

# CIVL 4440

## ADVANCED STRUCTURAL ANALYSIS

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**Class Hours:** Tue Fri: 2:00 - 3:30 pm      Location: CII 4050

**Instructor:** Gianluca Cusatis  
Office: JEC 4048  
Phone: 276 - 3956  
e-mail: cusatg@rpi.edu

**Instructor Office Hours:** Wed 1:00 – 3:00 pm  
You are also welcome to make an appointment for a different time.

**Teaching Assistant:** N/A

**Textbook:** Notes provided by the instructor

**Reference books:** Fundamentals of Structural Analysis, K.M. Leet and C.-M. Uang, Mc Graw Hill (Chaps. 16-18).  
Analysis of Structural Member Systems, J. J. Connor, Ronald Press, (Chaps. 11, 13)  
Stability of Structures, Z.P. Bažant and L. Cedolin, Dover (Chaps. 1, 2, 8)  
Inelastic Analysis of Structures, M. Jirásek and Z.P. Bažant, Wiley, (Chaps. 1-6, 17)

**Catalog Description:** Computer Analysis of structures. Advanced topics in the behavior of structural components. Bending of plates, buckling of columns and frames. Beam-columns. Torsion in structural members. Inelastic behavior and limit analysis of structures.

**Course Objective:** The objective of this course is to develop a working knowledge on matrix analysis of elastic structures, plastic behavior of structures, buckling of elastic structures. Students will do this by building on the knowledge gained through IEA (ENGR 1100) and introduction to structural engineering (CIVL 2670). Upon successful completion of the course, students will have an adequate insight of elastic, plastic, and buckling behavior of structures as well as specific structural analysis tools needed in the professional practice of modern structural engineers.

**Course Outcomes:** After successfully completing this course students will be able to:

- Solve statically indeterminate elastic trusses, beams, and frames.

- Perform the incremental analysis of elastic-plastic trusses, beams, and frames
- Calculate the buckling load for elastic columns and frames.

**Prerequisites:** CIVL 2670 – Introduction to structural engineering

**Exam Dates:** See schedule

**Homework Policy:** Homework is due no later than 5:00pm on the due date. Collaboration with your classmates is encouraged. Solving homework problems within study groups is encouraged. However, it is also suggested that each student attempt the homework problems on their own prior to meeting with their study group so as to understand their personal deficiencies. In this way, group study will be most effective for each student. Each student must hand in each individual problem. Copying is not acceptable. If copying is suspected, you will be asked to demonstrate your solution to the instructor. Homework assignments are worth a total of 100 points.

**Grading Policy:** Grades between 0 and 100 are assigned based upon the level of mastery of the subject by the student. Grades will not be curved.

**Final HW Grade** = Total homework points earned

**Final Grade** =  $0.25 (\text{Exam \# 1}) + 0.25 (\text{Exam \# 2}) + 0.30 (\text{Exam \# 3}) + 0.20 (\text{HW}) + (\text{project})$

A = 96-100; A- = 91-95; B+ = 86-90; B = 81-85; B- = 76-80; C+ = 71-75; C = 66-70; C- = 61-65; D+ = 56-60; D = 51-55; F < 50.

**Academic Integrity:** Student-teacher relationships are built on trust. Acts, which violate this trust, undermine the educational process. The *Rensselaer Handbook of Student Right and Responsibilities* defines various forms of Academic Dishonesty and everyone should be familiarized with these. In this class, all HW and AR assignments that are turned in must represent the student's own work. Submission of any assignment that is in violation of this policy will result in a penalty of ten (10) points on the final grade.