Department of Civil Engineering

Course Name:

Plastic Analysis of Structures

Course Number: 20-124	**Credit:** 3
Program: Graduate	**Course Type:** Technical Selective
Prerequisite: -	**Corequisite:** -

Course Description (Objectives):

The main goal of this course is to familiarize students with the concepts and methods of plastic design for beams and building frames. The focus is on the optimal use of the ultimate plastic capacity of sections for safe and economical structural design.

Course Content (outline):

- Chapter 1: Stress-Strain Relationships
- Chapter 2: Fully plastic moment – ideal plastic theory
- Chapter 3: Theorems of plastic theory – upper bound theorem, lower bound theorem, uniqueness theorem
- Chapter 4: Plastic analysis and design of beams
- Chapter 5: Plastic analysis and design of braced multi-story frames
- Chapter 6: Calculation of displacements at the onset of collapse
- Chapter 7: Design of unbraced frames
- Chapter 8: Principles of the method
- Chapter 9: Reinforced concrete and plastic design
- Chapter 10: Yield line theory

References:

- Jirásek, Milan, and Zdenek P. Bazant. Inelastic analysis of structures. John Wiley & Sons, 2002.