

Course Name:

Seismic Retrofitting of Structures

Course Number: 20-169	Credit: 3
Program: Graduate	Course Type: Technical Selective
Prerequisite: -	Corequisite: Dynamics of Structures

Course Description (Objectives):

The main goal of this course is to familiarize students with the concepts of control and energy dissipation in structures and to teach them methods of analysis and design for structures equipped with these systems. By the end of the course, students will have a good understanding of the performance of various control systems (passive, semi-active, and active) in improving structural behavior.

Course Content (outline):

- Chapter 1: Introduction to the Concepts of Energy Dissipation and Seismic Isolation in Structures
- Chapter 2: Principles of Designing Passive Energy Dissipation Systems
- Chapter 3: Metallic, Friction, Viscoelastic, and Viscous Dampers
- Chapter 4: Tuned Mass and Tuned Liquid Dampers
- Chapter 5: Theory of Seismic Isolation
- Chapter 6: Smart Materials and Their Application in Semi-Active Control Systems
- Chapter 7: Active Structural Control, Overview of Basic Definitions, and Classical Active Control Algorithms
- Chapter 8: Classical Optimal Control and Instantaneous Optimal Control for Different Cases

References:

- Soong, T.T. and Dargush, G.F. 1997. 'Passive Energy Dissipation Systems in Structural Engineering', John Wiley & Sons, New York, NY.
- Soong, T.T. 1990. 'Active Structural Control: Theory and Practice', Longman.
- M. C. Constantinou, T. T. Soong, and G. F. Dargush, "Passive Energy Dissipation Systems for Structural Design and Retrofit", The Multidisciplinary Center for Earthquake Engineering Research (MCEER), New York, 1998.