Built
Environment
Courses

Land Acquisition Law & Valuation Principles: A Comprehensive Course

Training Duration
3 days

Mode
Lecture & Case Study Discussion

Certification
Certificate of Competency

Fees
RM2,000 per pax

Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Act 486: An Introduction
	10.30–11.00 a.m	**Lecture 2**: Land Acquisition Process – Pre-stage
	11.00 a.m – 1.00 p.m	**Lecture 3**: Land Acquisition Process – Acquisition stage
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Lecture 4**: Land Acquisition Process – Post-acquisition
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	**Discussion 1**: Case laws relating to the Land Acquisition Process End of Day 1
Day 2	9.00-10.30 a.m	**Lecture 5**: Principles of Compensation
	10.30-11.00 a.m	Tea break
	11.00 a.m -12.00 p.m	**Lecture 6**: First Schedule: Market Value
	12.00 -1.00 p.m	**Lecture 7**: First Schedule: Matters to be considered in determining compensation and Matters to be neglected in determining compensation
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Lecture 8**: Second Schedule & Third Schedule of Act 486
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	**Discussion 2**: Case laws relating to Land Acquisition Valuation and Compensation End of Day 2
Day 3	9.00–10.30 a.m.	**Case study**: Land Acquisition and Compensation Valuation of a Site Study
	10.30–11.00 a.m	Tea break
	11.00 a.m – 1.00 p.m	**Case study**: Land Acquisition and Compensation Valuation of a Site Study
		Closing Ceremony

Remarks

- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Land Acquisition Law & Valuation Principles: A Comprehensive Course

Objectives

This course comprehensively explores the Land Acquisition Act 1960 (Act 486), focusing primarily on the objectives and procedures involved in land acquisition in Malaysia.

Additionally, participants will be introduced to valuation principles and the factors influencing adequate compensation, drawing from the relevant legislation and case laws.

The training will include the following courses:

- **Land Acquisition Process and Legislation**
- **References to Court, Objection, and Appeal**
- **Principles of Compensation**
- **Schedule of Land Acquisition Act 1960**
- **Valuation for Adequate Compensation**

Facilitators

PMgr Sr Dr. Kamalahasan Achu

Sr. Wee Soon Chit

Dr. Hamdi bin Abdul Hamid

Geospatial Approach for Landslide Hazard and Risk Analysis

Training Duration
3 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM3,000 per pax

Day	Time	Activity
Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Fundamental of concept of landslide susceptibility and hazard modelling and analysis PM. Dr. Muhammad Zulkarnain bin Abd Rahman
	10.30–11.00 a.m	**Lecture 2**: Fundamental of concept of landslide exposure and element-at-risk mapping PM. Dr. Muhammad Zulkarnain bin Abd Rahman
	11.00 a.m – 1.00 p.m	**Lecture 3**: Fundamental of concept of landslide vulnerability and risk modelling and analysis Dr. Mohd Faisal bin Abdul Khanan
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 1**: Production landslide causal factor maps
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	**Hands on 2**: Production landslide causal factor maps End of Day 1
Day 2	9.00-10.30 a.m	**Hands on 3**: Production landslide causal factor maps
	10.30-11.00 a.m	Tea break
	11.00 a.m -12.00 p.m	**Hands on 4**: Landslide susceptibility modelling and accuracy assessment
	12.00 -1.00 p.m	**Hands on 5**: Landslide hazard modelling and accuracy assessment
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 6**: Landslide exposure and element-at-risk mapping
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	**Hands on 7**: Landslide vulnerability modelling and analysis End of Day 2
Day 3	9.00-10.30 a.m	**Hands on 8**: Landslide risk modelling and analysis
	10.30–11.00 a.m	**Hands on 9**: Landslide risk modelling and analysis
	11.00 a.m – 12.00 p.m	Round table discussion
	12.00-1.00 p.m	Closing ceremony

Remarks
- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Geospatial Approach for Landslide Hazard and Risk Analysis

Objectives

To introduce the basic training for geospatial approach for landslide hazard and risk analysis.

The training will include:
- **General concept of landslide susceptibility, hazard, vulnerability and risk analysis and mapping**
- **Production of landslide causal factors**
- **Production of landslide triggering factors**
- **Landslide susceptibility modelling and analysis**
- **Landslide hazard modelling and analysis**
- **Landslide exposure and element - at- risk mapping**
- **Landslide vulnerability modelling and analysis**
- **Landslide risk modelling and analysis**

Facilitators

Associate Professor Sr Dr. Muhammad Zulkarnain Abd Rahman

Dr. Mohd. Faisal bin Abdul Khanan

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UAV–TLS based LiDAR Data Acquisition & Processing

Training Duration
3 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM3,000 per pax

Day	Time	Activity
Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Fundamental of LiDAR technology Assoc. Prof. Dr. Muhammad Zulkarnain Abd Rahman
	10.30–11.00 a.m	**Lecture 2**: UAV and TLS based LiDAR data acquisition plan and data pre-processing Dr. Khairulnizam M. Idris & Dr. Mohd Farid Mohd Ariff
	11.00 a.m – 1.00 p.m	**Lecture 3**: UAV and TLS based LiDAR data post-processing Dr. Zamri bin Ismail
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Lecture 4**: Introduction to REVIT Dr. Khairulnizam M. Idris & Dr. Mohd Farid Mohd Ariff
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	**Hands on 1**: UAV-based LiDAR data acquisition planning End of Day 1
Day 2	9.00-10.30 a.m	**Hands on 2**: TLS-based LiDAR data acquisition planning
	10.30-11.00 a.m	**Hands on 3**: UAV-based LiDAR data acquisition
	11.00 a.m -12.00 p.m	**Hands on 4**: TLS-based LiDAR data acquisition
	12.00 -1.00 p.m	**Hands on 5**: UAV-based LiDAR data pre-processing
	12.00 -1.00 p.m	**Hands on 6**: TLS-based LiDAR data pre-processing
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 7**: TLS-based LiDAR data pre-processing
	3.30-4.00 p.m	**Hands on 8**: LiDAR data integration End of Day 2
Day 3	9.00-10.30 a.m	**Hands on 9**: LiDAR data post-processing – Calibration, noise removal, ground filtering, QC
	10.30-11.00 a.m	Tea break
	11.00 a.m -12.00 p.m	**Hands on 10**: LiDAR data post-processing – Calibration, noise removal, ground filtering
	12.00 -1.00 p.m	**Hands on 11**: Feature extraction using REVIT
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 12**: Feature extraction using REVIT
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	Round table discussion Closing ceremony

Remarks
- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

UAV–TLS based LiDAR Data Acquisition & Processing

Objectives

To introduce the basic training for the UAV and TLS based LiDAR data acquisition and point cloud processing.

The training will include:
- **UAV and TLS based LiDAR data acquisition plan**
- **UAV and TLS based LiDAR data acquisition**
- **LiDAR data pre-processing**
- **LiDAR data post-processing**
- **Quality Assurance (QA) and Quality Check (QC) process**
- **Feature extraction**

Facilitators

Associate Professor Sr Dr. Muhammad Zulkarnain Abd Rahman

Dr. Mohd Farid bin Mohd Ariff

Dr. Khairulnizam bin M.Idris

Dr. Zamri Bin Ismail

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Digital Image Analysis

Training Duration
3 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM2,500 per pax

Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Fundamental of remote sensing technologyPM. Dr. Muhammad Zulkarnain bin Abd Rahman
	10.30–11.00 a.m	**Lecture 2**: Introduction to digital image processing for earth observation Dr. Alvin Lau Meng Shin
	11.00 a.m – 1.00 p.m	**Lecture 3**: Introduction to Machine Learning and Deep Learning for image analysis Dr. Norhakim bin Yusof
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Lecture 4**: Google Earth Engine tool Dr. Norhakim bin Yusof
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	**Hands on 1:** Digital image geometric correction End of day 1
Day 2	9.00-10.30 a.m	**Hands on 2:** Digital image radiometric correction and conversion from DN to reflectance
	10.30-11.00 a.m	Tea break
	11.00 a.m -12.00 p.m	**Hands on 3:** Image band combination
	12.00 -1.00 p.m	**Hands on 4:** Image enhancement (image filtering)
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 5:** Image enhancement (band ratio)
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	**Hands on 6:** SVM and ANN for image classification End of day 2
Day 3	9.00-10.30 a.m	**Hands on 7:** Deep Learning for object detection
	10.30–11.00 a.m	**Hands on 8:** Deep Learning for object detection
	11.00 a.m – 1.00 p.m	**Hands on 9:** Google Earth Engine for data acquisition and processing
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Hands on 10:** Google Earth Engine for data acquisition and processing
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	Round table discussion Closing ceremony

Remarks
- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Digital Image Analysis

Objectives

To introduce the basic digital data processing for remote sensing data using several related image processing tools.

The training will include the following courses:

- **Image geometric and radiometric correction**
- **Image band combination for interpretation**
- **Conversion from Digital Number (DN) to reflectance and image enhancement.**
- **Machine Learning for image classification**
- **Deep learning for object detection**
- **Google Earth Engine for data acquisition and processing**

Facilitators

Associate Professor Sr Dr. Muhammad Zulkarnain Abd Rahman

Dr. Alvin Lau Meng Shin

Dr. Norhakim bin Yusof

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Geospatial Approach for Carbon Stock Mapping

Training Duration
2 Days

Mode
Hands-on

Certification
Certificate of Competency

Fees
RM1,100 per pax

	Time	Activity
Day 1	9.00-10.30 a.m	**Lecture 1** **Introduction Forest Carbon Sequestration**
	10.30–11.00 a.m	Tea break
	11.00 a.m – 12.00 p.m	**Lecture 2** **Forest Carbon Stocks and IPCC Guidelines**
	12.00pm - 1.00pm	**Lecture 3** **Forest Carbon Measurement & Monitoring Methods**
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Lecture 4** **The role of geospatial approach for forest biomass and carbon stock mapping**
	3.30-4.00 p.m	Tea break
	4.00 – 5.00 p.m	**Demo 1** **Mobile LiDAR data for individual tree census in a plot level**
		End of Day 1
Day 2	9.00-10.30 a.m	**Demo 2** **Airborne LiDAR data for individual tree census in plot level**
	10.30-11.00 a.m	Tea break
	11.00 a.m -1.00 p.m	**Demo 3** **Individual tree aboveground biomass (AGB) and aboveground carbon stock estimation using geospatial approach**
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	**Demo 4** **Upscaling of forest above ground carbon stock density (ACD) mapping using remote sensing satellite imagery**
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	Round table discussion and closing ceremony

Remarks

- Minimum pax per session is 25 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Geospatial Approach for Carbon Stock Mapping

Facilitators

Objectives

To introduce the basic application of geospatial technology for forest carbon stock estimation and mapping.

The training will include:

- Introduction to Carbon Sequestration & Measurement Method

- Principle of geospatial approach for forest carbon stock estimation and mapping

- Mobile LiDAR data processing for tree measurement

- Airborne LiDAR data processing for tree measurement

- Plot level forest aboveground biomass and carbon stock mapping

- Upscaling of carbon stock mapping using remotely sensed satellite imagery

Associate Professor Sr Dr. Abdullah Hisam Omar

Dr. Umi Aisah Asli

Associate Professor Sr Dr. Muhammad Zulkarnain Abd Rahman

Geomatic Innovation Research Group (Post Graduate)

Please contact
Assoc. Prof. Sr Dr. Abdullah Hisam Omar
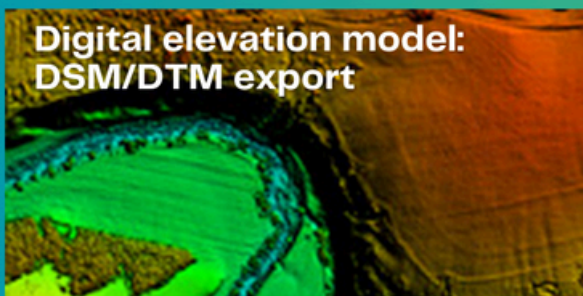
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UNMANNED AERIAL SYSTEM DATA PROCESSING & MAPPING

Digital elevation model: DSM/DTM export

Digital Surface and/or Digital Terrain Model — depending on the project.

Georeferenced orthomosaic export

Georeferenced orthomosaic: most GIS-compatible GeoTIFF format; .KML file to be located on Google Earth.

Training Duration
3 DAYS

Mode
LECTURE & HANDS ON

Certification
Certificate of Competency

Module

| UAS Technology and Mapping
- Introduction to Drone
- Drone flight planning
- Drone image processing requirements

| Ground Control Point Requirements
- Selection of GCP Area
- GCP Field Observation
- GPS Data Processing

| UAS Flight Planning & Field Observation
- Flight Line Parameters
- Generation of Flight Line

Mapping Requirements
- Datum and Coordinate System
- Projection

| Drone Data Processing with Image Processing Software (2 software)
- Introduction to Image processing Software
- Aerial photo preparation
- Georeferencing Technique with GCP

| Generating orthophoto & DTM/DSM
Generation of Aerial Product– Digital Surface Model , Orthophoto, Photogrammetry Point Cloud

| Map Template in GIS/Mapping software

Requirements

- Notebook/Laptop with image processing capabilities

RM3000
Fee per participant

Remarks
- Minimum pax per session is 15 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

UNMANNED AERIAL SYSTEM DATA PROCESSING & MAPPING

The aim of this training workshop is to provide comprehensive understanding and practicality aspect of UAS data processing and mapping that will give broad exposure on the subject matters to each participant. The training workshop will cover simple lectures and practices, yet exciting topics on drone technology and mapping, and GPS observation techniques as well as the basic of coordinates Transformation map projection.

In addition, each participant will experience to fly the drone, establish GCP and hands on lab to process drone for mapping purposes At the end of this workshop, it is expected that participants will be competent to practice knowledge from this training in a daily routine of work.

Facilitators

Assoc. Prof. Sr Dr. Abdullah Hisam Omar

Assoc. Prof Sr Dr. Tajul Ariffin bin Musa

Dr. Norhadija binti Darwin

Sr Dr. Ivin Amri bin Musliman

Dr. Wan Anom binti Wan Aris

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Hyperspectral Data Acquisition

Training Duration
2 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM2,000 per pax

Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Fundamental of hyperspectral imagery
	10.30–11.30 a.m	**Lecture 2**: Non-imaging hyperspectral data acquisition
	11.30 a.m – 12.30 p.m	**Lecture 3**: Non-imaging hyperspectral data analyses
	12.30 p.m – 2.00 p.m	Lunch break
	2.00-3.00 p.m	**Hands-on 1**: Non-imaging hyperspectral data acquisition
	3.00 – 4.00 p.m	**Lecture 4**: Hyperspectral sensor calibration
	4.00-4.30 p.m	Tea break End of Day 1
Day 2	9.00-10.00 a.m	**Hands-on 2**: Hyperspectral sensor calibration
	10.00-10.30 a.m	Tea break
	10.30 a.m -12.30 p.m	**Lecture 5**: Imaging Hyperspectral data acquisition planning and pre-processing (field campaign)
	12.30 -2.00 p.m	Lunch break
	2.00-3.30 p.m	**Hands on 3**: Imaging Hyperspectral data acquisition planning (field campaign)
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	Round table discussion Closing ceremony

Remarks
- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Hyperspectral Data Calibration & Image Correction

Objectives

To introduce hyperspectral data image calibration and correction.

The training will include the following courses:

- **Non-imaging hyperspectral data analyses**

- **Hyperspectral image calibration**

- **Hyperspectral image correction**

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Hyperspectral Image Classification, Validation & Representation

Training Duration
2 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM2,000 per pax

Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-10.30 a.m	**Lecture 1**: Fundamental of spectral response of the features
	10.30–11.30 a.m	**Lecture 2**: Hyperspectral spectral unmixing
	11.30 a.m – 12.30p.m	**Lecture 3**: Hyperspectral feature extraction
	12.30 p.m – 2.00 p.m	Lunch break
	2.00-3.00 p.m	**Lecture 4**: Hyperspectral image classification validation and confusion matrix
	3.00 – 3.30 p.m	Tea break
	3.30-4.30 p.m	**Lecture 5**: Introduction to digital mapping
		End of Day 1
Day 2	9.00-11.00 a.m	**Hands-on 1**: Hyperspectral spectral unmixing
	11.00-11.30 a.m	Tea break
	11.30 a.m -1.00 p.m	**Hands-on 2**: Hyperspectral feature extraction
	1.00-2.30 p.m	Lunch break
	2.00-3.00 p.m	**Hands-on 3**: Hyperspectral image classification validation and confusion matrix
	3.30-4.00 p.m	Tea break
	4.00-5.00 p.m	Round table discussion Closing ceremony

Remarks

- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Hyperspectral Image Classification, Validation & Representation

Objectives

To introduce hyperspectral data image calibration and correction.

The training will include the following courses:

- **Hyperspectral spectral unmixing**
- **Hyperspectral feature extraction**
- **Hyperspectral image classification validation and confusion matrix**

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Fundamental of Surveying & Mapping: Theory, Instrumentation & Data Acquisition

Training Duration
4 days

Mode
Lecture & Hands-on

Certification
Certificate of Competency

Fees
RM3,000 per pax

Day	Time	Activity
Day 1	8.00 a.m	Registration
	8.30 a.m	Arrival of guests and opening ceremony
	8.35 a.m	Doa recitation
	8.40 a.m	Welcoming Speech by the Program Manager
	8.50 a.m	Opening Ceremony Speech by TNBGrid
	9.00 a.m	End of Opening Ceremony Coffee Break
	9.30-11.00 a.m	**Lecture 1**: Basic theory on the principle of surveying and mapping
	11.00–1.00 p.m	**Lecture 2**: Basic theory on the reference systems: horizontal and vertical
	1.00-2.30 p.m	Lunch break
	2.30 – 4.30 p.m	**Lecture 3**: Basic theory on traversing and levelling
	4.30-5.00p.m	Tea break & End of Day 1
Day 2	9.00-10.30 a.m	**Lecture 4**: Principle of surveying instrumentation: Total Station, Levelling, Distometer and Compass
	10.30-11.00 a.m	Tea break
	11.00 a.m -1.00 p.m	**Lecture 4**: Principle of surveying instrumentation: Total Station, Levelling, Distometer and Compass (Continue)
	1.00-2.30 p.m	Lunch break
	2.30 – 4.30 p.m	**Hands-on 1**: Demonstration and familiarisation with surveying instrumentsBriefing on fieldwork for data acqusition
	4.30-5.00p.m	Tea break & End of Day 2
Day 3	9.00-10.00 a.m	**Hands-on 2**: Data Acquisition (fieldwork): Compass, Total Station, Levelling and Distometer
	10.00–10.30 a.m	Tea Break
	11.00 a.m – 1.00 p.m	**Hands-on 2**: Data Acquisition (fieldwork): Compass, Total Station, Levelling and Distometer (Continue)
	1.00-2.30 p.m	Lunch break
	2.30 – 4.30 p.m	**Hands-on 2**: Data Acquisition (fieldwork): Compass, Total Station, Levelling and Distometer (Continue)
	4.30-5.00p.m	Tea break & End of Day 3
Day 4	9.00-10.30 a.m	**Hands-on 3**: Data analysis, adjustment and quality control
	10.30-11.00 a.m	Tea Break
	11.00 a.m -1.00 p.m	**Hands-on 3**: Data analysis, adjustment and quality control (Continue)
	1.00-2.30 p.m	Lunch break
	2.30 – 3.30 p.m	Round table discussion
	3.30-4.30 p.m	Closing ceremony
	4.30-5.00p.m	Tea break & End of Course

Remarks
- Minimum pax per session is 20 pax
- Fees do not include accommodation and training package.
- Training materials will be provided

Fundamental of Surveying & Mapping: Theory, Instrumentation & Data Acquisition

Objectives

To introduce the basic training on the fundamental theory of surveying and mapping, instrumentation, data acquisition and processing.

The training will include:

- **Basic theory on the principle of surveying and mapping**
- **Basic theory on the reference systems: horizontal and vertical**
- **Basic theory on traversing and levelling**
- **Principle of surveying instrumentation: Total Station, Levelling, Distometer and Compass**
- **Data acquisition and processing**
- **Data analysis, adjustment and quality control**

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