

**Course Number:** CE 504

**Approval:** 9<sup>th</sup> senate meeting

**Course Name:** Slope Stability and Retaining Structures

**Credits:** 2-1-0-3

**Prerequisites:** CE 302 - Geotechnical Engineering

**Intended for:** UG/PG

**Distribution:** Discipline Elective

**Semester:** Odd/Even

**Preamble:** This course is designed for graduate students with understanding of soil mechanics and shear strength theories. The subject introduces design and analysis concepts related to retaining walls. In addition to this, the analysis of stability of slopes and ascertain the soil and slope stability. With the knowledge from the subject, the students would be able to analyse and design retaining structures and also evaluate the stability of slopes.

**Course Outline:** The course is allocated into 4 modules. The first module introduces the theory of earth pressure theories, Rankine and Coulomb postulates and theories, where the lateral stress of different soils in different conditions can be evaluated. After understanding the lateral pressures of different soils, stability of slopes in different soils and seepage conditions employing various theories and postulates. With this understanding, the concept of design of retaining walls is explained consequently for various retaining walls. The last module includes the recent

**Modules:**

Earth pressure, Rankine and Coloumb Earth Pressure theory, stresses and pressures for different conditions **(7 contact hours)**

Slope stability, types of slopes, theories of slope stability, seepage effects, theory of infinite slope stability, stabilisation methods. **(12 contact hours)**

Design of retaining structures: gravity, cantilever, semi-gravity. **(8 contact hours)**

Soil reinforcement, earth retaining structures, design and analysis. **(8 contact hours)**

Lateral earth pressure in braced cuts, Design of various components, Stability of braced cuts, base heave and stability, yielding and settlement of ground surrounding excavation. Diaphragm walls, slurry support; Soil Nailing. **(7 contact hours)**

**Textbooks:**

- a) B. M. Das, 'Principles of Foundation Engineering', Cengage learning, 2011.
- b) J. E. Bowles, 'Foundation Analysis & Design', McGraw-Hill Higher Education, 2001.
- c) V. N. S. Murty, 'Geotechnical Engineering', CRC press, 2002.

**References:**

- a) S Hansbo – Geotechnical Engineering, Elsevier, 1994
- b) Hsai-Yang Fang – Foundation engineering handbook, Springer Science, 1991.