

Approval: 9th Senate Meeting

Course Number: CE 551

Course Name: Geosynthetics and their applications

Credits: 3-0-0-3

Prerequisites: CE 302 - Geotechnical Engineering

Intended for: UG/PG

Distribution: Discipline Core

Semester: Odd/Even

Preamble: With the increasing issues and problems in ground, there is a requirement of ground improvement to ensure proper working of the structures and facilities to be provided on them. In this circumstances, modification by means of geosynthetics is very simple and effective option. Geosynthetics have been considered to be one best option in ground improvement. Keeping this in view, this course aims at introducing the required concepts, applications and design aids for geosynthetics in soil suiting the required ground modification.

Course Outline: The course introduces the various types of geosynthetics and their broad application area. The properties of these various geosynthetics and their standard testing procedures are detailed. Further, considering each application, the concept and the design of the geosynthetics is elaborated in separate modules.

Modules:

1. An Overview of Geosynthetics: Description of Geosynthetics, Properties, Functions
(4 contact hours)
2. Properties and tests: Properties of geosynthetics, standard testing procedures based on applications. **(8 contact hours)**
3. Soil Reinforcement: Mechanism, Reinforced slopes, Embankments on soft ground, Reinforced Embankments, Reinforced soil walls and Slope stabilization. **(9 contact hours)**
4. Geosynthetics for Highways: Roadway Reinforcement, Separation, Filtration, Drainage, Reinforcement, Moisture Barrier, Membrane encapsulation. **(6 contact hours)**
5. Ground Improvement applications: Drainage, PVDs, French Drains, encapsulated sand tubes, on-shore applications. **(7 contact hours)**
6. Geoenvironmental Applications: Geomembranes for landfills and ponds, Geosynthetic clay liners, designing with GCL's, Filtration, Erosion control, Slope protection. **(8 contact hours)**

Text books:

- a) R. M. Koerner, 'Designing with Geosynthetics, Xlibris Corporation, 6th edition', USA, 2012.
- b) G L Sivakumar Babu, 'An Introduction to Soil Reinforcement and Geosynthetics, Universities Press', India, 2006.

Reference Books:

- a) G. V. Rao and G. V. S. S. Raju, 'Engineering with Geosynthetics', McGraw Hill Education India Pvt Ltd., 1998.
- b) Sanjay Kumar Shukla, 'Geosynthetics and their applications', Thomas Telford Publications, 2002.