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UNDERGROUND UTILITY DETECTION SURVEY AND MAPPING (UUDSM)

Certification Course

Land Surveyors Board of Malaysia

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Underground Utility Detection Survey & Mapping (UUDSM) Course

- Introduction
- Background of Course Modules
- The Modules and Syllabus
- Course Schedule
- Conclusion

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Introduction

- The need for accurate information of existing underground utilities

- Mandate by the Malaysian Government to the Department of Survey and Mapping Malaysia (JUPEM) to compile underground utilities data.

- Knowledge in utility mapping and tertiary education is still lacking

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Introduction

- The challenge of issue is to merge the 3 core disciplines i.e. Electrical and Electricity, Geology and Geophysics, and Survey Mapping.

- Recognising the issue, the Land Surveyors Board of Malaysia (LJT) and the Association of Authorised Land Surveyors Malaysia (PEJUTA) taken the initiative to offer a professional course in UUSDM to its members.

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Background

- A committee comprising of LJT, PEJUTA, JUPEM and University of Technology of Malaysia (UTM) was set-up to design the course
- The course design is to be in line with a Post-graduate standard level with addition of Professional practise input.
- The course is envisaged to have approximately 390 credit hours or equivalent to 26 study weeks

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Background

- The framework design is to provide fundamental and understanding, system operation and applications, and professional practise.
- The quality, standard and recognition is regulated by accreditation requirements such as exam, coursework, report, competency test and demonstrate skills
- To complete a project paper/dissertation

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The Modules & Syllabus

Module 1: Fundamental and Basic Principal of Measurement (75 hrs)

Module 2: System Operations an Applications (240 hrs)

Module 3: Professional, Industry and Society (75 hrs)

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Module 1 : Fundamental & Basic Principal of Measurement

Principal of Measurement and Tools – Classroom and Laboratory (15Hrs)

- Electrical and Electricity
- Frequency modulation
- Pulse Signal
- Bore hole
- Gyro
- Magnetometer
- Other non destructive tools

Fundamental of GeoPhysics – Classroom and Laboratory (34Hrs)

- Introduction of Electromagnetic
- Wave Propagations
- Electromagnetic Bandwidth
- Radar
- Subsurface Soil Characteristic
- Soil and stratigraphy
- Soil Electromagnetic Parameters
- Wave interaction with Soil

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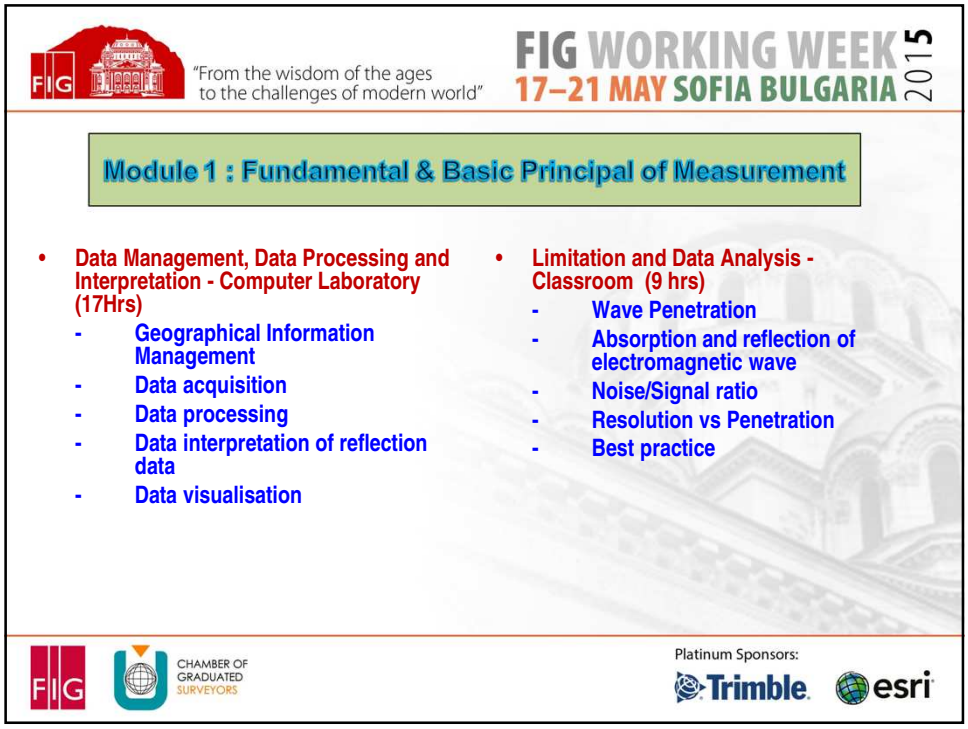
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Module 1 : Fundamental & Basic Principal of Measurement
• Data Management, Data Processing and Interpretation - Computer Laboratory (17Hrs)
- Geographical Information Management
- Data acquisition
- Data processing
- Data interpretation of reflection data
- Data visualisation
• Limitation and Data Analysis - Classroom (9 hrs)
- Wave Penetration
- Absorption and reflection of electromagnetic wave
- Noise/Signal ratio
- Resolution vs Penetration
- Best practice
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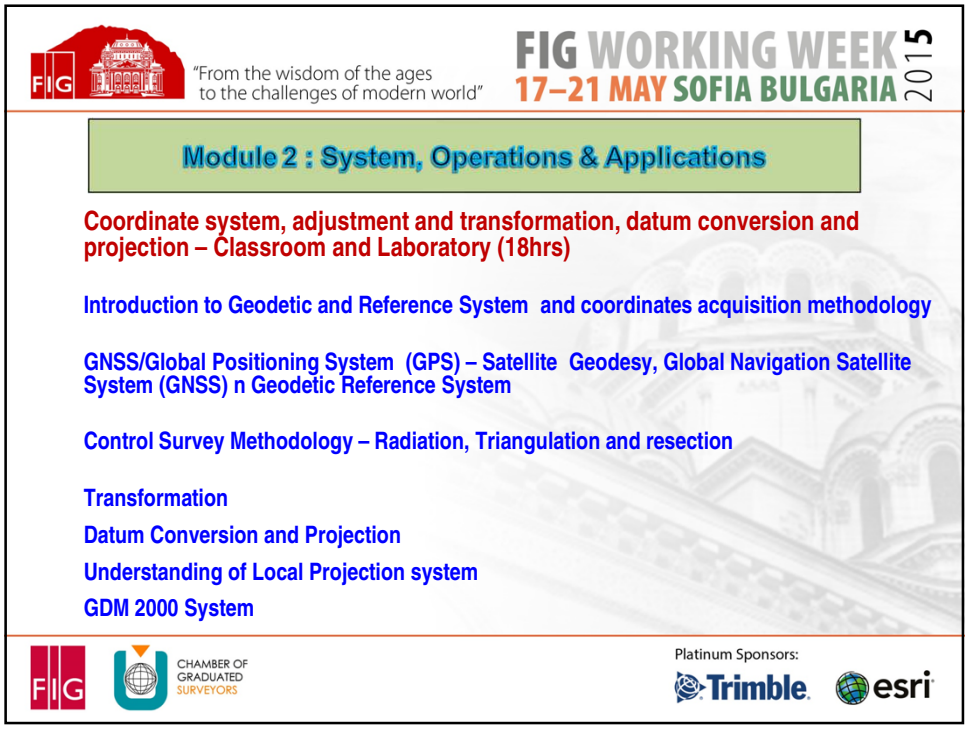
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Module 2 : System, Operations & Applications
Coordinate system, adjustment and transformation, datum conversion and projection – Classroom and Laboratory (18hrs)
Introduction to Geodetic and Reference System and coordinates acquisition methodology
GNSS/Global Positioning System (GPS) – Satellite Geodesy, Global Navigation Satellite System (GNSS) n Geodetic Reference System
Control Survey Methodology – Radiation, Triangulation and resection
Transformation
Datum Conversion and Projection
Understanding of Local Projection system
GDM 2000 System
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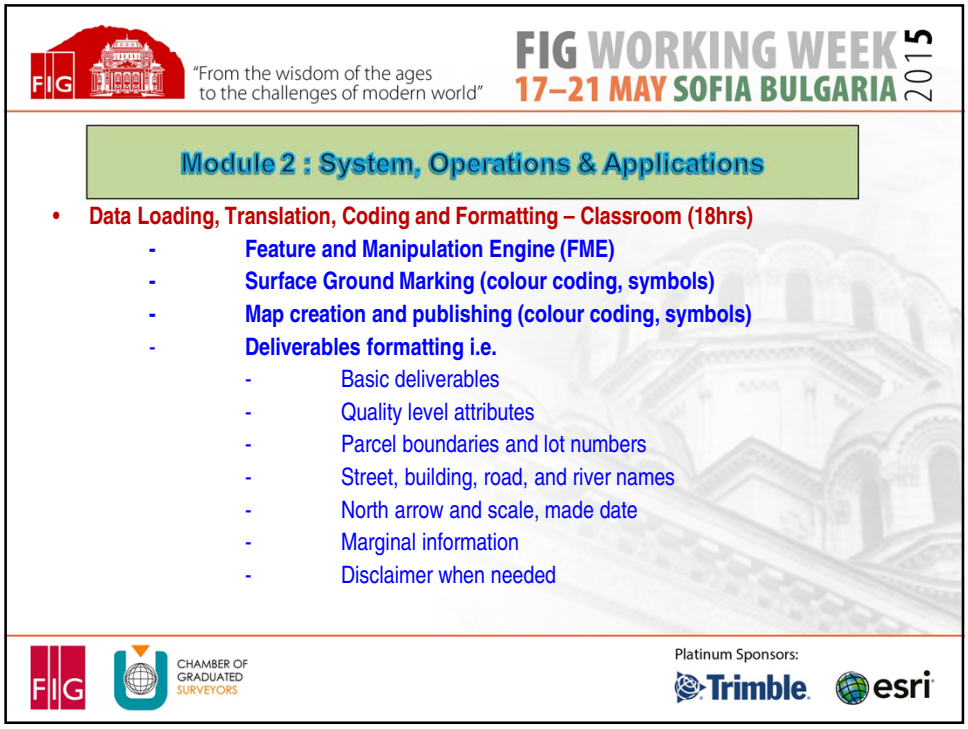
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Module 2 : System, Operations & Applications
• Data Loading, Translation, Coding and Formatting – Classroom (18hrs)
- Feature and Manipulation Engine (FME)
- Surface Ground Marking (colour coding, symbols)
- Map creation and publishing (colour coding, symbols)
- Deliverables formatting i.e.
- Basic deliverables
- Quality level attributes
- Parcel boundaries and lot numbers
- Street, building, road, and river names
- North arrow and scale, made date
- Marginal information
- Disclaimer when needed
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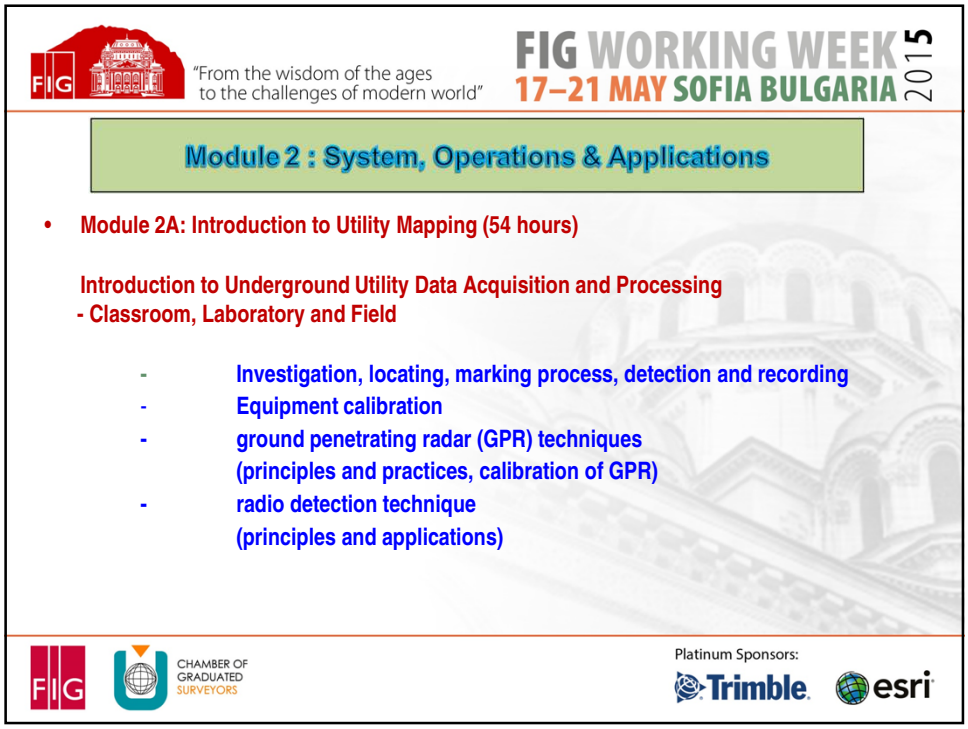
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Module 2 : System, Operations & Applications
• Module 2A: Introduction to Utility Mapping (54 hours)
Introduction to Underground Utility Data Acquisition and Processing
- Classroom, Laboratory and Field
- Investigation, locating, marking process, detection and recording
- Equipment calibration
- ground penetrating radar (GPR) techniques
(principles and practices, calibration of GPR)
- radio detection technique
(principles and applications)
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Module 2 : System, Operations & Applications

- Pipe and Cable Locator (PCL)
  - (principles and practice, calibration of PCL)
- Other methods of detection
  - (gyro-based pipeline mapping systems, etc.)
- Survey methodology and positioning methods
- Positioning and Marking Tolerance
- Survey data processing
- PCL data processing and analysis
- GPR data interpretation and processing, data editing
- Data processing feature and attribute codes
- Data processing for other detection techniques

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Module 2 : System, Operations & Applications

- **Module 2B: Underground Utility Data Acquisition (30 hours)**
- Principles of Pre- Utility Investigation
- Survey Procedures
- Survey deliverables
- Development of a Survey Strategy

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Module 2 : System, Operations & Applications

- Troubleshooting Processing & Interpretation
- Inappropriate Utility Detection Technology

Module 2 : System, Operations & Applications

- Log Report of Practical utility detection (30 hours)
- Preparation of Dissertation/Project (40 hours)

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Module 3 : Professional and Practise

Utility Mapping Standards & Safety Requirements
- Classroom and Technical Visit (30 hrs)

Related enactments and legislations

Introduction to Malaysian Standards and Government Circulars – Example: Stratum Act.

Features and Attributes Codes for Utility Mapping in Malaysian Standard (MS1759)

Malaysian Standards for Geographic Information - Metadata

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Module 3 : Professional, Industry & Society

Director General of Survey and Mapping Circulars (Standard Guideline on Utility Mapping)

Health and Safety Requirements for Utility Mapping (DOSH, NIOSH, OSHA)

Understanding of Professional and Public Liabilities

Underground utilities system design, Construction standards and practices.
- Classroom and Technical Visit (45 hrs)

Standard Guidelines for Underground Utility Mapping

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Module 3 : Professional, Industry & Society

Introduction and Roles of the Land Surveyor and detecting tasks (utility owner, land surveyor, JUPEM)

Utility quality level attributes (Quality Levels D, C, B, A)

Understanding Utilities Network and Print Reading Fundamental (Eg.: Syabas, TNB, and Telekom Network)

Maintenance of the National Underground Utility Database (PADU)

Other Standard Guidelines

Horizontal Directional Drills (HDD) and Bore Hole Drilling - Industry Practice (Presentation)

Other related UUM practice. Eg. Forensic (Uniten) & Gasteg (UTM)

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Module 1 & 2 : Syllabus Subject Details

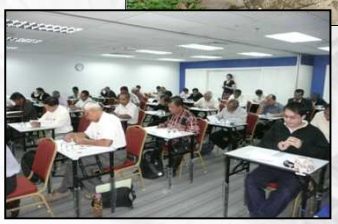
Module 1: Fundamental and Basic Principal of Measurement (75 hrs)

M1 Syllabus n subject (FIG).pdf

\M1 Subject Details.pdf

Module 2: System Operations and Applications (240 hrs)

M2 Subject Details (FIG).pdf



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Accreditation Prerequisite

- Accredit for all written coursework, report and documentation
- for each module/syllabus.
- Accredit Dissertation/Project documentation form.
- Competency test and demonstrate skills.
- Oral/Interview (Panel of Accreditation)
- Certification Award of CUUDM

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Course Implementation Schedule

Course schedule

Course Schedule Sample.xlsx
Course Schedule Sample

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Conclusion

To date 79 candidates have been awarded with a UUDSM Certificate

- Another 20 will be graduating soon after successful submission of their project paper.

- Graduates from the program have the knowledge and skill to provide a strong foundation and professional support towards establishing a respectable and reliable source of professional service to the nation as it strive to be a developed nation by 2020.

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Conclusion

- From a surveyor view point a country cannot claim to be fully developed if it fails, among other things, to reliably map and thus efficiently manage its underground utilities.
- This course is a contribution by Malaysian surveyors towards achieving the national aspiration.

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UNDERGROUND UTILITY DETECTION SURVEY AND MAPPING (UUDSM)

More Course Information, Please Contact :

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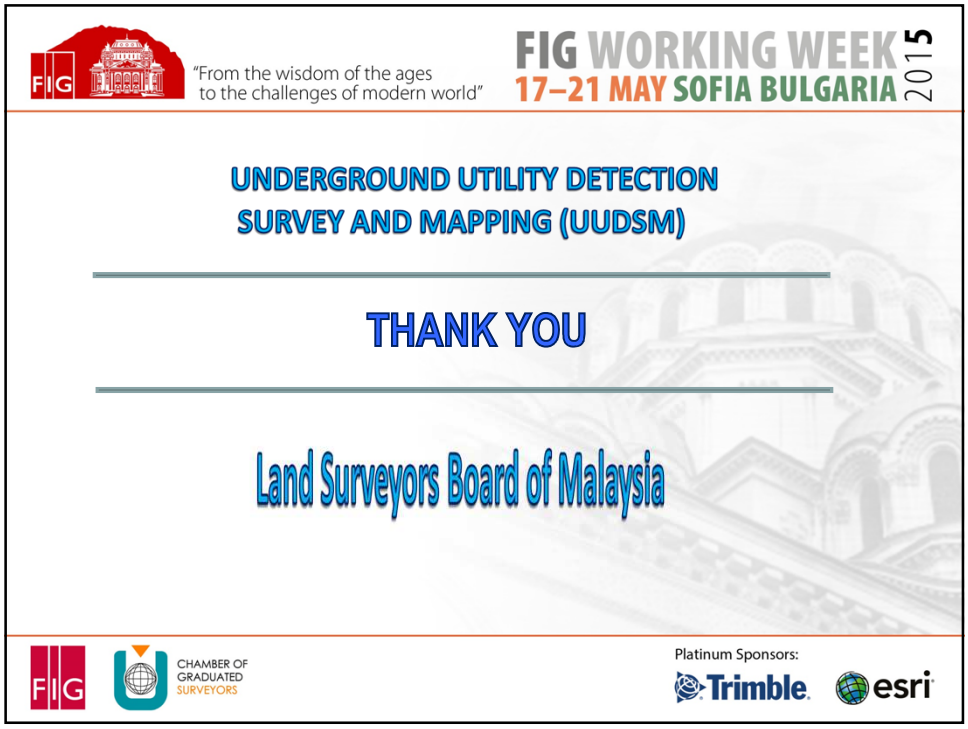
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