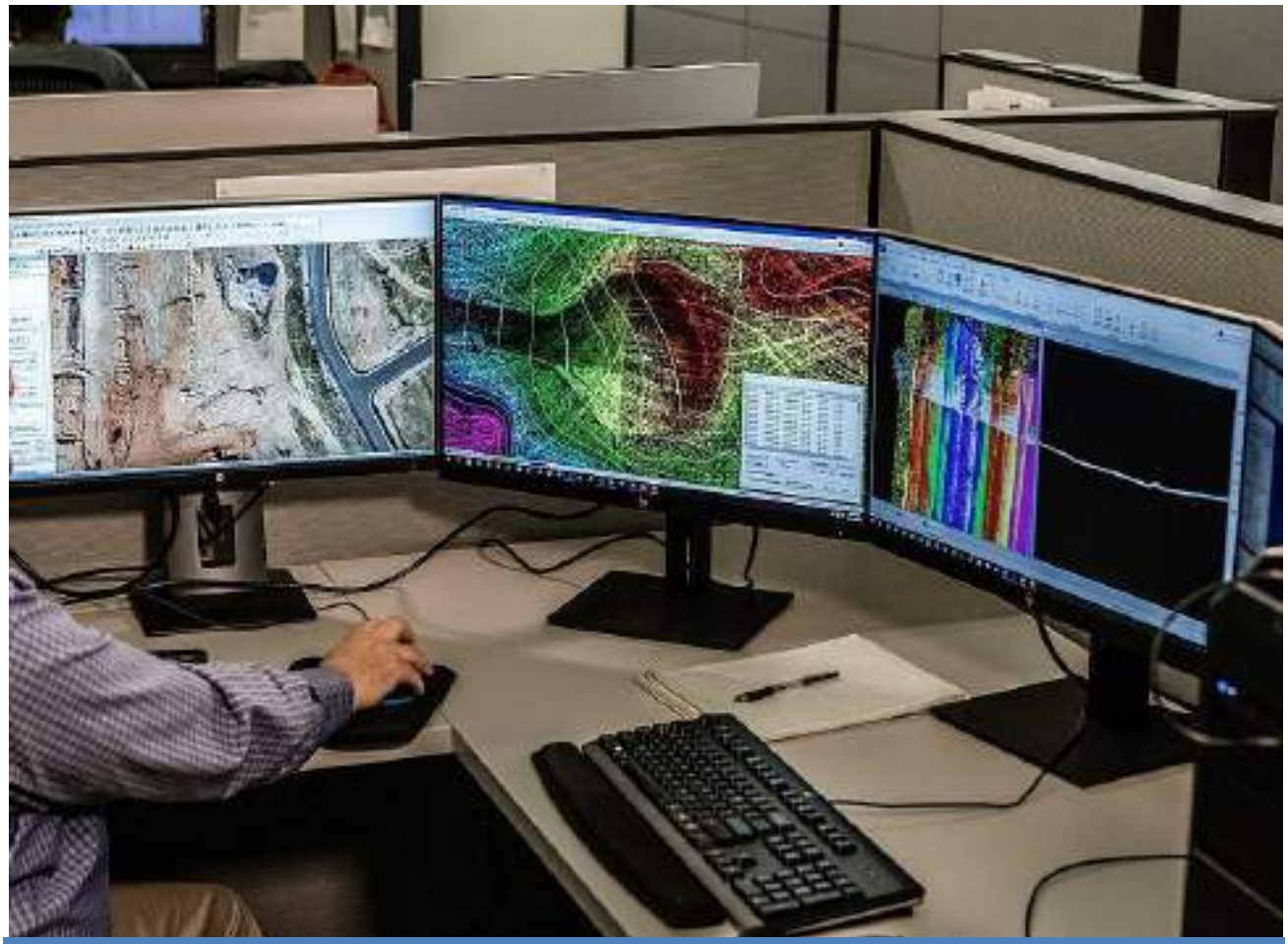

Model Curriculum

QP Name: Drone Data Processor

QP Code: TEL/Q6223

Version: 1.0

NSQF Level: 5

Telecom Sector Skill Council || 3rd Floor, Plot No. 126, Sector – 44
Gurgaon – 122003

Table of Contents

Training Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Network Operation and Maintenance
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2523.0100
Minimum Educational Qualification and Experience	Graduate (Completed 2nd Year of 3year/4year (Electronics/Telecom/CS)) with NA of experience OR Graduate (Completed 1st Year of 3year/4year (Electronics/Telecom/CS)) with 1 Year of experience and 6 months in relevant experience OR Completed 3-year diploma after 10th with 1 Year of experience and 6 months in relevant experience OR Previous relevant Qualification of NSQF Level (NSQF Level 4.5) with 1 Year of experience and 6 months in relevant experience OR Previous relevant Qualification of NSQF Level (NSQF Level 4) with 3 Years of experience in relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	30-05-2024
Next Review Date	30-05-2027
NSQC Approval Date	30-05-2024
QP Version	1.0
Model Curriculum Creation Date	30-05-2024
Model Curriculum Valid Up to Date	30-05-2027
Model Curriculum Version	1.0
Minimum Duration of the Course	540 Hours
Maximum Duration of the Course	540 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:

- Demonstrate proficiency in importing, pre-processing, and synthesizing drone and remote sensing data, including 3D point cloud spatial data, aerial imagery, and remote sensing data such as thermal, infrared, and RF data.
- Develop the ability to perform thorough analysis of GIS data, extract relevant features, and generate 3D models and orthomosaics for further analysis and decision-making processes.
- Acquire the skills necessary to identify equipment and infrastructure faults using thermal imaging analysis, RF signal strength analysis, and geospatial mapping techniques.
- Learn to collect RF signal data, analyze signal strength, detect interference, and conduct frequency analysis to optimize RF mapping and enhance communication infrastructure performance.
- Understand the importance of data organization for quality checks and will be able to perform automated analysis of accurate data, ensuring data integrity and efficiency in processing large datasets.

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
TEL/N6273: Data extraction/collection **NOS Version-1.0** **NSQF Level- 5**	**20:00**	**40:00**	**30:00**	**-**	**90:00**
Module 1: Data extraction and collection	20:00	40:00	30:00	-	90:00
TEL/N6274: Processing of Collected Data **NOS Version-1.0** **NSQF Level- 5**	**20:00**	**40:00**	**30:00**	**-**	**90:00**
Module 2: Data Processing and Integration	20:00	40:00	30:00	-	90:00
TEL/N6275: Analyze and Project the Collected Data **NOS Version-1.0** **NSQF Level- 5**	**15:00**	**45:00**	**30:00**	**-**	**90:00**
Module 3: Data Analysis and Projection Techniques	15:00	45:00	30:00	-	90:00

TEL/N6276: Analise Remote Sensing Data **NOS Version-1.0** **NSQF Level- 5**	**15:00**	**45:00**	**30:00**	**-**	**90:00**
Module 4: Remote Sensing Data Analysis and Interpretation	15:00	45:00	30:00	-	90:00
TEL/N6277: Identify Equipment and Infra Faults **NOS Version-1.0** **NSQF Level- 5**	**10:00**	**20:00**	**30:00**	**-**	**60:00**
Module 5: Fault Identification and Analysis in Equipment and Infrastructure	10:00	20:00	30:00	-	60:00
TEL/N6278: RF Mapping and Optimization **NOS Version-1.0** **NSQF Level- 5**	**10:00**	**20:00**	**30:00**	**-**	**60:00**
Module 6: RF Signal Mapping and Optimization Fundamentals	10:00	20:00	30:00	-	60:00
DGT/VSQ/N0102: Employability Skills (60 Hours) **NOS Version No. 1** **NSQF Level- 4**	**60:00**	**00:00**	**00:00**	**-**	**60:00**
Module 7: Employability Skills	60:00	00:00	00:00	-	60:00
Total Duration	**150:00**	**210:00**	**180:00**	**-**	**540:00**

Module Details

Module 1: Data Extraction and Collection

Mapped to NOS: TEL/N6273, v1.0

Terminal Outcomes:

- Define the components of drones and associated sensors involved in calibration.
- Explain the importance of accurate data measurements in drone calibration.
- Create 2D orthomosaics from individual images using principles of photogrammetry.
- Adjust sensor settings based on environmental conditions and data collection requirements.

Duration: 20:00	**Duration: 40:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the components of drones and associated sensors involved in calibration. • Identify the factors influencing the optimal overlap between images in drone flight planning. • Explain the importance of accurate data measurements in drone calibration. • Describe the significance of data compatibility with downstream processing tools in drone data extraction. • Explain the process of data extraction and collection using drones. • Utilize software interfaces for inputting parameters and executing calibration processes effectively. • Analyze selected data formats to ensure they meet project specifications and industry standards. • Evaluate the effectiveness of ground control points (GCPs) in enhancing calibration precision. • Generate comprehensive reports detailing findings derived from 2D DEM processing. • Evaluate elevation data discrepancies and rectify anomalies in DEMs derived from drone data.	• Identify and calibrate various sensors on drones for accurate data measurements. • Plan drone flights to ensure optimal overlap between images. • Apply techniques to adjust sensor settings based on environmental conditions. • Create 2D orthomosaics from individual images using principles of photogrammetry. • Adjust sensor settings based on environmental conditions and data collection requirements. • Execute the calibration process effectively using software interfaces. • Perform accuracy assessments of orthomosaics and identify artifacts or irrelevant data. • Generate 2D DEMs and apply filtering and smoothing techniques to enhance quality.

Classroom Aids
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop
Tools, Equipment and Other Requirements
Drone, Drone Sensors (Inertial Measurement Unit (IMU), Global Navigation Satellite System (GNSS), RGB Camera, Thermal Camera, LiDAR Sensor), Software (DroneDeploy, Pix4D, Agisoft Metashape), GPS Receiver, External Hard Drives, USB Flash Drives, cones, flags, Adobe Photoshop, Safety Equipment (Safety goggles, First aid kit), Fire extinguisher

Module 2: Data Processing and Integration

Mapped to NOS: TEL/N6274, v1.0

Terminal Outcomes:

- Describe the components of drones and associated sensors used for accurate data measurements.
- Explain the importance of optimal flight planning for drone operations.
- Process raw drone imagery efficiently for 3D reconstruction.
- Evaluate the quality of orthomosaics and DEMs based on project requirements.

Duration: 20:00	**Duration: 40:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the components of drones and associated sensors used for accurate data measurements. • Explain the importance of optimal flight planning for drone operations. • Define various types of drone data and their significance in data processing. • Understand the necessity of sensor calibration for ensuring accurate data measurements. • Explain the process of adjusting sensor settings based on environmental conditions. • Interpret the importance of compatibility of data formats with downstream processing tools. • Apply principles of photogrammetry and image acquisition for capturing drone data. • Apply georeferencing techniques to ensure spatial accuracy in orthomosaic creation. • Apply filtering and smoothing techniques to enhance the quality of 2D DEMs. • Analyze drone imagery to filter out artifacts and irrelevant data from orthomosaics. • Analyze elevation data to identify anomalies and discrepancies for rectification. • Analyze project specifications and industry standards to verify selected data formats.	• Calibrate drones and associated sensors to ensure accurate data measurements. • Plan drone flights with optimal overlap for accurate data extraction. • Process raw drone imagery efficiently for 3D reconstruction. • Implement accurate Ground Control Points (GCPs) for precise calibration. • Perform accuracy assessments by comparing orthomosaics with ground truth data. • Extract 2D DEM data files from external memory sources. • Integrate drone-acquired elevation data with existing 2D DEMs. • Generate realistic and detailed textures on 3D meshes using original images. • Generate comprehensive reports detailing findings from DEM processing for stakeholders. • Evaluate the quality of orthomosaics and DEMs based on project requirements.

Classroom Aids:
Training Kit (Trainer **G**uide, Presentations). Whiteboard, Marker, Projector, Laptop
Tools, Equipment and Other Requirements
Drone, Sensors (Accelerometers, Tilt Sensors, Current Sensors, Magnetic Sensors), Drone Flight Planning Software (e.g., DroneDeploy, Pix4D, DJI Terra), GIS Software (e.g., ArcGIS, QGIS), Image Processing Software (e.g., Adobe Photoshop), External Hard Drive, USB Flash Drive, Lens Distortion Measurement Grids, Checkerboard Patterns

Module 3: Data Analysis and Projection Techniques

Mapped to NOS: TEL/N6275, v1.0

Terminal Outcomes:

- Identify the fundamental principles of remote sensing technologies and their applications in GIS.
- Comprehend the principles of 3D modeling techniques, including point cloud generation and mesh creation.
- Generate 3D models from drone-collected data, including point cloud generation and mesh creation.

Duration: 15:00	**Duration: 45:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the process of extracting spatial data from drone sensors and ensuring georeferencing. • Explain the importance of integrating diverse datasets into GIS environments for comprehensive analysis. • Define various GIS analysis methods such as spatial queries, overlay analysis, and buffer analysis. • Identify the fundamental principles of remote sensing technologies and their applications in GIS. • Understand the necessity of data alignment and coordinate projections for spatial consistency in GIS. • Explain the process of image processing algorithms and their role in feature extraction from drone-collected data. • Interpret the steps involved in creating orthomosaics, including image registration and colour balancing. • Comprehend the principles of 3D modeling techniques, including point cloud generation and mesh creation. • Apply georeferencing techniques to ensure spatial accuracy in drone data integration. • Utilize GIS software to perform spatial queries and overlay analysis for specific information extraction. • Apply image processing algorithms to	• Extract spatial data from drone sensors and align it with the desired coordinate system. • Integrate diverse datasets into GIS environments for comprehensive spatial analysis. • Perform spatial queries and overlay analysis using GIS software to extract specific information. • Utilize image processing algorithms to enhance and manipulate raw drone imagery for feature extraction. • Analyze drone imagery to identify artifacts and irrelevant data for filtration. • Analyze elevation data to identify anomalies and discrepancies for rectification. • Analyze project specifications and industry standards to verify selected data formats. • Generate 3D models from drone-collected data, including point cloud generation and mesh creation. • Create orthomosaics by registering individual images, adjusting image overlap, and applying image stitching algorithms. • Synthesize visual information onto 3D meshes to enhance realism and detail in the generated models. • Generate comprehensive metadata for spatial datasets, documenting key information for effective communication with stakeholders. • Evaluate the quality of orthomosaics and DEMs

enhance and manipulate raw drone imagery for feature extraction. ● Apply quality control checks and preprocessing steps for accurate data preparation in 3D modeling.	based on project requirements. ● Evaluate the accuracy and reliability of processed spatial data for 3D modeling and feature extraction. ● Evaluate the completeness and fidelity of generated 3D models and orthomosaics.
Classroom Aids:	
Training Kit (Trainer **G**uide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
GIS Software (ArcGIS, QGIS, GRASS GIS), Remote Sensing Software (ENVI, Erdas Imagine, SNAP), Image Processing Software (Adobe Photoshop, GIMP, ImageJ), 3D Modeling Software (AutoCAD, Blender, SketchUp), GPS Receiver (Garmin GPSMAP, Trimble GPS), Drone Camera, Orthophoto Software (Pix4D, Agisoft Metashape, DroneDeploy), LiDAR Processing Software (TerraScan, Global Mapper, Lastools), Metadata Management Software (ArcCatalog, GeoNetwork, MetadataTouch)	

Module 4: Remote Sensing Data Analysis and Interpretation

Mapped to NOS: TEL/N6276, v1.0

Terminal Outcomes:

- Explain methods for analyzing thermal and infrared data to detect anomalies and patterns.
- Explain the necessity of metadata tagging and database organization for efficient data management.
- Analyze thermal variations across landscapes and interpret temperature distributions.

Duration: 15:00	**Duration: 45:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the process of calibrating TIR sensors for accurate thermal imagery. • Define temperature calibration techniques for converting raw thermal data into meaningful temperature values. • Explain methods for analyzing thermal and infrared data to detect anomalies and patterns. • Identify techniques for quantifying thermal variations across landscapes and interpreting temperature distributions. • Define frequency analysis and pattern recognition algorithms used in analyzing RF data. • Understand the importance of integrating diverse datasets for comprehensive spatial analysis. • Explain the necessity of metadata tagging and database organization for efficient data management. • Interpret the principles behind automated analysis of Thermal, Infrared, and RF data. • Comprehend the role of machine learning in automating data analysis and pattern recognition.	• Calibrate TIR sensors to ensure accurate thermal measurements. • Apply temperature calibration techniques to convert raw thermal data into temperature values. • Analyze thermal and infrared data to detect anomalies and patterns. • Generate thermal maps and visualizations to represent temperature distributions spatially. • Retrieve and analyze RF data collected from drone storage systems. • Implement metadata tagging and database management for organizing Thermal, Infrared, and RF data. • Utilize industry-standard software tools for automated analysis of Thermal, Infrared, and RF data. • Develop streamlined processing workflows and implement validation procedures for automated analysis. • Analyze thermal variations across landscapes and interpret temperature distributions. • Conduct frequency analysis and identify trends or anomalies in collected RF signals. • Compare automated analysis results with manual or ground truth assessments to ensure consistency. • Design automated reporting mechanisms to present analysis results effectively. • Develop systematic approaches for categorizing Thermal, Infrared, and RF data based on parameters such as location and time.

	• Customize or develop algorithms as needed to address specific requirements or challenges posed by the dataset. • Incorporate machine learning models and techniques to automate identification of patterns and anomalies within the data. • Design automated processing workflows and incorporate parallel processing or distributed computing solutions for efficient analysis.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
TIR Sensor Calibration Equipment (Thermal Imaging Camera, Blackbody Calibration Source, Reference Thermometer), Thermocouples, Data Analysis Software (MATLAB, NumPy, SciPy, Pandas), Spectrum analyzers, Signal generators, RF power meters	

Module 5: Fault Identification and Analysis in Equipment and Infrastructure

Mapped to NOS: TEL/N6277, v1.0

Terminal Outcomes:

- Explain the principles behind planning drone flight paths for telecom equipment inspection.
- Define normal operating temperatures for various types of telecom equipment.
- Demonstrate the integration of acquired geospatial data with existing maps or infrastructure layouts of telecom equipment.

Duration: 10:00	**Duration: 20:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles behind planning drone flight paths for telecom equipment inspection. • Describe the significance of using software tools like Pix4D, Metashape, DroneDeploy, WebODM for thermal image analysis. • Define normal operating temperatures for various types of telecom equipment. • Understand the correlation between abnormal heat signatures in thermal images and potential equipment malfunctions. • Apply temperature calibration techniques to convert raw thermal data into meaningful temperature values. • Utilize machine learning models for automated detection of thermal anomalies associated with equipment faults. • Apply spatial analysis tools and algorithms for systematic processing and interpretation of geospatial data. • Analyze thermal images to identify abnormal heat patterns and correlate them with potential equipment malfunctions. • Analyze RF signal strength data collected by drones to interpret variations and identify potential equipment issues.	• Plan drone flight paths to ensure comprehensive coverage of the target area for telecom equipment inspection. • Utilize software tools like Pix4D, Metashape, DroneDeploy, WebODM for the analysis of thermal images. • Execute temperature calibration techniques to convert raw thermal data into meaningful temperature values. • Utilize machine learning models for automated fault detection based on spatial patterns and anomalies. • Demonstrate the correlation between abnormal heat signatures in thermal images and potential equipment malfunctions. • Demonstrate the integration of acquired geospatial data with existing maps or infrastructure layouts of telecom equipment. • Perform spatial analysis using automated spatial analysis tools and algorithms. • Perform RF signal strength analysis to identify potential equipment issues. • Practice using machine learning models for automated fault detection in geospatial data. • Practice generating three-dimensional (3D) models of telecom infrastructure

• Analyze captured geospatial data to identify irregularities or misalignments in the spatial distribution of telecom equipment. • Evaluate the accuracy and reliability of fault detection in thermal imaging analysis through temperature calibration techniques. • Evaluate the effectiveness of machine learning models for automated fault detection based on spatial patterns and anomalies. • Generate thermal maps representing temperature distributions across telecom equipment. • Create three-dimensional (3D) models of telecom infrastructure using geospatial data.	using geospatial data.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drones, Thermal Imaging Cameras, Software Tools (Pix4D, DroneDeploy, ArcGIS, QGIS), Thermometers, RF Signal Strength Measurement Tools (Spectrum Analyzer, RF Signal Meter)	

Module 6: RF Signal Mapping and Optimization Fundamentals

Mapped to NOS: TEL/N6278, v1.0

Terminal Outcomes:

- Explain the fundamental principles of spatial data, GIS concepts, and coordinate systems.
- Describe image processing algorithms used in spatial data analysis.
- Define 3D modeling techniques, including point cloud generation, surface reconstruction, mesh creation, and quality assessment.
- Conduct terrain analysis to derive information about elevation, slope, aspect, and other terrain characteristics.

Duration: 10:00	**Duration: 20:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the fundamental principles of spatial data, GIS concepts, and coordinate systems. • Define remote sensing technologies and their applications in feature extraction, GIS analysis, and 3D modeling. • Describe image processing algorithms used in spatial data analysis. • Define various GIS analysis methods such as spatial queries, overlay analysis, buffer analysis, network analysis, and terrain analysis. • Explain quality control checks, preprocessing steps, and data organization techniques for spatial data processing. • Define 3D modeling techniques, including point cloud generation, surface reconstruction, mesh creation, and quality assessment. • Describe the steps involved in creating orthomosaics, including image registration, adjustment of image overlap, colour balancing, image stitching algorithms, and orthorectification techniques. • Define the application of TIR sensors, temperature calibration techniques, and the analysis of thermal and infrared data in GIS platforms.	• Extract spatial data from drone sensors and ensure georeferencing and alignment with the desired coordinate system. • Integrate diverse datasets into GIS environments and perform spatial queries and analyses. • Conduct overlay analysis, buffer analysis, and network analysis using GIS software. • Generate 3D models from drone-collected data and perform quality assessment. • Create orthomosaics by registering individual images, adjusting image overlap, and applying image stitching algorithms. • Apply temperature calibration techniques to convert raw thermal data into meaningful temperature values. • Perform image processing to enhance and manipulate raw drone imagery for feature extraction. • Conduct terrain analysis to derive information about elevation, slope, aspect, and other terrain characteristics. • Implement preprocessing steps to clean and prepare data for 3D modeling and

• Understand the principles of planning drone flight paths and extracting spatial data from drone sensors. • Comprehend the integration of diverse datasets into GIS environments and the importance of spatial consistency. • Understand the significance of metadata generation for spatial datasets and its documentation. • Grasp the specific features or objects of interest within collected drone data and the use of remote sensing techniques for data extraction. • Understand the process of 3D modeling, including point cloud generation, surface reconstruction, and mesh creation. • Comprehend the principles behind orthomosaic creation and the application of image registration and stitching algorithms. • Understand the importance of temperature calibration techniques and their impact on fault detection in thermal imaging analysis.	orthomosaic creation. • Apply orthorectification techniques to correct for terrain variations and camera tilt in orthomosaic creation. • Use machine learning models for automated fault detection based on spatial patterns and anomalies. • Generate comprehensive metadata for spatial datasets and document key information for effective communication with stakeholders. • Utilize image stitching algorithms to seamlessly merge individual images into a coherent orthomosaic. • Perform quality control checks and rectify errors or inconsistencies in collected data. • Verify the appropriate coordinate system for consistent and accurate 3D modeling and orthomosaic creation. • Apply visual information from original images onto 3D meshes to enhance realism and detail in the generated model. • Utilize automated spatial analysis tools and algorithms to process and interpret geospatial data.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Drone, GIS Software (ArcGIS, QGIS, GRASS GIS), Remote Sensing Software (Pix4D, Agisoft Metashape, DroneDeploy, WebODM), Image Processing Software (Adobe Photoshop, MATLAB), Thermal Sensors (FLIR Systems thermal cameras, DJI Zenmuse XT Thermal Cameras), GPS	

Module 7: DGT/VSQ/N0102: Employability Skills (60 Hours)

Mandatory Duration: 60:00			
Location: On-Site			
S.No.	**Module Name**	**Key Learning Outcomes**	**Duration(hours)**
1.	Introduction to Employability Skills	• Discuss the Employability Skills required for jobs in various industries • List different learning and employability related GOI and private portals and their usage	1.5 Hours
2.	Constitutional values - Citizenship	• 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 • Show how to practice different environmentally sustainable practices.	1.5 Hours
3.	Becoming a Professional in the 21st Century	• Discuss importance of relevant 21st century skills. • 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. • Describe the benefits of continuous learning.	2.5 Hours
4.	Basic English Skills	• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and interpret text written in basic English • Write a short note/paragraph / letter/e -mail using basic English	10 Hours
5.	Career Development & Goal Setting	• Create a career development plan with well-defined short- and long-term goals	2 Hours
6.	Communication Skills	• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. • Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team	5 Hours
7.	Diversity & Inclusion	• Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD • Discuss the significance of escalating sexual	2.5 Hours

		harassment issues as per POSH act.	
8.	Basic English Skills	• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and interpret text written in basic English • Write a short note/paragraph / letter/e -mail using basic English	10 Hours
9.	Career Development & Goal Setting	• Create a career development plan with well-defined short- and long-term goals	2 Hours
10.	Communication Skills	• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. • Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team	5 Hours
11.	Diversity & Inclusion	• Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD • Discuss the significance of escalating sexual harassment issues as per POSH act.	2.5 Hours
12.	Financial and Legal Literacy	• Outline the importance of selecting the right financial institution, product, and service • Demonstrate how to carry out offline and online financial transactions, safely and securely • List the common components of salary and compute income, expenditure, taxes, investments etc. • Discuss the legal rights, laws, and aids	5 Hours
13.	Essential Digital Skills	• Describe the role of digital technology in today's life • Demonstrate how to operate digital devices and use the associated applications and features, safely and securely • Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely • Create sample word documents, excel sheets and presentations using basic features • Utilize virtual collaboration tools to work effectively	10 Hours
14.	Entrepreneurship	• Explain the types of entrepreneurship and enterprises • Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its	7 Hours

		mitigation plan ● Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement ● Create a sample business plan, for the selected business opportunity	
15.	Customer Service	● Describe the significance of analyzing different types and needs of customers ● Explain the significance of identifying customer needs and responding to them in a professional manner. ● Discuss the significance of maintaining hygiene and dressing appropriately	5 Hours
16.	Getting Ready for apprenticeship & Jobs	● Create a professional Curriculum Vitae (CV) ● Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively ● Discuss the significance of maintaining hygiene and confidence during an interview ● Perform a mock interview ● List the steps for searching and registering for apprenticeship opportunities	8 Hours

LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS

Sl No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required
2.	UPS	As required
3.	Scanner cum Printer	As required
4.	Computer Tables	As required
5.	Computer Chairs	As required
6.	LCD Projector	As required
7.	White Board 1200mm x 900mm	As required
Note: Above Tools &Equipment not required, if Computer LAB is available in the institute.		

Module 8: On-the-Job Training

Mandatory Duration: 180:00	Recommended Duration: 00:00
Location: On-Site	

Terminal Outcomes

1. Calibrate sensors on drones to ensure accurate data measurements, learning how to adjust settings based on environmental conditions.
2. Plan drone flights to ensure optimal overlap between images, practicing techniques to maximize data extraction efficiency.
3. Process raw drone imagery to create 2D orthomosaics using photogrammetry principles, adjusting sensor settings and executing calibration processes effectively.
4. Generate 2D DEMs from drone-collected elevation data, applying filtering and smoothing techniques to enhance quality.
5. Create 2D orthomosaics from individual images, applying techniques for image registration, adjustment of image overlap, and color balancing.
6. Extract spatial data from drone sensors, ensuring georeferencing and alignment with the desired coordinate system.
7. Analyze elevation data to identify anomalies and discrepancies for rectification, practicing techniques to verify and enhance DEM accuracy.

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
3 years in Engineering Diploma	Electrical/Electronics	5	NA	2	NA	Eligible for ToT program
Graduate	Electrical/Electronics	3	NA	2	NA	Eligible for ToT program
Trainer Certification						
Domain Certification				**Platform Certification**		
Job Role "**Drone Data Processor**", "TEL/Q6223, v1.0", Minimum accepted score is 80%				Job Role: "**Trainer (VET and Skills)", "MEP/Q2601" v2.0, Minimum accepted score is 80%**.		

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Diploma	Science/Electronics/ Telecom/IT and other related domains	5	NA	0	NA	Eligible for ToA program
Graduate	Science/Electronics /Telecom/IT and other relevant domains	3	NA	0	NA	Eligible for ToA program

Assessor Certification	
Domain Certification	**Platform Certification**
Job Role "**Drone Data Processor**", "TEL/Q6223, v1.0", Minimum accepted score is 80%	Job Role: "**Assessor (VET and Skills)", "MEP/Q2701" v2.0, Minimum accepted score is 80%**

Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
- The assessment agency deploys the ToA certified Assessor for executing the assessment.
- SSC monitors the assessment process & records.

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP.
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME).
- Question papers created by the SME verified by the other subject Matter Experts.
- Questions are mapped with NOS and PC.
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi- skilled individuals, and level 4 and above are for the skilled, supervisor & higher management.
- An assessor must be ToA certified & the trainer must be ToT Certified.
- The assessment agency must follow the assessment guidelines to conduct the assessment.

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location.
- Center photographs with signboards and scheme-specific branding.
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period.
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

5. Method of verification or validation:

- A surprise visit to the assessment location.
- A random audit of the batch.
- Random audit of any candidate.

6. Method for assessment documentation, archiving, and access:

- Hard copies of the documents are stored.
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage.

- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives.

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	A key learning outcome is a 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
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