



**CE 208 Jan 3:0**

## **Ground Improvement and Geosynthetics**

### **Instructor**

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### **Teaching Assistant**

Email:

**Department: Civil Engineering**

Course Time: Tue Thu 2 - 3:30 PM

Lecture venue: Geotechnical Lecture Hall

Detailed Course Page:

## **Announcements**

### **Brief description of the course**

This is a graduate level course focused on various techniques available for improving the ground properties to suit the requirements of structures built on them. The contents give background on what kind of soils need improvement, what are the specific infrastructural projects where ground improvement is mandatory and goes deep into explaining various ground improvement techniques including stabilization with admixtures, freezing, compaction, grouting, sand and stone columns, blasting and heavy tamping. Considerable part of the course deals with polymeric reinforcing materials called geosynthetics, detailed description of their properties, laboratory testing and their use for various functions like separation, filtration, drainage and reinforcement.

This course is relevant to the undergraduate and graduate students in the areas of Civil Engineering and Transportation Engineering.

### **Prerequisites**

Background of Basic Soil Mechanics

### **Syllabus**

Principles of ground improvement, mechanical modification. Properties of compacted soil. Hydraulic

modification, dewatering systems, preloading and vertical drains, electro-kinetic dewatering, chemical modification,

modification by admixtures, stabilization using industrial wastes, grouting, soil reinforcement principles, properties of geosynthetics, applications of geosynthetics in bearing capacity improvement, slope stability, retaining walls, embankments on soft soil, and pavements, filtration, drainage and seepage control with geosynthetics, geosynthetics in landfills, soil nailing and other applications of geosynthetics.

### **Course outcomes**

Student will learn about various ground improvement techniques available, how to design them and implement them in field along with various case studies where ground failures were resolved using these techniques and also many case studies that involved ground improvement in large scale with details of engineering design aspects.

### **Grading policy**

30% for mid-term exams, 10% for assignments, 10% for term paper and 50% for final exam

### **Assignments**

Design of stone columns

Design of sand/band drains

Design of ground anchors

Design of reinforced foundations

Design of reinforced retaining wall

### **Resources**

Hausmann, M.R., Engineering Principles of Ground Modification, McGraw-Hill, 1990.

Jones, C.J.E.P., Reinforcement and Soil Structures, Butterworth Publications, 1996.

Koerner, R. M., Designing with Geosynthetics, Prentice Hall Inc. 1998.