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المكتب الهندسي لخدمات التكنولوجيا والبرمجيات

Engineering office for Technology and Software Services



## Course Title: Geotechnical Site Investigation



Code: 4021Soft-CIV

### Introduction

Subsurface conditions can significantly impact the design and safety of civil engineering structures. A geotechnical site investigation provides critical data about soil, rock, and groundwater that influences foundation design, slope stability, and construction methods. This course equips engineers with the knowledge and skills needed to plan, execute, and interpret site investigations, ensuring informed design decisions and reduced risk in construction projects.

Main Branch: United building – E Shams –Front NBE  
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## Course Description

This course offers an in-depth study of geotechnical site investigation techniques used to evaluate ground conditions for civil and structural engineering projects. It covers the theoretical foundations of soil and rock behavior, field investigation methods (e.g., SPT, CPT, borehole drilling), laboratory testing, data analysis, and report writing. The program includes practical examples, case studies, and project-based learning to simulate real-world applications in foundation design and risk mitigation.

## Objectives

By the end of this course, participants will be able to:

1. Understand the importance of geotechnical site investigation in structural and civil engineering projects.
2. Conduct field and laboratory tests to evaluate soil and rock properties.
3. Interpret geotechnical data and identify potential soil-related risks.
4. Produce comprehensive geotechnical reports and design recommendations.
5. Apply investigation outcomes to foundation and slope stability design.

## Detailed Course Outline

### Week 1: Introduction to Geotechnical Engineering

- Importance of soil investigations in construction.
- Basic soil and rock properties.
- Soil classification systems (USCS, AASHTO).

### Week 2: Site Investigation Methods

- Drilling methods: boreholes, test pits.
- Sampling techniques: disturbed vs. undisturbed.
- Standard Penetration Test (SPT).
- Cone Penetration Test (CPT).
- Geophysical testing overview.

### Week 3: Laboratory Testing and Data Analysis

- Grain size distribution and Atterberg limits.
- Compaction and permeability tests.
- Consolidation and shear strength tests.
- Data interpretation for design input.

### Week 4: Reporting and Risk Assessment

- Preparing geotechnical investigation reports.
- Identifying geotechnical hazards.
- Ground improvement techniques.

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- Case studies and lessons learned.

### Week 5: Practical Applications

- Slope stability assessment and mitigation.
- Design of shallow and deep foundations.
- Group project: interpreting real site data and preparing a report.

### Expected Outcomes

Participants will gain:

- Proficiency in conducting and supervising geotechnical field investigations.
- Hands-on experience with interpreting test data and evaluating site conditions.
- Capability to write professional geotechnical reports for construction projects.
- Fundamental skills in recommending suitable foundation solutions.

### Time Frame (Total 40 Hours / 5 Weeks)

Week	Topic	Hours
Week 1	Intro + Soil/Rock Properties	6 hrs
Week 2	Site Investigation Techniques	8 hrs
Week 3	Laboratory Testing & Interpretation	8 hrs
Week 4	Reporting + Hazard Assessment	8 hrs
Week 5	Applications + Group Project	10 hrs

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