Model Curriculum

QP Name: Kisan Drone Operator

QP Code: AGR/Q1006

Version: 2.0

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	Precision Farming
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification and Experience	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
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2025
NSQC Approval Date	31/03/2022

QP Version	2.0
Model Curriculum Creation Date	14/01/2022
Model Curriculum Valid Up to Date	31/03/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	390 Hours
Maximum Duration of the Course	390 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:

- Identify the job role of Kisan Drone Operator
- Plan appropriate route for drone operation.
- Set up the drone for operation.
- Demonstrate the ATC procedures and Radiotelephony
- Compare Fixed-wing, Rotorcraft & Hybrid UAVs
- Identify appropriate conditions for drone operations.
- Identify & select different types of Drones and illustrate Fundamentals of Flight (Aerodynamics).
- Interpret DGCA Safety Regulations & observe safety guidelines, ATC procedures & Radio Telephony, Weather and meteorology as a Drone Pilot in flying a Drone.
- Identify & select different Airframes & Propellers in drone flying.
- Explain & apply knowledge of Power systems viz. Electric motors, Batteries, chargers, Connectors etc. in drone flying
- Carry out drone flying as per the requirement
- Demonstrate the process of post operation drone maintenance
- Demonstrate the process of collecting, and analysing the required data
- Prepare reports based on the analyzed data
- Demonstrate basic assembly and disassembly procedures for drones
- Demonstrate the procedure for flight simulation
- Demonstrate various flying techniques
- Demonstrate measures for storage of pesticides/crop nutrients
- Plan the agricultural enterprise/ business.
- Identify employability opportunities
- Describe the process of managing the entrepreneurial activities.
- Describe how to comply with rules and regulations
- Adhere precautionary measures before, during and post-operation for drone-based pesticide application
- Determine soil fertility using drone sensors
- Discuss how to adhere to personal hygiene practices.
- Demonstrate ways to ensure cleanliness around the workplace

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
AGR/N1037: Ensure adherence to the laws/procedures and principles of flight for drone operation **NOS Version- 1.0** **NSQF Level- 4**	**25:00**	**5:00**	**0:00**	**0:00**	**30:00**
Module 1: Introduction to the role of Kisan Drone Operator	02:00	00:00	0:00	0:00	02:00
Module 2: Rules and regulations related to drone operation	03:00	01:00	0:00	0:00	04:00
Module 3: Basic drone operation dynamics and principles	04:00	01:00	0:00	0:00	05:00
Module 4: ATC procedures & Radiotelephony (non-FRTOL)	04:00	01:00	0:00	0:00	05:00
Module 5: Operation of Fixed-wing, Rotorcraft & Hybrid UAVs	09:00	01:00	0:00	0:00	10:00
Module 6: Role of Weather and Meteorology in drone operations	03:00	01:00	0:00	0:00	04:00
AGR/N1038: Prepare for the operation of the drone **NOS Version- 1.0** **NSQF Level- 4**	**10:00**	**20:00**	**00:00**	**00:00**	**30:00**
Module 7: Basic Maintenance of drone equipment	04:00	06:00	0:00	0:00	10:00
Module 8: Analysis and Assessment of Risk	02:00	02:00	0:00	0:00	04:00
Module 9: Carryout installation and utilization of Payload	02:00	10:00	0:00	0:00	12:00
Module 10: Data Analysis and report preparation	02:00	02:00	0:00	0:00	04:00

AGR/N1032: Undertake Drone Flying as per the requirement **NOS Version- 1.0** **NSQF Level- 4**	**10:00**	**20:00**	**0:00**	**0:00**	**30:00**
Module 11: Carryout drone flying as per the requirement	10:00	20:00	0:00	0:00	30:00
AGR/N1030: Carry out drone based pesticide and crop nutrient application **NOS Version- 2.0** **NSQF Level- 4**	**15:00**	**45:00**	**0:00**	**0:00**	**60:00**
Module 12: Application of pesticides and nutrients with drones	15:00	45:00	0:00	0:00	60:00
AGR/N1020: Ensure adherence of precautionary measures before, during and post-operation for **drone based pesticide application** **NOS Version- 1.0** **NSQF Level- 4**	**15:00**	**15:00**	**0:00**	**0:00**	**30:00**
Module 13: Safety and emergency procedures before and after pesticide spraying through drone operation	15:00	15:00	0:00	0:00	30:00
AGR/N1021 Use a drone to carry out multispectral mapping for various agriculture and allied activities **NOS Version- 1.0** **NSQF Level- 4**	**15:00**	**15:00**	**0:00**	**0:00**	**30:00**
Module 14: Carrying out multispectral mapping for various agriculture and allied activities using drone	15:00	15:00	0:00	0:00	30:00
DGT/VSQ/N0102 Employability Skills **NOS Version-1.0** **NSQF Level-4**	**60:00**	**00:00**	**0:00**	**0:00**	**60:00**
Module 15: Employability Skills	60:00	00:00	0:00	0:00	60:00
Total Duration	**150:00**	**120:00**	**0:00**	**0:00**	**270:00**
OJT: 120 hours					

Module 1: Introduction to the role of Kisan Drone Operator

Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Discuss the job role of Kisan Drone Operator
- Explain Scope and Avenues of Kisan Drones
- Identify the employment opportunities as Kisan drone operator

Duration: 02:00	Duration: 0:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the scope of Drones in agriculture industry - Discuss the role and responsibilities of an Kisan Drone Operator - Identify various employment opportunities for a Kisan Drone Operator - Discuss about RPTO - Discuss about Cat-1[VLOS] remote Pilate certifications - Discuss about UAS types, categorization and their limits - Explain DigitalSky and how does it work - Discuss UIN and DAN	
Classroom Aids	
Training Kit - Trainer Gguide, Power Point Presentation, White board, Marker, Projector, Laptop, Videos etc.	
Tools, Equipment and Other Requirements	
NA	

Module 2: Rules and regulations related to drone operation
Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Explain various international laws and SOP for drone operation
- Explain the process of registration for Drone certificate and UIN
- Explain the process for registration, sale of drones
- Explain DGCA safety rules and regulations

Duration: 03:00	Duration: 01:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain Various international rules, regulations, standards & practices - Explain Civil aviation requirements, AIPs, NOTAM - Explain Various type of certifications of drone - Discuss about Registration, sale & de-registration of drones - Explain Operations of various types of drones - Explain Dos and don'ts while carrying out drone operation - Explain the significance of Remote pilot certificate - Explain about drone insurance - Explain the importance of Unique Identification Number (UIN) - Discuss Drone (Amendment) Rules, 2022 notified by Ministry of Civil Aviation	- Classify and categorize drones based on weight, size etc. - Demonstrate the procedure to apply drone certification and Unique Identification number (UIN) from DGCA - Demonstrate the procedure for Registration, Sale & De-Registration of Drones - Demonstrate procedure for operating drone - Recognize DGCA safety regulations, Do's and Don'ts
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Pprojector, Laptop	
Tools, Equipment and Other Requirements	
Drone, software, spares and accessories, nozzle system	

Module 3: Basic drone operation dynamics and principles
Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Explain basic principles of flight operation
- Demonstrate various flying techniques
- Explain restrictions for drone operation
- Explain various scientific laws and theories in drone operation

Duration: 04:00	Duration: 01:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain fundamentals of flight - Explain introduction to aerodynamics of flight - Explain how to How to Take-off, flight, and landing - Explain about Maneuvers, turns and circuit pattern - List drone forbidden areas - Explain about Longitude/ Latitude - Discuss about Different types of Drones and their Nomenclatures - Describe current/future uses of drones - Explain about Newton's Laws of Motion, Bernoulli's Principle, four forces of Fight, three axes of Fight - Explain about various laws, principles and forces applies to drone Flight - Explain why drone should not be operated over public events, stadiums etc.	- Identify different types of drones - Select basic components - Demonstrate Take-off, flight, and landing - Recognise basic principles of flying like Bernoulli's Principle etc. - Demonstrate Take-off, flight, and landing - Demonstrate flying techniques such as pull, roll and yaw to operate flight - Demonstrate Maneuvers, turns and circuit pattern
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

Module 4: ATC procedures & Radiotelephony (non-FRTOL)

Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Demonstrate the ATC procedures and Radiotelephony
- Explain zones in airspace and its regulations and restrictions
- Explain general issues encountered by drone pilots and their measures

Duration: 04:00	Duration: 01:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Define Radiotelephony - Explain about ATC Procedures of operation - Discuss about Airspace structure and Airspace - Explain Rules and regulations for no drone zones - Explain about Various zones for drone flight such as green, yellow and red and their parameters - Explain Various restrictions of no drone Zone - Explain Flight regulations and procedures in Yellow Zone - Explain about how to communicate with ATC & RT Phraseology including Position and Altitude Reporting - Explain procedures for flight planning including Altimeter setting - Explain techniques/ measures for collision avoidance - Explain techniques for Radio Telephony (RT) - Explain the importance of adopting a safety attitude when flying a drone - Describe about issues aircraft pilots encounter including airspace, traffic patterns, and safe attitudes	- Demonstrate ATC operations - Demonstrate Flight regulations and procedures in Yellow Zone - Show how to communication with ATC & RT Phraseology including Position and Altitude Reporting - Identify specific Flight Planning Procedures for specific drone flights including Altimeter setting procedures - Demonstrate measures of collision avoidance - Recognise issues Drone pilots encounter including airspace, traffic patterns etc.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone accessories, remote control	

Module 5: Operation of Fixed-wing, Rotorcraft & Hybrid UAVs
Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Differentiate between Fixed-wing, Rotorcraft & Hybrid UAVs
- Describe the appropriate conditions for drone operations.
- Explain pros and cons of Fixed-wing, Rotorcraft & Hybrid UAVs
- Explain various types of Fixed-wing, Rotorcraft & Hybrid UAVs
- Identify various types of drones, parts and terminology

Duration: 09:00	Duration: 01:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Compare fixed-wing, rotorcraft and hybrid UAVs - Explain Types of fixed wing drones, make, parts, terminology - Explain about how to Operation and maneuver fixed wing drones, Flight Performance - Discuss Applications of fixed-wing, Multirotor, Hybrid UAVs - Explain Pros and Cons of Fixed Wing, Rotorcraft Drones - Discuss basic drone terminology & parts of Rotorcraft - Explain Types of Rotorcraft drones, material used and size of drones - Discuss about Rotorcraft Drone Anatomy: Different parts of drones - Explain the importance of Avionics & C2 Link - Explain about Introduction to Mission Planning, Instrument Flying & Navigation (GCS) of Fixed wing, Rotorcraft & Hybrid - State Principles of Aerodynamics - Explain types of Hybrid Drones & Parts - Compare rotorcraft & Aeroplane	- Identify various Types of fixed wing drones, make, parts, terminology - Demonstrate Operation and maneuvers of fixed wing drones, - Demonstrate Mission Planning, Instrument Flying & Navigation (GCS) - Demonstrate the use of fixed-wing, Multirotor, Hybrid UAVs - Demonstrate how to use Avionics & C2 Link
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

Module 6: Role of Weather and Meteorology in drone operations
Mapped to AGR/N1037 v1.0

Terminal Outcomes:

- Explain various atmospheric components
- Describe the appropriate conditions for drone operations.
- Demonstrate measuring various atmospheric components

Duration: 03:00	Duration: 01:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain about the standard atmosphere, Measuring air pressure, Heat and temperature Wind Moisture, cloud formation etc. - Discuss about Terminal Aviation Routine Weather Report (METAR) - Explain the effects of atmospheric components such as air pressure, heat, wind, moisture, cloud formation, icing etc. - Explain about Favourable conditions for drone operation - Explain about the Emergency procedures during sudden shift in weather conditions - Explain the effect of atmosphere on RPAS operation & hazardous weather avoidance - Explain how to measure air pressure, heat, temperature and wind speed - List tools and equipment required to measure components of atmosphere	- Recognize optimal Weather and meteorology in drone flight - Demonstrate drone operations in standard atmospheric conditions - Demonstrate the procedure for measuring air pressure, temperature, Wind speed, moisture - Estimate effect of atmosphere on RPAS operation - Demonstrate measures for hazardous weather avoidance - Demonstrate the use of various tools and equipment to measure components of atmosphere - Set the tools and equipment in correct manner to avoid errors - Demonstrate the maintenance procedures for tools and equipment post usage of measuring atmospheric components
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

Module 7: Basic Maintenance of drone equipment
Mapped to AGR/N1038 v1.0

Terminal Outcomes:

- Demonstrate the basic maintenance practices of drone equipment
- Identify faults and implement rectification measures
- Demonstrate basic assembly and disassembly procedures for drones
- Demonstrate integration of various modules and sub sections
- Demonstrate documentation of various maintenance activities

Duration: 04:00	Duration: 06:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain about Servicing schedule - Explain how to repair drone equipment - Discuss about General faults and their measures after drone operation - Explain the Components of flight control box and ground station - Explain about emergency procedures in case of breakdown of the drone during operation - Discuss the uses of various sensors of the drone - Explain the procedure for Assembling & disassembling of the drone equipment - Explain how to carry out maintenance repair and overhaul of the drone - Explain safety measures safety when using batteries including proper charging methods, discharging, handing, and disposal - Explain the procedure to integrate sub-sections/ modules, propulsion system of drones - Explain the importance of documentation of drone activities	- Demonstrate the maintenance activities of drone, flight control box, ground station - Demonstrate the maintenance activities of ground equipment, batteries and payloads - Demonstrate the procedures for minor repair of the equipment and contact the manufacturer for major repair - Detect faults and implement necessary measures for their rectification - Demonstrate the emergency procedures in case of breakdown of the drone during operation - Inspect the drone for any damages before and after the drone operation - Check the drone sensors are working properly - Demonstrate the assembling & disassembling of drones - Demonstrate the Integration of sub-sections/ modules - Demonstrate safety precautions while handling batteries - Demonstrate documentation of drone and its peripherals repair
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

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Module 8: Analysis and Assessment of Risk

Mapped to AGR/N1038 v1.0

Terminal Outcomes:

- Demonstrate the risk management procedures
- Describe various emergency procedures of drone operation.
- Discuss ways to promote diversity and inclusion at the workplace.
- Demonstrate different safety management practices for drone operations

Duration: 02:00	Duration: 02:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Discuss about Drone emergency and handling - Explain about emergency procedures during loss of C2-link - Discuss the Consequences of loss of power - Explain Emergency procedures during fly aways (straying) - Explain about Control surface failures - Explain about Human Performance & Pilot Incapacitation - Discuss about Fail safe features of drone - Explain DGCA Safety Regulations & safety guidelines - Explain the importance of buffer zones to avoid contaminating non target crops	- Demonstrate appropriate handling procedures in case of emergencies - Demonstrate necessary procedures during loss of C2-link - Demonstrate procedure to recover drone in case of fly aways - Demonstrate emergency measures during loss of power, control surface failures, flight emergencies, fail safe mechanisms - Assess factors affecting human Performance & Pilot Incapacitation - Assess the risk of contaminating waterbodies, affecting non-target crops - Plan the best possible flight route ensuring safety and minimizing risk - Interpret DGCA Safety Regulations & observe safety guidelines, ATC procedures & Radio Telephony, Weather and meteorology while operating a Drone
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

Module 9: Carryout installation and utilization of Payload
Mapped to AGR/N1038 v1.0

Terminal Outcomes:

- Demonstrate the process of setting up the drone for agriculture and allied operation.
- Demonstrate the mounting and demounting procedures of payload on drone.
- Demonstrate various safety measures for handling payload
- Estimate payload requirements for agriculture operations

Duration: 02:00	Duration: 10:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain Various Types of payloads - What to carry, what not to carry - Explain Parts of payloads - Explain the procedure for Mounting/installation of payloads on the drone - Explain Features of payloads - Explain the use of drone for various agricultural and allied operations - Explain capacities of various drones for handling payloads - Explain the effects of leakage in the payload (chemical)	- Plan & estimate payload considerations, camera options, resolution etc. & other pay load possibilities - Identify types of payloads - What to carry, what not to carry - Identify Parts of payloads - Show how to consider features of payloads suitable for carrying out assigned task - Demonstrate Installation/ mounting of the payload on the drone as per the manufacturer's guidelines - Demonstrate the use of different payloads in drone flying/ maintenance - Estimate the payload capacity of the drone and install accordingly based on specific operation - Examine the payload for any faults and rectify the same - Demonstrate the procedure to operate the drone for specified activities as per the route map
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries, accessories, various payloads for demonstration	

Module 10: Data Analysis and report preparation
Mapped to AGR/N1038 v1.0

Terminal Outcomes:

- Identify relevant images and data videos
- Demonstrate procedure to collect relevant data
- Explain process of data analysis

Duration: 02:00	Duration: 02:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain Principles of Observation - Explain the procedure to interpret elements of image & video - Explain the basic principles of Photogrammetry - Explain Various Types of Image & Video Data - Explain process of data analysis and their interpretation	- Demonstrate the procedure to analyze the collected data such as images and videos and interpret their various elements - Identify various types of image and video data - Show how to collect the data relevant to the specified operation - Demonstrate the procedure for Photogrammetry
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, drone's remote control, batteries	

Module 11: Carryout Drone flying as per the requirement
Mapped to ARG/N1032 v1.0

Terminal Outcomes:

- Demonstrate the procedure for flight simulation.
- Describe various terminology in flight simulation
- Demonstrate practical flying and safe landing
- Demonstrate various safety check pre and post operation
- Demonstrate various flying techniques

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain about flight simulation - Explain how to check controls and sim familiarization - Explain about Pre-flight checks, Take off, Cruise - Explain about Flying techniques such as approach, Go-around & Landing, Post-Flight Checks - Discuss terminology such as Cruise and Turns, Climbing and Climbing turns, Descend & Descending turns - Explain Consequences of disorientation and measures to recover the path - Explain Various flying techniques such as Circuit Flying - Rectangle/ Square/ Circle / Orbit - Explain about Gimbal controls - Explain how to fly at night - Explain Abnormal / Emergency Procedures - Explain introduction to Digital Sky Platform - Explain Safety measures and RPAS familiarization - Explain about Take-off, Climbing, descending and maintaining height - Explain about basic Controls: Pitch, Roll and Yaw - Explain about Mission Planning & Instrument Flying - Explain about Auto Mission & Flight - Explain how to fly Left and right square circuits patterns - Explain how to Level turns in both directions - Explain about Progress Check –	- Identify Basic operating features of a drone flight simulator - Show how to check controls related to drone operation - Select different drones and aerodromes - Demonstrate demo of Flight simulation - Demonstrate Pre-flight checks and start-up - Show how to coordinate drone flight - Demonstrate Take-off drone and carry out flight stage - Demonstrate safe landing of drone - Demonstrate post-flight checks - Demonstrate Practical flying viz. go-around, cruise and turns, climbing, climbing turns, descend & descending turns etc. - Show how to recover disoriented/ straying drone back to path - Demonstrate the circuit flying- Rectangle/Square/Circle/Orbit/Flying - Demonstrate handling gimbal controls (Pan, tilt & zoom) appropriately as per requirements - Demonstrate night flying of drone - Identify emergency and handle it accordingly - Show how to Tackle flight emergencies or abnormal conditions viz. Loss of link, Fly-aways (Straying), Loss of power, Control surface failures etc. - Demonstrate the practical flying with instructor in drone simulator - Identify components of Digital Sky

Multirotor • Explain about GCS monitoring and its uses • Explain about FPV flying	Platform • Demonstrate safety measures during flying • Demonstrate how to operate Remotely piloted aircraft system (RPAS) • Demonstrate how to handle sensitivity of controls to learn the orientation of RPA • Demonstrate basic Controls: Pitch, Roll and Yaw • Show how to maintain levelled turns in both directions to stabilize the drone • Set auto mission & flight

Classroom Aids

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Drone, drone's remote control, batteries

Module 12: Application of pesticides and nutrients with drones
Mapped to ARG/N1030 v1.0

Terminal Outcomes:

- Describe how to prepare the drone for application of pesticides and fertilizers
- Demonstrate application of pesticides and fertilizers using the drone
- Determine soil fertility using various sensors of drone
- Describe the ways to safeguard non-targeted areas during drone operation
- Demonstrate measures for storage of pesticides/crop nutrients
- Demonstrate general maintenance practices post drone operation

Duration: 15:00	Duration: 45:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain Principles of pesticide Applications-Basic Principles, Drone Sop and Policy issues - Explain about type of drone, parts of Agri drone, battery and their replacement, spray tank and balancing, Nozzle replacement etc. - Explain about obstacles in the area of operation for necessary mapping software adjustments - Explain Critical parameter in Spraying viz drone parameter, Agrochemical parameter, environmental issues, operational Parameter, Non Target applications etc. - Discuss about Nozzles and their use, type of nozzles, their classification, droplet measures, calibration of nozzle - Explain the the process of using drones to apply fertilisers, herbicides, pesticides and insecticides uniformly at the identified sites in the field - Explain about formulations and their types, various compatibility issues, formulation management and efficacy evaluation, dosage requirements etc. - Explain about Various types of spray equipment viz. High/Low/Ultra Low volume application equipment - Explain about various documentation	- select appropriate drones which can carry suitably sized reservoirs, which can be filled with fertilizers, herbicides, or pesticides for crop spraying - identify appropriate software and technology with reference to different farming practices for drone utilization in various agriculture activities - Show how to attach the nozzle system in an efficient manner for continuity in spray swath during spray from minimum permitted height above the uniformly distributed crop - Set the drone software to self-adjust its altitude and speed for spraying on desired height above the crop - Track the fields and fix the coordinates appropriately - Demonstrate the use of GPS and map accuracy of the drone to demarcate the target area boundary and safety/buffer margins - plan the appropriate route for the drone operation - demonstrate how to check obstacle presence in the area of operation and make necessary mapping and adjustments in software or peripherals - Demonstrate the procedure to adjust row spacing, row number, borders indentation, obstacle boundary distance, route type with available

- requirements of the organization

- Explain the process of obtaining the necessary regulatory approvals to use a drone for agricultural operations

- Explain spray dynamics, spray volume, droplet size, concentration, drift mechanism, specific nozzles, delivery mechanism and pressure

- Explain how to load pesticide/ fertilizer on the drone according to its payload capacity

- Explain how to use a drone to apply pesticides and fertilizers uniformly over an agricultural field

- List approved agrochemicals by Central Insecticides Board and Committee (CIB&RC)

- Explain recommended dose of agrochemical for the crops and their droplet size for bio efficacy

- Explain agrochemical(liquid/solid) compatibility with the drone spray system and their dilution requirements

- Explain CIB&RC specified guidelines for mixing of agrochemicals

- Explain about active ingredients dosage/ha and PHI interval

- Compare drone sprayers with other sprayers

- Explain how to attach the nozzle system in an efficient manner for continuity in spray swath during spray

- Explain how to make appropriate setting in drone software to self-adjust its altitude and speed for spraying on desired height above the crop

- Explain How to ensure GPS and map accuracy of the drone to demarcate the target area boundary and safety/buffer margins

- Explain general principle of calibration

- software

- Inspect the drone for leakage of pesticides/agrochemicals

- calibrate the drone spray system to ensure recommended accuracy on amount of input to be sprayed

- Inspect the field to know the extent of pest/disease/weeds infestation

- select /use the agrochemicals duly approved by Central Insecticide Board and Registration committee

- plan the chemical spraying as per the spraying schedule at various / critical crop growth and infestation stages as per crop protection guidelines

- demonstrate the dilution of agrochemical in clean water as per recommendations by the manufacturing company using appropriate PPE

- Demonstrate the crop spraying in safer and cost-effective way by its autonomous and pre-programmed on specific schedules and routes.

- Demonstrate the operation of drone to apply soil/crop nutrients in the form/concentration of the nutrients being sprayed/ broadcasted using sensors/ spraying systems installed

- Ensure efficient fertigation use of water using drone (depending on the sprayer system of the drone)

- Demonstrate the use different kinds of sprayer nozzles depending on the form and concentration of the nutrients to be applied

- Evaluate residue and bio efficacy effects

- Demonstrate the use of available advance feature of the software for accurate movement of drone and its control as per manifested various parameters like battery discharge or low voltage in the area operation

- identify and resolve common error messages and corrections by debugging of Software appropriately

- Explain how to Calibrate handheld/vehicle mounted sprayer and drone spray system
- Explain agrochemical safety guidelines prescribed by the manufacturer for their safe handling
- Explain recommended agro-chemical doses for specific crops
- Explain recommended spray schedule at various/ critical crop growth and infestation stages as per crop protection guidelines and phytotoxic assessment
- Explain dilution methods of the agrochemical as per recommendations
- Explain how to perform crop spraying in safer and cost-effective way
- Explain troubleshooting for common malfunctions as per the manufacturer's instructions
- Explain ways to minimize spray drift in non-target field
- Explain the hazardous effect of agri Inputs/chemicals
- Explain Critical operational parameters for drift management
- Explain Importance of emergency eyewash and emergency drench showers and absorbent spill kits within or near storage areas
- Explain how to dispose excess/ obsolete materials and chemicals in accordance with manufacturers recommendation and state law
- Explain the use of multispectral and hyperspectral imaging sensors to determine soil fertility in the field
- Explain about spares and accessories, maintenance of battery
- Explain different type of nozzles, their functions and maintenance
- Differentiate between Recommended dose of fertilizer (RDF) protocol and real-time

- demonstrate how to set the drone to home position post completion of task
- Demonstrate the measures to Safeguard the non-target while pesticide application
- Demonstrate the safety practices while spraying agrochemicals such as avoid windward direction, no human or animal movement within or in the close proximity of the farm during and immediately after the spray operations.
- Demonstrate the use of GPS and GIS-based sensors, along with drones and satellite imagery to get a 3- Dimensional (3D) analysis of the field and the composition of soil in the cultivated region
- Demonstrate drone operation with appropriate sensors to capture high resolution pictures which can be directly sent to the cloud/ software facilitating precise corrective measures in the form of prescription maps
- Demonstrate the use of multispectral and Hyper Spectral/ LiDAR sensor to capture the data of soil fertility before sowing or planting
- Demonstrate the use of recommended Dose of Fertilizer (RDF) Protocol to assess the soil nutrient status and post-process the data to generate the GPS tagged precision nutrient requirements map of the field as an input logic to the nutrient spraying drone with the help of soil indices
- Demonstrate the use of real-time operation protocol to live process the data from multispectral camera for spraying the nutrients simultaneously
- Demonstrate the use of electrostatic nozzle to avoid drift during the operation
- Demonstrate the preparation of the relevant reports in graphical or tabular form as per client requirement
- Demonstrate labelling of all the materials appropriately

operation protocol • Explain how to prepare report in graphical or tabular form as per client requirement • Explain various ICT-driven tools and technologies in agriculture and allied sector • Explain how to maintain necessary data and carry out documentation • Explain about Spray Monitoring form and its components • Read labels carefully to understand safety guidance • Explain provisions of Insecticides Rule 1971	• Demonstrate the SOP to store crop nutrients, herbicides, pesticides are separately stored in a secured building with absorbent spill kits in all liquid storage areas and regularly inspect • Demonstrate the use of emergency eyewash and emergency drench showers within or near the storage area, and dispose the excess or obsolete materials or chemicals in accordance with rules and regulations of manufacturer and state law • examine the drone, their peripherals and relevant attachments post completion of operation for signs of wear and tear or damage • Demonstrate the maintenance of the drone as per the respective manufacturer's instructions using appropriate and recommended tools and equipment • schedule periodic maintenance of drone, their peripherals and relevant attachments as per the maintenance schedule suggested by their respective manufacturers • Show how to fill the spray monitoring form

Classroom Aids
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop
Tools, Equipment and Other Requirements
Drone, drone's remote control, batteries

Module 13: Safety and emergency procedures before and after pesticide spraying through drone operation
Mapped to NOS AGR/N1020 v1.0

Terminal Outcomes:

- Describe pre and post-application precautionary measures.
- Describe precautionary measures during application
- Demonstrate administration of first aid

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain the importance of restricting drone operation in the drone-forbidden area (airport or electronic station) - Explain the local aviation laws and regulations in area of operation - Explain about working and leak proof condition of the drone spraying system - Explain health and safety guidelines - Explain do and don't while solution preparation and carrying out spraying operation - Explain how to fix flying route to minimize turn around and select flying height as per target crop - State appropriate weather conditions and timing for agro-chemical spray - Explain how to - Explain the risk in entering contaminated area affected by drifting spray - Explain the importance of product label requirements and effective measures to avoid any associated risks - Explain the use of anti-drift nozzle to decrease/avoid drift to human, environment, non-target organisms, crops etc. - Explain about evacuation timing and transfer to fresh air post completion of the pesticide spray operation	- Examine the drone for any damages or leakages - Select the place for take-off and landing, tank mix operations etc. - Identify and mark the obstacles (wall, trees) around the field for safe operation - Show how to set up at least buffer zone (as specified by DGCA) between drone treatment and the non-target crop - Identify water sources and do not spray pesticides near water sources (less than 100 m) to avoid polluting water sources - Select nature of plant protection chemicals, especially herbicides - Demonstrate how to perform dilution of agro-chemical as per recommendation - Show how to rinse the empty container to avoid any contamination for next operation - Demonstrate the safe disposal of the hazardous waste/ spills at appropriate place in correct manner as per the legal regulations and law - Show how to store the plant protection products - select a flying route to minimize turn around - Demonstrate spraying with pure water first to test operation for at least 5 min - Demonstrate two step dilutions to fully dissolve the pesticide

- Explain about the insecticide rule 1971

- Explain about various warning signs to be setup in the spray area for people awareness

- Explain preventative measure during transport for leakage of remaining plant protection products

- Explain about the maintenance prescription given by the manufacturer of drone and their peripherals

- Explain the importance of operation team to stay at the downwind end of the field and backlightdirection

- Explain the risk of burning or burying hazardous waste

- Explain about post spraying care such as shower and wearing clean clothes

- Describe the basic safety checks to be done before the operation of any equipment

- Describe the common first aid procedures to be followed in case of emergencies.

- Explain the importance of reporting details of first aid administered, to the reporting officer/ doctor, in accordance with workplace procedures.

- Show how to adopt proper pressure for optimized droplet spectrum (>l00pm).

- Demonstrate proper storage of unused chemicals during transport

- Demonstrate first aid procedures for dealing with accidents, fires and emergencies.

- Demonstrate the use of emergency equipment in accordance with manufacturers' specifications and workplace requirements.

- Prepare a list of relevant hotline/ emergency numbers.

Classroom Aids:

Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant Handbook.

Tools, Equipment and Other Requirements

Drone, water, recommended   samples of pesticides/ fertilizers, Personal Protective Equipment, First Aid Kit, Equipment used in Medical Emergencies.

Module 14: Carrying out multispectral mapping for various agriculture and allied activities using drone
Mapped to NOS AGR/N1021 v1.0

Terminal Outcomes:

- Describe the process of preparing the drone for carrying out farm mapping.
- Demonstrate crop surveillance and crop health monitoring using a drone

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain various uses of drones, such as monitoring the effects of weather, , crop growth and yield, weed and pest/ insect infestation, etc. - Explain how to use the software to plan a route - Explain the use of GPS and GIS-based sensors - Explain how to do analysis of the field and the soil in the target region - Explain about moisture deficit and irrigation water requirements - Explain concept of INM, IPM, IWM etc. for the respective crops and measuring of their indices - Explain how to determine the most effective patterns for planting, managing crops, soil, and other required field operations - Explain how to regulate the nutrient level in the soil based on the data captured by electrochemical sensors	- Demonstrate how to set the drone appropriately ensure it takes the required images and capture required data for intended operation - Demonstrate how to use the software to plan a route - Demonstrate the usage of GPS and GIS-based sensors, along with drones and satellite imagery to get a 3- Dimensional (3D) analysis of the field and the composition of soil in the cultivated region - Identify with help of drones loaded with sensors moisture deficits parts of fields using multispectral indices - Demonstrate how to set up the drone appropriately for capturing the required images and data for intended operation - Demonstrate how to use the feature of crop surveillance and crop health assessment for facilitating agricultural insurance and for cross verifying farmers' insurance claims - Demonstrate how to obtain 3D images /maps of existing soil to monitor potential soil health indicators
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
Drone, applicable peripherals and sensors, Personal Protective Equipment, First Aid Kit, Equipment used in Medical Emergencies.	

Module 15: 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 16: On-the-Job Training
Mapped to QP- AGR/Q1006: Kisan Drone Operator

Duration: 120:00
Location: On Site
Terminal Outcomes

- Comprehend Stakeholders & their laws (Basic) as per Drone Rules 2021
- Basic flight principles in drone operation
- Prepare for the drone operation
- Procedures related to ATC & Radio telephony
- Fixed-wing Operations and Aerodynamics
- Rotorcraft Operations and Aerodynamics
- Hybrid Operations and Aerodynamics
- Weather and Meteorology
- Undertake drone equipment maintenance
- Perform Basic Assembly and Maintenance of drone
- Risk Assessment & Analysis
- Install and utilize payload
- Collection of Drone data & Analysis
- Flight Simulator Training
- Practice drone flying with Instructor/ Solo Flying
- Prepare the drone for application of pesticides and fertilizers
- Apply pesticides and fertilizers using the drone
- Safeguard the non-target while pesticide application
- Drone, sensors data processing software and soil nutrient spraying system
- Precautions for storage of crop nutrients/ pesticides
- Undertake post operation drone maintenance
- Undertake pre-application precautionary measures
- Follow precautionary measures during application
- Adhere to post application precautionary measures
- Identify employability opportunities
- Identify and plan for entrepreneurship opportunities in drone operations
- Follow the entrepreneurial practices
- Practice inclusive practices at workplace related to gender and PwD sensitization
- Communicate effectively at the workplace
- Maintain personal hygiene
- Maintain clean and safe workplace
- Administer appropriate emergency procedures

Annexure

Trainer Requirements

Trainer Prerequisites					
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	*Specialization*	*Years*	*Specialization*	
10th	Not Applicable	0 *		0.5	UAV/Drone flight operation	Mandatory to complete instructor course in drone flight operations from DGCA/DGCA recognized organization (RPTO) * Being Future Skills, Industry Experience will be on case to case basis. For Ex-Defence/Para-military / Police personnel certificate course in UAV flight operations from DGCA/ DGCA recognized organization (RPTO) / parent organization
12th	Not Applicable	0 *		0.5	UAV/Drone flight operation	Mandatory to complete instructor course in drone flight operations from DGCA/DGCA recognized organization (RPTO) * Being Future Skills, Industry Experience will be on case to case basis. For Ex-Defence/Para-military / Police personnel certificate course in UAV flight operations from DGCA/ DGCA recognized organization (RPTO) / parent organization
Graduate	Any Stream	0 *		0		Mandatory to complete instructor course in drone flight operations from DGCA/DGCA recognized organization (RPTO) * Being future skills, Industry Experience will be

							on case to case basis.
							For Ex-Defence/Para-military / Police personnel certificate course in UAV flight operations from DGCA/ DGCA recognized organization (RPTO) / parent organization

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role "**Kisan Drone Operator**", mapped to QP: "AGR/Q1006, v2.0", 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". The mminimum 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*	
12th /H.sc	Any Stream	1.0	UAV/Drone flight operation #	0		For Ex-Defence/Para-military/ Police personnel certificate course in UAV flight operations from DGCA/DGCA Recognized Organization (RPTO) / parent organization
Graduate	Any Stream	0.5	UAV/Drone flight operation #	0		For Ex-Defence/Para-military / Police personnel certificate course in UAV flight operations from DGCA/ DGCA Recognized Organization (RPTO)/ parent organization

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role "**Kisan Drone Operator**", mapped to QP: "AGR/Q1006, v2.0", Minimum accepted score is 80%	Certified for the Job Role: "Assessor (Vet and Skills)", mapped to the Qualification Pack: "MEP/Q2701, v2.0", with a minimum score of 80%.

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. <u>Multiple Choice Questions</u>: To assess basic knowledge (Objective/Subjective)
2. <u>Viva:</u> To assess awareness on processes (Oral and/or written questioning)
3. <u>Practical:</u> 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 the ground through qualified and ToA certified assessors.

An individual must have adequate knowledge and skills to perform a specific task, weightage for different aspects of the assessment is 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 empaneled assessment partners. Based on the results of the 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 the assessment location.

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

- Multilingual assessments (ASCI is conducting the assessments in 13 + languages pan India)
- Rubric driven assessments in Practical/Viva sections and responses recorded accordingly
- All responses, data, records and feedback are stored digitally on the 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 the training / within 7 days of completion of training.

- Assessment will be conducted at the training venue

- The 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 practice 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 questions, etc. which will test the trainee on his theoretical knowledge of the subject.

- The theory, practical and viva assessments will be carried out on the same day. In case of a greater number of candidates, the number of assessors and venue facilitation be increased and facilitated

Assessment			
Assessment	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 the usability of job roles/advantages /importance of adherence to procedures. Viva will be used to gauge trainee's confidence and correct knowledge in handling the job situation

The question paper is 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 a 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 that 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 the 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 a 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, dos and don'ts, subjective questions to check the understanding of practical tasks.

The assessor has to go through an orientation program organized by the Assessment Agency. The training would give an overview to the assessors on the overall framework of QP evaluation. The assessor shall be given a NOS and PC level overview of each QP as applicable. The 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 that will maintain the standardization of the marking scheme.

Type of Evidence and Evidence Gathering Protocol:

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

- GeoTagging to track ongoing assessment
- AA's coordinator emails the list of documents and evidence (photos and videos) to the assessor one day before the assessment. The list is mentioned below:
    - Signed Attendance sheet
    - Assessor feedback sheet
    - Candidate feedback sheet

ASCI
Agriculture Skill Council of India

Skill India

NSDC
National Skill Development Corporation
Transforming the skill landscape

- o Assessment checklist for assessor
- o Candidate Aadhar/ID card verification
- o Pictures of the classroom, labs to check the availability of adequate equipment's and tools to conduct the training and assessment
- o Pictures and videos of Assessment, training feedback and infrastructure.

- Apart from the Assessor, a Technical assistant is popularly known as Proctor also ensures the proper documentation and they verify each other's tasks.

- To validate their work on the day of the assessment, regular calls and video calls are done.

- On-boarding and training of the assessor and proctor are done on a timely basis to ensure that the 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 a check on assessment quality and ensure assessment is carried out in a fair and transparent manner

- Aadhar verification of candidates

- Evening Check (Post Assessment): Calls are made to the ground team to ensure the event is over by what time and the documentation is done properly or not.

- TP Calling: To keep a check on malpractices, an independent audit team calls the TP on a recorded line to take confirmation if there was any malpractice activity observed in the assessment on part of the AA/SSC team. If calls are not connected, an email is sent to TP SPOC for taking their confirmation

- Video and Picture Evidence: Backend team collects video and pictures for assessment on a real-time basis and highlights any issue such as students sitting idle/ trainer helping the candidates during the assessment.

- Surprise Visit: Time to time SSC/AA Audit team can visit the assessment location and conduct a surprise audit for the assessment carried out by the ground team.

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

Method for assessment documentation, archiving, and Access:

- ASCI have a 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 were captured and stored in the System with Time-Stamps at the end of AAs and SSC. NOS-wise and PC-wise scores can

be generated.

- • Maker Checker concept: One person prepares the results and another audit result which is internally approved by AA at first and then gets vetted at the end of SSC

- • All softcopies of documents are received from the on-ground tech team over email. The same is downloaded by our internal backend team and saved in Repository. The repository consists of scheme-wise folders. These scheme-wise folders have two 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 candidates shall be stored and available for review (retained for 5 years/ till the conclusion of the project or scheme)

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	The 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 task. It is the ability to work or produce a tangible work output by applying cognitive, affective or psychomotor skills.
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	The 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
UA	Unmanned Aircraft
RPA	Remotely Piloted Aircraft
UAVS	Unmanned Aircraft Vehicle System
FRTOL	Flight Radio Telephony Operator License
NOS	National Occupational Standard (s)
NSQF	National Skills Qualifications Framework
OJT	On-the-job Training
QP	Qualifications Pack
DGCA	Directorate General of Civil Aviation
RPTO	Remote Pilot Training organization
PwD	People with Disability
PPE	Personal Protective Equipment
ATC	Air Traffic Control
METAR	Met Terminal Aviation Routine Weather Report