**Department of Civil Engineering**

**Course Name:**

Advanced Numerical Methods in Geomechanics

| **Course Number:** 20-409 | **Credit:** 3 |
|---|---|
| **Program:** Graduate | **Course Type:** Technical Selective |
| **Prerequisite**: - | **Corequisite:** - |

**Course Description (Objectives):**

This course aims to introduce students to advanced numerical methods, including the finite element method, nonlinear and dynamic analysis, geomechanics modeling, and related engineering phenomena. It enhances their understanding and application of these techniques in engineering.

**Course Content (outline):**

- Chapter 1: Advanced Topics in the Finite Element Method
- Chapter 2: Nonlinear Analysis in Solid Mechanics
- Chapter 3: Dynamic Analysis
- Chapter 4: Modeling Discontinuities in Geomechanics
- Chapter 5: Modeling Coupled Phenomena
- Chapter 6: Introduction to Other Numerical Methods

**References:**

- Cook, Malkus and Plesha, "Concepts and Applications of Finite Element Analysis", (1989), John Wiley
- Bathe, K.J., "Finite Element Procedures in Engineering Analysis", (1996), Prentice Hall
- Zienkiewicz & Taylor, "The Finite Element Method", vol. 2, 4th Edition, (1989), McGraw Hill
- Smith, I.M., & Griffith, D.C., "Programming the Finite Element Method", 2nd Edition (1992), John Wiley & Sons
- Zienkiewicz, O.C., Chan, A.C.H, Pastor, M., Schrefler, B.A., Shiomi, T., "Computational Geomechanics, with special reference to earthquake engineering",