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Course Name

GIS, Mapping, and Spatial Analysis

Sector Name
Civil Engineering

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GIS, Mapping, and Spatial Analysis

Course Introduction

The course will comprise general and specific roles and applicability of how GIS & Mapping can optimize operation and maintenance.

This course will tackle different relative disciplines and corresponding issues like; GIS & GPS Functionality, Geographic Coordinate System & Scale, Projected Coordinate Systems, Acquiring Data & Data Collection, Mapping Methodology, and International Case Studies & Best Practices World Wide. Moreover, this course will cover the GIS role in field force automation (FFA) and control/ monitoring systems.

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Target Audience

- ✓ Chief Engineer
- ✓ Civil Engineer
- ✓ Commissioning Engineer
- ✓ Construction Engineer
- ✓ Drilling Engineer
- ✓ Fire Protection Engineer
- ✓ Piping Engineer
- ✓ Piping Stress Engineer
- ✓ Planning Engineer
- ✓ Reservoir Engineer
- ✓ Structural Engineer
- ✓ Welding Engineer

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Learning Objectives

- ✓ Understand and gain experience on how GIS and mapping can work.
- ✓ Particularly, in the optimization of the operation, regular maintenance, predictive maintenance, proactive maintenance, pipeline and piping inspection, repair in a manner that follows international best practices, and being aware of the kind of tools appropriate for each corresponding task.
- ✓ The course will cover the most advanced techniques used in data collection, data processing & handling, state-of-the-art GIS, and mapping modules applied in that context.
- ✓ Furthermore, the course will cover also cutting-edge technology applied in the geo-database and spatial analysis affiliated with slandered attributes.
- ✓ Noteworthy, the GIS role in the field force automation (FFA) and control/monitoring systems will be explained. Moreover, significant best practices and tangible case studies will be discussed in detail as well.

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Course Outline

✓ DAY 01

Module (01) Introduction to GIS Functionality:

- ✓ What is GIS?
- ✓ GIS Components
- ✓ Characteristics of Spatial Data
- ✓ Data Modelling techniques
- ✓ Different Modelling Algorithms
- ✓ Different Techniques of Manipulation and Analysis
- ✓ Databases & Attributes
- ✓ Spatial Data Infrastructure (SDI)
- ✓ GIS Application Areas.

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Course Outline

✓ Day 02

Module (02) Introduction to GPS Application:

- ✓ What is the Global Positioning System (GPS)?
- ✓ How GPS Works?
- ✓ Different Types and Accuracy Levels of Receiver(s)
- ✓ User Segment
- ✓ Sources of GPS Errors
- ✓ Sources of Signal Interference
- ✓ Good Satellite Geometry
- ✓ Map Datum
- ✓ Real-Time Differential GPS
- ✓ GPS Wide Area Augmentation System (WWAS)
- ✓ GPS/GIS Functionality

Module (03) Geographic Coordinate System & Scale

- ✓ Working with Data in Different Geographic Coordinate Systems
- ✓ Choose an Appropriate Geographic Transformation
- ✓ Map Projections and Scale Proper

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Course Outline

✓ Day 03

Module (04) Projected Coordinate Systems

- ✓ Types of Map Projections
- ✓ Projecting Coordinates
- ✓ Projections and Distortion
- ✓ Classifying Projections According to the Properties They Preserve
- ✓ Reasons for Using a Specific Projected Coordinate System
- ✓ Choose an Appropriate Projection

Module (05) Geodatabase

- ✓ Spatial Data Formats
- ✓ Geodatabase Data Structure
- ✓ Personal Vs. Enterprise Geodatabase
- ✓ Components of Geodatabase.. 6.5.Building Geodatabase
- ✓ Specific Scheme and Attributes

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✓ Day 04

Module (06) Acquiring Data & Data Collection

- ✓ Different Types of Data Collection Methodology
- ✓ Different Types of Data Sources
- ✓ Different Types of Data Formats
- ✓ Data considerations
- ✓ Data Collection Instrumentation & Various Techniques
- ✓ Data Collection Verification
- ✓ Data Collection Quality Control (QC) & Quality Assurance (QA)
- ✓ Best Practice in Data Collection

Module (07) Mapping Methodology

- ✓ How to Prepare an Image Map
- ✓ Data Types and Data Conversions
- ✓ Raster Formats & Vector Format
- ✓ Vector Feature Types & Classification
- ✓ Spatial Data Criteria
- ✓ Feasibility Checking
- ✓ Real-Time Mapping in Integration with Collection of Data & Surveying Techniques and Advanced Methodology
- ✓ Real-Time GPS and Handhelds: Different Techniques of Data Collection in Relation to GIS Mapping
- ✓ Mapping QS & QA and Field Verification Survey by GPS

✓ Prepare Database & Multiuser Geodatabase

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Course Outline

✓ Day 05

Module (08) The Role of the GIS/Mapping in Optimizing Operations

- ✓ Role of the GIS in Optimizing the Operation
- ✓ Role of the GIS in Optimizing Control & Inspection
- ✓ Maintenance According to the GIS Map/System
- ✓ Role of the GIS in Predictive, Proactive, and Regular Maintenance
- ✓ Role of the GIS in Network Spatial Asset Inventories & Management
- ✓ Enterprise Geo-Database of "As Built Drawing"
- ✓ International Case study: Preparation of Base-map & As Built Drawing & Survey and Investigation, Collect GPS data of Transmission and Distribution Network.
- ✓ International Case Studies

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 4, 2026	May 8, 2026	5 days	4250.00 $	UAE , Dubai
July 20, 2026	July 24, 2026	5 days	4950.00 $	Austria , Vienna
March 15, 2027	March 19, 2027	5 days	4250.00 $	UAE , Dubai
Dec. 28, 2026	Jan. 1, 2027	5 days	4250.00 $	UAE , Abu Dhabi

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