III Year - I Semester　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
20CE5642　　　　　　　　　　　　　　　　　　　　　　　　　　**3　0　0　3**

EARTH & EARTH RETAINING STRUCTURES

Course Objectives:
- The overall objective of this course is to provide students the fundamentals needed for the design and analysis of earth retaining systems.
- Performance evaluation, selection, design of earth retaining structures used for the support of fills and excavations.
- Classical earth pressures theories and soil-reinforcement interaction.
- Case studies as well as demonstrating the selection, design and performance of various earth retaining structures
- Distinguish among retaining walls, bulk heads, well caissons and coffer dams.

Course Outcomes:
At the end of the course, the student will be able to
- Quantify the lateral earth pressures associated with different earth systems
- Identify the merits and demerits of different earth retaining systems.
- A thorough knowledge of available systems Design of retaining structures using appropriate design methods, factors of safety,
- Earth pressure diagrams and field verification methods
- Aware of current guidelines regarding the design of earth retaining structures.

SYLLABUS

UNIT I
Earth pressures – Different types and their coefficients- Classical Theories of Earth pressure – Rankine"s and Coulomb's Theories for Active and Passive earth pressure- Computation of Lateral Earth Pressure in Homogeneous and Layered soils- Graphical solutions for Coulomb"s Theory in active and passive conditions.

UNIT II
Retaining walls – different types - Type of Failures of Retaining Walls – Stability requirements – Drainage behind Retaining walls – Provision of Joints – Relief Shells.

UNIT III
Sheet Pile Structures – Types of Sheet piles – Cantilever sheet piles in sands and clays – Anchored sheet piles – Free earth and Fixed earth support methods – Rowe"s moment reduction method – Location of anchors and Design of Anchorage system.

UNIT IV
Braced cuts and Cofferdams: Lateral Pressure in Braced cuts – Design of Various Components of a Braced cut – Stability of Braced cuts – Bottom Heave in cuts. – types of cofferdam, suitability, merits and demerits – Design of single – wall cofferdams and their stability aspects – TVA method and Cummins" methods.

UNIT V
Pseudo static analysis of Earth Retaining Structures using Mononobe & Okabe Solution

TEXTBOOKS:

1. Principles of Foundation Engineering by Braja M. Das.
2. Foundation analysis and design – Bowles, JE – McGraw Hill

REFERENCES

1. Soil Mechanics in Engineering Practice – Terzaghi, K and Rolph, B. peck 2nd Edn. – John Wiley & Co.,
2. Analysis and Design of Foundations and Retaining Structures, Prakash, S – SarithaPrakashan, Mearut.