

Earth Structures

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| Code CE-841 | Credit Hours 3-0 |
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Course Description:

The subject equips the students with the knowledge of slope stability, embankment designs, and earthen dams. It enables the students to learn various soil improvement techniques and methods to construct civil infrastructures on the economic ground. It also helps the students become familiar with the in-situ soil and site conditions through laboratory and field investigations.

Textbooks/References:

1. Design of Small Dams, (1987) United States Department of the Interior, Bureau of Reclamation, A Water Resource Technical Publication.
2. James L.S., et al. (1963), Earth and Rock Dams: Engineering Problems of Design and Construction, John Wiley and Sons.
3. Landslides; Analysis and Control, Transportation Research Board Special Report 176
4. National Academy of Sciences. USACE (2004), EM-1110-2-2300, General Design and Construction Considerations for Earth and Rock-Fill Dams.

Prerequisites:

Nil

Assessment system for theory

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| Quizzes | 10-15% |
| Assignments | 5-10% |
| Mid Terms | 25-30% |
| Project | 0-10% |
| ESE | 45-50% |

Teaching plan

| Week No. | Topics | Learning outcomes |
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| 1 | Introduction | General Aspects of the Course and Covered Topics |
| 2-4 | Shear Strength | Mohr-Coulomb Failure Criterion, Stress Paths |
| 5-8 | Slope Stability and Methods of Stability Analysis | Slope Stability Analysis Methods, Theoretical and Numerical Aspects of Limit Equilibrium Analysis and Deformation Analysis. Total Stress and Effective Stress Analysis of Soil and Rock |
| 9 | MID SEMESTER EXAMS | |
| 10-12 | Dam Embankment Analysis | Theoretical Aspects of Seepage, Seepage Forces, Control of Seepage through Embankments, Control of Seepage through Foundations, Seepage Failures |
| 13-14 | Dam Embankment Design -General | Dam Components, General Dam Design Criteria |
| 15-17 | Membrane Reinforced Structures | Use of Geosynthetic (Geotextile, Geomembrane, Geo-nets, etc.) in Retaining Walls, Foundation |

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| | Beds, Canal Lining, and Drainage |
| 18 | END SEMESTER EXAMS |