

COURSE IDENTIFICATION FORM

Course Code and Name: IM5005 / FINITE ELEMENTS METHOD

Department of : CIVIL ENGINEERING / MASTER PROGRAMME

Semester	Theoretic Hour	Practice Hour	Total Hour	Credits	ECTS	Education Language	Type: Compulsory Elective
Autumn/Spring	3	0	3	3	5	Turkish	Optional

Prerequisite (s)

Instructor

Assoc. Prof. Dr. Alper POLAT

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Course Assistant

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Groups / Classes

Course Aim

To introduce the finite element method for structural analysis and to give detailed information required for complex modelling with software packages.

Course Goals

Rod equations, work of internal and external forces, potential and kinetic energy, shape function, equation of motion, strain element, torsion element, bending and frame elements, elastic stability, complex modelling with package programmes in structural engineering.

Course Learning Outcomes and Proficiencies

- Gains knowledge about numerical solution methods.
- Gains knowledge about the basic equations used in structural analysis.
- Gains knowledge about element equilibrium matrices, stiffness matrices and kinematic matrix.
- Gains knowledge about stiffness relations in the total system.
- Gains knowledge about the calculation of planar systems by finite element method.

Course Basic and Auxiliary Contexts

- Omurtag, M.H., Çubuk Sonlu Elemanlar, Birsen Yayınevi, İstanbul, 2010.
- Cook, R.D., Malkus, D.S., and Plesha, M.E., and Witt R.J., Concepts and Applications of Finite Element Methods, 4 th Edition, John Wiley & Sons, Inc., 2001.
- Tirupathi R. Chandrupatla, Ashok D. Belegundu, Mühendislikte Sonlu

- Elemanlara Giriş, Çeviren: Sami Karadeniz, 4. Basımdan Çeviri
- Jacob Fisher , Ted Belytschko, Sonlu Elemanlar Yönetimine Giriş, Nobel Akademik Yayıncılık, Çeviren: Babür Deliktaş , Mehmet Ali Güler , Murat Yazıcı

Methods of Give a Lecture

Face to Face

Assessment Criteria**Midterm Exam****If Available, to
Sign (x)****General Average
Percentage (%) Rate****X****50****1. Quiz****2. Quiz****3. Quiz****4. Quiz****Oral Examination****Practice Examination
(Laboratory, Project etc.)****Final Exam****X****50****Semester Course Plan****Week****Subjects****1**

Rod Equations, Work of Internal and External Forces

2

Potential and Kinetic Energy

3

Shape Function, Equation of Motion

4

Elongation Element

5

Torsion Element

6

Bending and Frame Elements

7

Shell Elements

8

Midterm Exam

9

Solid body elements

10

Elastic Stability

11

The use of package programmes in the solution of engineering structures, issues to be considered in the use of package programmes, assumptions used in modelling structural elements

12

Detailed information about commands and short applications

13

Application

