

CE 5690: Ground Improvement

Course Description:

Classification of ground improvement methods. Dynamic compaction, vibrocompaction, preloading using fill surcharge, vacuum or a combination of both and prefabricated vertical drains, vibro replacement or stone columns, dynamic replacement, sand compaction piles, geotextile confined columns, rigid inclusion, column supported embankment, microbial methods, particulate and chemical grouting, lime and cement columns, jet grouting, and deep cement mixing.

Course objectives (course designed to provide students with):

To explore ground improvement technologies leading to the development of skills in the selection, design, construction and the assessment of said technologies. To this end, we will first discuss the various types of ground improvement/modification methods and their effects on the engineering properties of soils. This will be followed by applications of specific technologies and their use in ground improvement projects.

Course Topics

- Historical perspective on ground improvement and modification
- Problem soils
- Classification of methods & GeoTechTools
- Soft soils
- PVDs - Prefabricated Vertical Drains
- LWFs – Light Weight Fill
- Mass Mixing Methods – Deep, Shallow
- GRE – Embankments of soft soils and column supported
- Column supported embankments, including electro-osmosis, deep dynamic compaction
- Vibro-compaction
- Blast densification
- Intelligent compaction
- Other compaction: HE Impact Rollers, RIC, Freezing
- Earthwork Construction & Increased Pavement Performance
- Chemical Stabilization
- Biogeotechnics
- Geosynthetics in Pavements
- Soil Nailing
- Ground Anchors/Shored MSE Walls
- Grouting: Chemical, Compaction, Bulk Void Filling, Slabjacking, Jet, Rock & fissure