

COURSE DETAIL

ADVANCED STRUCTURAL MECHANICS

Country

Italy

Host Institution

University of Bologna

Program(s)

University of Bologna

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Civil Engineering

UCEAP Course Number

168

UCEAP Course Suffix**UCEAP Official Title**

ADVANCED STRUCTURAL MECHANICS

UCEAP Transcript Title

ADV STRCTRL MECH

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

This course is part of the Laurea Magistrale degree program and is intended for advanced level students. Enrollment is by permission of the instructor. This course advances students' understanding of structural behavior and enhances their ability to apply structural analysis methods to civil engineering structures. Students acquire knowledge in the following areas: Structural Matrix Analysis, i.e., techniques for analyzing 2D truss and frame structures using the Direct Stiffness Method and FEM software. Buckling Analysis, i.e., methods for buckling and post-buckling analysis of discrete and continuous systems, with FEM applications. Plastic Analysis, i.e., concepts of plasticity, incremental and limit analysis for truss and beam systems, also using FEM tools. The main skills developed during this course include: Proficiency in matrix analysis and the Finite Element Method (FEM) for analyzing truss and frame structures. Ability to evaluate buckling and post-buckling behavior of rigid and continuous systems, using equilibrium and energy methods. Competence in conducting plastic analysis of structural systems, including an understanding of plastic hinges. Software Proficiency: hands-on experience with FEM-based software for solving structural, buckling, and elasto-plastic problems. Analytical and critical thinking: enhanced ability to approach complex structural issues with theoretical and computational tools. The course contributes to the objectives of the master's program related to the application of mathematical tools for interpreting, describing, and modeling structural problems.

A prior knowledge and understanding of the static behavior of planar truss and beam structures is recommended. The course includes theoretical lectures (module 1), exercises and laboratory sessions (module 2).

Language(s) of Instruction

English

Host Institution Course Number

72758

Host Institution Course Title

ADVANCED STRUCTURAL MECHANICS

Host Institution Course Details

<https://www.unibo.it/en/study/course-units-transferable-skills-moocs/course-unit...>

Host Institution Campus

BOLOGNA

Host Institution Faculty**Host Institution Degree**

LM in CIVIL ENGINEERING

Host Institution Department

Civil, Chemical, Environmental, and Materials Engineering

Course Last Reviewed

2025-2026

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