

**Course Name:**

Advanced Engineering Geology

**Course Number:**

20452

**Credit:**

3

**Course Content (outline):****1. Surface Explorations**

- 1.1 Application of Topographical Maps, Aerial Photographs, Satellite Images, Geological Maps, Hydrogeological Maps
- 1.2 Geological and Geotechnical Site Investigations
- 1.3 Applications and Preparations of Geological Maps

**2. Sub-Surface Explorations**

- 2.1 Geophysical Methods (Geoseismic, Geoelectric, Gravimetry, ...)
- 2.2 Boring (borehole, Trench, Access Tunnel)
- 2.3 Design of Sub-Surface Exploration Network
- 2.4 Hydrologic and Hydro-Geologic Explorations

**3. Geotechnical Sampling**

- 3.1 Sample Types and Characteristics
- 3.2 Sampling Techniques and Sampler Types
- 3.3 Sampling in Soil and Rocks / in land and Sea

**4. Processing Geotechnical Data**

- 4.1 Subsurface Stratigraphy and Plotting Soil Profiles
- 4.2 Preparation of Structural Geology Maps and Three-Dimensional Images
- 4.3 Analysis of Stereographic Pictures
- 4.4 Preparation of Geological and Geotechnical Reports

**5. Geological Explorations for Special Purposes**

- 5.1 Geological Explorations for Special Cases Such as Roads, Tunnels, Underground Openings, Dams , Natural Slopes, ...

**6. Site Visits**

**References:**

- De Vallejo and Ferrer, M. (2011), *Geological Engineering*, CRC Press
- Rahn, H. R. (1996), *Engineering Geology: An Environmental Approach*, Prentice Hall
- Legget, R.F. (1962), *Geology and Engineering*, McGraw Hill
- Clayton, C.R.I, Simons, N.E., Mathews, M.C. (1982), *Site Investigation*, Granada
- Hunt, R.E. (1984), *Geotechnical Engineering Investigation Manual*, McGraw Hill
- Duncliff, J. (1994), *Geotechnical Instrumentation for Monitoring Field Performance*, John Wiley