

Syllabus for Combine Harvester Operation & Maintenance Technician

Course Name	Combine Harvester Operation & Maintenance Technician
Sector	Agriculture
Course Code	AGR/2024/CHMT/374
Level	4
Occupation	Combine Harvester Operation & Maintenance Technician
Job Description	The Technician will be responsible for efficiently operating combine harvesters during harvesting seasons, ensuring optimal crop yield. In addition to operation, the technician will play a crucial role in conducting routine maintenance checks, diagnosing and repairing mechanical issues and implementing preventive measures to the combine harvester's reliability and longevity.
Course Duration	Total Duration 420 Hrs (T-90, P- 210, OJT-60 and ES-60)
Trainees' Entry Qualification	Grade 12 – Regular OR Vocational OR 10th grade pass plus 2-year NTC/NAC OR Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR 10th grade pass and pursuing continuous schooling OR 10th grade pass with 2 years 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
Trainers Qualification	Diploma in Mechanical Engineering with 3 years experience in the relevant field

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Elective	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
1	Fundamental of Combine Harvester for field operation	Explain the process of operation of combine harvester	Compulsory	20	40		60
2	Repair & Maintenance	Demonstrate the process of carrying out repair and maintenance.	Compulsory	30	90		120
3	Hygiene and cleanliness	Maintain personal hygiene, cleanliness and	Compulsory	10	20		30

Module No.	Module name	Outcome	Compulsory/ Elective	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
		safety at the workplace.					
4	Occupation safety hazards	Apply safe working practices	Compulsory	10	20		30
5	Application of computer day to day work	Exhibit the application of computer in day to day work (MEP/2023/ENDP/258)	Compulsory	20	40		60
6	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	Compulsory	-	-	60	60
7	Employability Skill	As per guided curriculum	Compulsory	60	--	-	60
TOTAL				150	210	60	420

SYLLABUS:**Module No. 1: Fundamental of Combine Harvester for field operation**

Outcome: Explain the process of operation combine harvester

Theory Content:

- Familiarization with different system and components of combine Harvester.
- Purpose of combine Harvester.
- Advantages & disadvantage. Functional systems of combine Harvester.
- Working Principal and Constructionaldetails of combine Harvester.
- Prime-mover and driving system.
- Flow path material of combine Harvester.
- Workshop adjustment for wheat & paddy.
- Method of field operation.

Practical Content:

- Identify different system and components of combine Harvester.
- Practice in dismantle and assemble the combine Harvester.
- Check & repair the Cutter bar, feeder, thresher, straw walker, sieves, blower and augers.
- Adjust the Cutter bar, feeder, thresher, straw walker, sieves, blower and augers.
- Replace thresher cylinder wheat/paddy.
- Check drive mechanism of combine Harvester.
- Workshop adjustment of combine Harvester.
- Field operation of combine Harvester

Module No. 2: Repair & Maintenance

Outcome: Demonstrate the process of carrying out repair and maintenance.

Theory Content:

- Field adjustments of combine Harvester.
- Recommended speeds for different crops.
- Types of losses, their causes & remedies.
- Care and maintenance of combineHarvester.
- Trouble shooting and remedies Common accidents and their prevention.
- Precautions while using combineHarvester.
- Transporting the combine Harvester.
- Storage during off season.
- Customhiring of combineHarvester.
- Evaluation of field Office of combine during operation

Practical Content:

- Harvester in wheat.
- Field operation of combineHarvester in paddy.
- Adjust cutter bar height.
- Adjust thresher cylinder speedaccording to crop condition.
- Adjust grain sieves and blower rpm. Faults and remedies of combineHarvester.
- Precaution while handling combineHarvester in field.
- Practice health & safety select, use, maintain and store tools, equipment's and clothing safety.

Module No. 3: Hygiene and cleanliness

Outcome: Maintain personal hygiene, cleanliness and safety at theworkplace.

Theory Content:

- 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 goodhousekeeping at the workplace.
- Explain the importance of informingthe designated authority on personal health issues related to injuries and infectious diseases.

Practical Content:

- Demonstrate personal hygienepractices to be followed at the workplace.
- Demonstrate the correct way of washing hands using soap andwater, and alcohol-based hand rubs.
- Demonstrate the steps to follow toput on and take off a mask safely. Show how to sanitize and disinfectone's work area regularly.
- Demonstrate adherence to theworkplace sanitization norms.
- Show how to ensure cleanliness ofthe work area.

Module No. 4: Occupation safety hazards

Outcome: Apply safe working practices

Theory Content:

- List the PPE required at theworkplace.
- Describe the commonly reportedhazards 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 damages 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.

Practical Content:

- 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.
- 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

Module No. 5: Application of computer day to day work

Outcome: Exhibit the application of computer in day to day work

Content:

Computer Awareness: Hardware

Overview of computer components and their roles: CPU, RAM, hard drives, motherboards, etc.

Understanding input and output devices: keyboards, mice, monitors, printers, etc.

Exploring storage technologies: hard disk drives (HDD), solid-state drives (SSD), etc. Starting and

Shutting down Windows (MS Windows 2007 or higher) Understanding device drivers and their

role in hardware communication. Installation and configuration of output devices like monitors,

printers, scanner

Computer Applications

MS Word:

Introduction to Microsoft Word

- Overview of Microsoft Word's Purpose and Features
- Navigating the User Interface: Ribbons, Tabs, and Menus
- Creating and Saving a New Document, Printing a document
- Using Keyboard Shortcuts for Efficiency

Basic Text formatting

- Text Selection Techniques: Click, Drag, and Shift
- Font Formatting: Typeface, Size, Bold, Italics, Underline
- Paragraph Formatting: Alignment, Line Spacing, Indentation
- Applying Bullets and Numbering

Document Formatting and Styles

Page Setup: Margins, Page Orientation, Page Size

- Adding Headers and Footers

Introduction to Styles: Applying and Modifying

Creating a Table of Contents using Styles

Tables and Columns

- Creating and Formatting Tables
- Adding and Deleting Rows and Columns
- Merging and Splitting Cells

Page Layout and Section Breaks

- Inserting Page Breaks and Section Breaks
- Customizing Headers and Footers for Different Sections

MS Excel

Introduction to Microsoft Excel

- Overview of Excel's Role in Data Management - Understanding Workbooks, Worksheets, and Cells
- Navigating the Excel Interface: Ribbons, Tabs, and Menus
- Creating and Saving a New Workbook, Printing a worksheet/selection of it.

Data Entry and Basic Formatting

- Inputting Data: Text, Numbers, Dates
- Introduction to Basic Formatting: Font, Alignment
- Applying Cell Borders and Background Colors
- Using AutoFill and Flash Fill Techniques

Basic Formulas and Functions

- Understanding Formulas and Functions
- Basic Arithmetic Operators (+, -, *, /)
- Introduction to SUM, AVERAGE, COUNT Functions
- Using AutoSum for Quick Totals

Sorting and Filtering Data

- Sorting Data in Ascending and Descending Order
- Applying Custom Sort Orders

Email:

Opening an Email id. Send and receive email. Use of Inbox, spam, Trash.

Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc. safely and securely.

Module 6: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module 7: Employability Skills (60 Hrs)

Key Learning Outcomes

Introduction to Employability Skills Hours

Duration: 1.5

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 Hours

Duration: 1.5

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 Hours

Duration: 2.5

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 Hours

Duration: 10

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 Hours

Duration: 2

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 analyzing 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

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Explain the process of operation combine harvester	<p>After completion of this module students will be able to:</p> <ol style="list-style-type: none"> 1.1 Identify different components of combine harvester 1.2 Articulate the primary purpose and objectives of combine harvester in agricultural operations 1.3 Explain the advantages and disadvantages of using a combine harvester in different agricultural contexts 1.4 Describes the functional systems of a combine harvester, including cutting, threshing, separating, and cleaning 1.5 Describes the functional systems of a combine harvester, including cutting, threshing, separating, and cleaning. 1.6 Explains the working principles and construction details of a combine harvester 1.7 Describes the prime-mover (engine) and driving system of the combine harvester. 1.8 Describes the method of field operation, including preparation, setup, and execution of harvesting activities. 1.9 Checks and repairs critical components such as the cutter bar, feeder, thresher, straw walker, sieves, blower, and augers. 1.10 Execute field operations with the combine harvester.
2	Demonstrate the process of carrying out repair and maintenance.	<p>After completion of this module students will be able to:</p> <ol style="list-style-type: none"> 2.1 Demonstrate the various field adjustments required for efficient combine harvester operation 2.2 Identify the types of losses in combine harvesting. 2.3 Describe routine maintenance tasks for combine harvester. 2.4 Identify common accidents during combine harvester operation. 2.5 Explains safety precautions to be taken during combine harvester operation. 2.6 Describe proper procedures for transporting a combine harvester. 2.7 Identify key maintenance tasks before storing the

Module No.	Outcome	Assessment Criteria
		combine harvester. 2.8 Demonstrate the operation of combine harvester in a wheat field. 2.9 Execute field operations with a combine harvester in a paddy field. 2.10 Set thresher cylinder speed according to the specific crop conditions 2.11 Identify common faults during practical operation. 2.12 Selects appropriate tools and equipment for the given tasks
3	Maintain personal hygiene, cleanliness and safety at the workplace.	After completion of this module students will be able to: 3.1 Illustrate the importance of personal health, hygiene, and fitness in the workplace. 3.2 Recognize and list key health-related guidelines commonly mandated by organizations or government authorities. 3.3 Articulate the significance of maintaining a clean and organized work environment, and the impact it has on overall workplace safety and efficiency. 3.4 Exhibit the proper personal hygiene practices that should be followed in a workplace setting. 3.5 Carry out the steps involved in washing hands correctly using both soap and water, and alcohol-based hand rubs. 3.6 Carry out workplace sanitization activities according to established norms and guidelines. 3.7 Explain methods to ensure the cleanliness of the work area, emphasizing specific practices and routines.
4	Apply safe working practices	After completion of this module students will be able to: 4.1 Identify and compile a comprehensive list of Personal Protective Equipment (PPE) required for the specific workplace. 4.2 Explain in detail the hazards commonly reported at the workplace, providing examples and illustrating potential risks. 4.3 List the essential safety checks that need to be conducted before operating equipment or machinery. 4.4 Explain step-by-step the common first aid procedures applicable to various emergency situations. 4.5 Identify and state key health and safety guidelines that should be adhered to in the workplace. 4.6 Demonstrate the proper procedures for the safe disposal of waste in accordance with workplace regulations.

Module No.	Outcome	Assessment Criteria
		4.7 Demonstrate the correct administration of first aid for common workplace injuries or emergencies
5	Exhibit the application of computer in day to day work	After completion of this module students will be able to: 5.1 Identify the basic components of computer and their functions 5.2 Explain different operating systems 5.3 Use word processing software for document creation and formatting 5.4 Create and deliver presentations using presentation software 5.5 Navigate and browse the internet effectively 5.6 Use of email for communication and file attachment
6	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).
7	Employability Skill	As per guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

S. No.	Equipment Name	Quantity
1	Self-propelled combine harvester axial flow (Multi crop)	1
2	Potato combine harvester	1
3	Sugar cane harvester	1
4	Steel Rule 30 cm, English and metric	1
5	Screw driver 20 cm.x 9mm blade	1
6	Screw driver 30 cm x 9mm blade	1
7	Pliers combination 20 cm	1
8	Pliers round 15 cm	1
9	Pliers flat nose 15 cm	1
10	Pliers side cutting 15 cm	1
11	Vice grip pliers.	1
12	Circlip pliers Expanding and contracting type 15 cm and 20 cm each 8 sets.	8 each set
13	Hand file 20 cm. Second cut half round	1
14	Hand file 20 cm. Smooth triangular	1
15	Hand file 30 cm bastard flat	1
16	Hand file 30 cm bastard round	1
17	Feeler gauge 20 blades (metric)	1
18	Steel tool box with lock & key(folding type) size 400x200x150mm	1
19	Allen Key set of 12 pieces (2mm to 14 mm)	1
20	Philips Screw Driver Type set of 5 pieces 100 mm to 300 mm 04 Sets 34 Spanner, ring offset set	4 set
21	Engineer"s square 15 cm blade	1
22	Divider spring joint 15 cm.	1

S. No.	Equipment Name	Quantity
23	Scriber 15 cm with scribing block universal	1
24	Pick punch 15 cm 2nos.	2
25	Drift punch copper 15 cm	1
26	Centre punch 10 mm dia x 100 mm	1
27	Chisel cold flat 20 mm	1
28	Chisels Cross cut 200mm x 6 mm	1
29	Hacksaw frame adjustable for 30 cm blade	1
30	Engineer's Stethoscope 04 Screw driver 30 cm x 9 mm blade	1
31	Hand vice 37 mm	1
32	Drill Twist (assorted)	1
33	Drill electric hand 6-12 mm	1
34	Washing unit	1
35	Air Compressor	1
36	Electric pedestal grinder with two wheels	1
37	Electric arc welding set portable	1
38	Taps and dies complete set in a box (metric) with handle.	1
39	Hand reamer adjustable 10.5 to 11.25 mm, 11.25 to 12.75mm, 12.75 to 14.25mm and 14.25 to 15.75mm.	1 each
40	Tachometer – to read up to 5000 rpm	1
41	Mallets (Wooden/plastic)	1

S. No.	Equipment Name	Quantity
42	Ball peen Hammer 0.5 Kg.	1
43	Cross peen Hammer 1 kg	1
44	Spanner D E set of 12 pieces (6mm to 32 mm)	1 set
45	Ring spanner set of 12 pieces (6mm to 32 mm.)	1 set
46	Spanner, adjustable 20 cm.	1
47	Spanner adjustable (pipe wrench) 350 mm	1
48	Spanners socket of 8 with handles, T bar and ratchet	1
49	Chain and Pulley block 3000 Kg capacity	1
50	Horses and wheel choke	1
51	Screw jack 4 ton capacity double lift	1
52	Hydraulic jack 3 ton capacity with trolley	1
53	Oil can 0.5-liter cap	1
54	Grease Gun Hand/Pneumatic	1
55	Cleaning trays 45 x 30 cm.	1
56	Torque wrench set of 3 Nos.	1 set
57	Stud remover.	1
58	„V“ Block 75 x 38 mm pair with Clamps.	1
59	Surface plate 60x60 cm	1
60	Compression testing gauge to read 0 to 760 mm of Hg.	1

S. No.	Equipment Name	Quantity
61	Triple leg grip puller with bearings attachment screw/hydraulic powered max. Spread 80,160,50,450 mm.	1
62	Work bench each 250 x 120 x 60 with 4 bench vices 12 cm jaw	4
63	Pullers screw powered 2mm with bearing puller attachment.	1
64	Bearing puller screw powered/hydraulic powered with attachments	1
65	Pulley puller plate type for thresher	1
66	Pulley puller disc type for pulley	1
67	Hydrometer.	1
68	Valve spring lifter.	1
69	Valve key inserter 1 no.	1
70	Valve grinding tool set	1
71	Fuel injection pump test bench with accessories	1
72	Injector cleaning kit	1
73	Injector dismantling & assembling jig & fixture	1
74	Injector dismantling tool kit	1
75	Injector testing set (hand operated)	1
76	Engine management systems Sensors & Actuators	4 sets
77	Tyre pressure gauge	1

S. No.	Item	Quantity
	Hardware	
1	Computers/Laptops	10 (one for three trainee)
2	Power backup	For all Systems
3	Inkjet/Laser Printer(Network/USB Printer)	1
4	Speaker	1
5	Spare H/W components	As per requirement
6	Microsoft Windows7/8/10 or UNIX/ LINUX or latest software	For all Systems
7	Microsoft Office 2007/ 2010/ 2013 or latest software	For all Systems
8	Antivirus Software (TVD/ Norton/QuickHeal Total Security/Kasper sky/ Any Popular brand)	For all Systems
9	Internet Connection	For all Systems

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Explain the process of operation of combine harvester	AGR/0274/OC1	30	130	0
Demonstrate the process of carrying out repair and maintenance.	AGR/0274/OC2	40	170	0
Maintain personal hygiene, cleanliness and safety at the workplace.	AGR/0274/OC3	20	110	0
Apply safe working practices	AGR/0274/OC4	30	110	0
Exhibit the application of computer in day to day work	(MEP/2023/ENDP/258)	30	130	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	AGR/0274/OC5	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0