence to the workplace sanitization norms. • Show how to ensure cleanliness of the work area. |
| Classroom Aids: | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| Tools, Equipment and Other Requirements | |
| Personal Protective Equipment, cleaning equipment and materials, sanitizer, soap, mask | |

Module 8: Safety and emergency procedures

Mapped to NOS AGR/N9903 v3.0

Terminal Outcomes:

- Describe how to adhere to safety guidelines.
- Show how to administer appropriate emergency procedures.

| Duration: 12:00 | Duration: 12:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • List the PPE required at the workplace. • Describe the commonly reported hazards at the workplace. • Describe the hazards caused due to chemicals/pesticides/fumigants. • Describe the basic safety checks to be done before the operation of any equipment/machinery. • Describe the common first aid procedures to be followed in case of emergencies. • State measures that can be taken to prevent accidents and damage s at the workplace. • Explain the importance of reporting details of first aid administered, to the reporting officer/doctor, in accordance with workplace procedures • State common health and safety guidelines to be followed at the workplace. | <ul style="list-style-type: none"> • Check various areas of the workplace for leakages, water-logging, pests, fire, etc. • Demonstrate how to safely use the PPE and implements as applicable to the workplace. • Display the correct way of donning, doffing and discarding PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Sanitize the tools, equipment and machinery properly. • Demonstrate the safe disposal of waste. • Demonstrate procedures for dealing with accidents, fires and emergencies. • Demonstrate emergency procedures to the given workplace requirements. • Demonstrate the use of emergency equipment in accordance with manufacturers' specifications and workplace requirements. • Demonstrate the administration of first aid. • Prepare a list of relevant hotline/ emergency numbers |
| Classroom Aids: | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| Tools, Equipment and Other Requirements | |
| Personal protective equipment, first aid kit, equipment used in medical emergencies. | |

Module 9: Employability Skills (60 hours)

Mapped to NOS DGT/VSQ/N0102 v1.0

Duration: 60:00

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration: 5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analysing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Module 10: Repair and maintenance of farm implements

Mapped to AGR/N1119 v2.0

Terminal Outcomes:

- Demonstrate the process of checking the mouldboard plough, disc plough, disc harrow and cultivator for faults, wear and tear or damage.
- Demonstrate the process of carrying out repair and maintenance of mouldboard plough, disc plough, disc harrow and cultivator.

| Duration: 10:00 | Duration: 50:00 |
|---|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the design and functions of primary and secondary tillage machinery. • Identify various components of a mouldboard plough, disc plough, disc harrow and cultivator. • Explain the common repair and maintenance needs of the mouldboard plough, disc plough, disc harrow and cultivator. • Describe the process of adjusting the gauge and wheel disc, tilt angle and working depth of the tillage machinery. • Explain the necessary safety measures to be undertaken while operating the tillage machinery. | <ul style="list-style-type: none"> • Demonstrate the process of checking the mouldboard plough, disc plough, disc harrow, cultivator and their components for correct functioning, wear and tear or damage. • Analyse the joints, nuts, bolts and pins for locking and the prescribed torque. • Demonstrate the process of making various adjustments such as correcting the level of plough, horizontal and vertical suction, level of the cultivator to ensure all the shovels touch the ground, etc. • Demonstrate the process of carrying out welding on broken joints. |
| Classroom Aids: | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator’s Guide, Participant’s Handbook. | |
| Tools, Equipment and Other Requirements | |
| Mould board plough, disc plough, disc harrow, cultivator, tools such as screw driver set, pliers set, hammer set, set of chisels, set of files, hand hacksaw, set of spanners, set of sockets, set of pullers, pipe wrench, adjustable screw wrench, chisel set, tongs, hand grease gun, bench vice, micrometer, vernier callipers, screw jack, hydraulic jack, air compressor, washing machine, welding machine, pullers, anvil, cotton jute etc. | |

Annexure

Trainer Requirements

| Trainer Prerequisites | | | | | | |
|-----------------------------------|---|------------------------------|----------------------------|---------------------|----------------|---|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| 12th Class | Class 12th with Science and having any Certificate in course in Farm Mechanization from recognized institutes | 5 | Agriculture Farm Machinery | 0 | | Ex-Service-Man including Ex-Paramilitary personnel: Minimum Qualification is 10+2 with an Honourable Discharge/Pension. SSC would consider a relaxation/waiver of sector-specific experience on case-to-case basis. |
| Diploma | Diploma (Mechanical / Agriculture engineering) | 3 | Agriculture Farm Machinery | 0 | | |
| ITI | ITI (Mechanical / Agriculture engineering) | 3 | Agriculture Farm Machinery | 0 | | |
| Graduate | Graduate (Agriculture) | 1 | Agriculture Farm Machinery | 0 | | For school Program minimum qualification of Trainer should be Graduate (Agriculture / Physics). Their Teaching experience will be considered industry experience |
| B. Tech | B Tech in Mechanical / Agriculture engineering. | 0 | | 0 | | |

| Trainer Certification | |
|---|---|
| Domain Certification | Platform Certification |
| Certified for Job Role “Tractor Service Mechanic”, mapped to QP: “AGR/Q1108, v3.0”, Minimum accepted score is 80% | Recommended that the Trainer is certified for the Job Role: “Trainer (Vet and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, v2.0”. Minimum accepted score as per MEPSC guidelines is 80%. |

Assessor Requirements

| Assessor Prerequisites | | | | | | |
|-----------------------------------|--|------------------------------|---|--------------------------------|----------------|--|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training/Assessment Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| Graduation | B. Tech (Agriculture/ Agriculture Engineering/Mechanical Engineering/Farm Machinery) | 5 | Agriculture/Farm Machinery/Mechanical Engineering and related streams | 0 | | Practical skills and knowledge required in maintenance of farm machinery |
| Graduation | B.Sc. (Agriculture / Agriculture Engineering and related streams) | 5 | Agriculture/Farm Machinery/Mechanical Engineering and related streams | 0 | | Practical skills and knowledge required in maintenance of farm machinery |
| Post-graduation | M. Tech (Agriculture/ Agriculture Engineering/Mechanical Engineering/Farm Machinery) | 2 | Agriculture/Farm Machinery/Mechanical Engineering and related streams | 0 | | Practical skills and knowledge required in maintenance of farm machinery |
| Post-graduation | M.Sc. (Agriculture / Agriculture Engineering and related streams) | 2 | Agriculture/Farm Machinery/Mechanical Engineering and related streams | 0 | | Practical skills and knowledge required in maintenance of farm machinery |
| PhD | PhD (Agriculture / Agriculture Engineering/Farm engineering and related streams) | 1 | Agriculture/Farm Machinery/Mechanical Engineering and related streams | 0 | | Practical skills and knowledge required in maintenance of farm machinery |

| Assessor Certification | |
|--|--|
| Domain Certification | Platform Certification |
| <p>“Tractor Service Mechanic”, “AGR/Q1108, v3.0”, Minimum accepted score is 80%</p> | <p>Certified for the Job Role: “Assessor (Vet and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0” with minimum score of 80%.</p> |

Assessment Strategy

Assessment System Overview

In Agriculture Sector it is of ultimate importance that individuals dealing with crop production or livestock have the requisite knowledge and competencies to undertake the task. Based on the Assessment Criteria, SSC in association with empaneled AAs, define the test structure for the given job roles to cover the required skills and competencies. Assessment strategy consists of the following:

1. Multiple Choice Questions: To assess basic knowledge (Objective/Subjective)
2. Viva: To assess awareness on processes (Oral and/or written questioning)
3. Practical: To evaluate skills and identify competencies. (Observation)

Assessments for knowledge and awareness on processes may be conducted through 'real time' internet-based evaluation or by conducting the same 'offline' through TABs. Skills and competencies are to be assessed by conducting 'practical' on ground through qualified and ToA certified assessors.

While it is important that an individual has adequate knowledge and skills to perform a specific task, weight age for different aspects for assessment are given as follows:

- Multiple Choice Questions: 20%-30%, depending on the specific QP
- Viva: 20%
- Practical: 50% - 60% (Involves demonstrations of applications and presentations of procedures/tasks and other components)
- Assessment will be carried out by certified assessors through empanelled assessment partners. Based on the results of assessment; ASCI will certify the learners/candidates

Testing Environment

Assessments are conducted on laptops, Mobiles and android tablets via both offline and online mode depending on the internet connectivity at assessment location.

In remote locations/villages, assessments get delivered through tablets without the requirement of Internet.

- Multilingual assessments (ASCI is conducting assessments in 13 + languages pan India)
- Rubric driven assessments in Practical/Viva sections and responses recorded accordingly
- All responses, data, records and feedback stored digitally on cloud
- Advanced auto-proctoring features – photographs, time-stamp, geographic-tagging, toggle-screen/copy-paste disabled, etc.
- Android based monitoring system
- End to end process from allocation of a batch to final result upload, there is no manual intervention

- Assessment will normally be fixed for a day after the end date of training / within 7 days of completion of training.
- Assessment will be conducted at the training venue
- Room where assessment is conducted will be set with proper seating arrangements with enough space to curb copying or other unethical activities
- Question bank of theory and practical will be prepared by ASCI /assessment agency and approved ASCI. Only from approved Question Bank assessment agency will prepare the question paper. Theory testing will include multiple choice questions, pictorial question, etc. which will test the trainee on his theoretical knowledge of the subject.
- The theory, practical and viva assessments will be carried out on same day. In case of more number of candidates, number of assessors and venue facilitation be increased and facilitated

| Assessment | | | |
|------------------------|-------------------------------|--------------------------------|--|
| Assessment Type | Formative or Summative | Strategies | Examples |
| Theory | Summative | MCQ/Written exam | Knowledge of facts related to the job role and functions. Understanding of principles and concepts related to the job role and functions |
| Practical | Summative | Structured tasks/Demonstration | Practical application /Demonstration /Application tasks |
| Viva | Summative | Questioning and Probing | Mock interviews on usability of job roles/advantages /importance of adherence to procedures. Viva will be used to gauge trainee's confidence and correct knowledge in handling job situation |

The question paper pre-loaded in the computer /Tablet and it will be in the language as requested by the training partner.

Assessment Quality Assurance framework

Assessment Framework and Design:

Based on the Assessment Criteria, SSC in association with AAs will define the test structure for the given roles to cover the required skills and competencies. ASCI offer a bouquet of tools for multi-dimensional evaluation of candidates covering language, cognitive skills, behavioral traits and domain knowledge.

Theoretical Knowledge - Item constructs and types are determined by theoretical understanding of the testing objectives and published research about the item-types and constructs that have shown statistical validity towards measuring the construct. Test item types which have been reported to be coachable are not included. Based on these, items are developed by domain experts. They are provided with comprehensive guidelines of testing objectives of each question and other quality measures.

Type – Questions based on Knowledge Required, Case-based practical scenario questions and automated simulation-based questions.

Practical Skills - The practical assessments are developed taking into consideration two aspects: what practical tasks is the candidate expected to perform on the job and what aspects of the job cannot be judged through theoretical assessments. The candidates shall be asked to perform either an entire task or a set of subtasks depending on the nature of the job role

Type – Standardized rubrics for evaluation against set of tasks in a demo/practical task

Viva Voce - Those practical tasks which cannot be performed due to time or resource constraints are evaluated through the viva mode. Practical tasks are backed up with Viva for thorough assessment and complete evaluation

Type – Procedural questions, do's and don'ts, subjective questions to check understanding of practical tasks.

Assessor has to go through orientation program organized by Assessment Agency. The training would give an overview to the assessors on the overall framework of QP evaluation. Assessor shall be given a NOS and PC level overview of each QP as applicable. Overall structure of assessment and objectivity of the marking scheme will be explained to them. The giving of marks will be driven by an objective framework which will maintain standardization of marking scheme.

Type of Evidence and Evidence Gathering Protocol:

During the assessment the evidences collected by AAs and ASCI are:

- Geo Tagging to track ongoing assessment
- AA's coordinator emails the list of documents and evidences (photos and videos) to the assessor one day prior to the assessment. List is mentioned below:
 - Signed Attendance sheet
 - Assessor feedback sheet
 - Candidate feedback sheet
 - Assessment checklist for assessor
 - Candidate Aadhar/ID card verification
 - Pictures of classroom, labs to check the availability of adequate equipment's and tool to conduct the training and assessment
 - Pictures and videos of Assessment, training feedback and infrastructure.
- Apart from the Assessor, Technical assistant popularly known as Proctor also ensures the proper documentation and they verify each other's tasks.
- To validate their work on the day of assessment, regular calls and video calls are done.
- On-boarding and training of assessor and proctor is done on timely basis to ensure that quality of the assessment should be maintained.
- Training covers the understanding of QP, NSQF level, NOS and assessment structure

Methods of Validation

- Morning Check (Pre-Assessment): Backend team of AA calls and confirms assessor/technical SPOC event status. Assessor/Technical SPOC are instructed to reach the centre on time by 9:30 AM / as decided with TC and delay should be highlighted to the Training Partner in advance.
- Video Calls: Random video calls are made to the technical SPOC/assessor so as to keep check on assessment quality and ensure assessment is carried out in fair and transparent manner
- Aadhar verification of candidates
- Evening Check (Post Assessment): Calls are made to the ground team to ensure event is over by what time and the documentation is done in proper manner or not.
- TP Calling: To keep check on malpractice activity, independent audit team calls to TP on recorded line to take confirmation if there was any malpractice activity observed in assessment on part of AA/SSC team. If calls are not connected, email is send to TP SPOC for taking their confirmation
- Video and Picture Evidence: Backend team collects video and pictures for assessment on real time basis and highlights any issue like, Students sitting idle/trainer allowed for helping out candidates during assessment.
- Surprise Visit: Time to time SSC/AA Audit team can visit the assessment location and do surprise audit for assessment process carried out by ground team.

- **Geo Tagging:** On day of assessment, each technical SPOC is required to login in our internal app which is Geo tagged. Any deviation with centre address needs to be highlighted to assessment team on real-time basis.

Method for assessment documentation, archiving, and Access:

- ASCI has fully automated result generation process in association with multiple AAs
- Theory, Practical and Viva marks form the basis of the results and encrypted files generated to avoid data manipulation. All responses captured and stored in System with Time-Stamps at the end of AAs and SSC. NOS-wise and PC-wise scores can be generated.
- Maker Checker concept: 1 person prepares results and other audit result which is internally approved by AA at first and then gets vetted at the end of SSC
- All soft copy of documents is received from the on-ground tech team over mail. The same are downloaded by our internal backend team and saved in Repository. The repository consists of scheme wise folders. These scheme wise folders have job role specific folders. These specific folders have Year wise and Month wise folders where all documents are saved in Batch specific folders. All Hard copies are filed and stored in the storeroom.

Result Review & Recheck Mechanism –

- Time stamped assessment logs
- Answer/Endorsement sheets for each candidate
- Attendance Sheet
- Feedback Forms: Assessor feedback form, Candidate feedback form, TP feedback form
- The results for each of the candidate shall be stored and available for review (retained for 5 years/ till conclusion of project or scheme)

References

Glossary

| Term | Description |
|-----------------------------|---|
| Sector | Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests |
| Key Learning | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| OJT (M) | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site |
| OJT (R) | On-the-job training (Recommended); trainees are recommended the specified hours of training on site |
| Procedural Knowledge | Procedural knowledge addresses how to do something, or how to perform a |
| Training Outcome | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training. |
| Terminal Outcome | Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome. |

Acronyms and Abbreviations

| Term | Description |
|------|--|
| AGR | Agriculture |
| NOS | National Occupational Standard (s) |
| NSQF | National Skills Qualifications Framework |
| OJT | On-the-job Training |
| QP | Qualifications Pack |
| PwD | People with Disability |
| PPE | Personal Protective Equipment |
| FIP | Fuel Injection Pump |
| TDI | Turbocharged Direct Injection |
| PTO | Power Take Off |
| SOP | Stander Operating Procedure |
| RPM | Revolutions Per Minute |