

Course: UC 5648 (CU-CEE 371)

STRUCTURAL MODELING AND BEHAVIOR

GENERAL INFORMATION

2st semester

Credits: 4CU-6UC

Lectures: W 12:00-14:00; F 12:00-14:00

INSTRUCTOR(S)

MIGUEL A. SERNA

Catedrático de Universidad. Departamento de Ingeniería Estructural y Mecánica.

COURSE OBJECTIVE

The main objective of this course is to present both the conceptual analysis of structures and its computational approach based on matrix analysis and finite elements. Topics include: analysis of two and three-dimensional trusses; analysis of frames; grids, cables and arches; virtual work and unit load method; basic concepts of structural stability; introduction to the finite element method. The course also introduces the application of finite element software.

TEXTBOOK

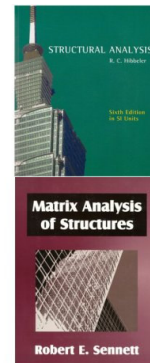
Structural Analysis (6th ed.)

Russell C. Hibbeler

ISBN: 978-0131976412

Publisher: Prentice Hall.

Published: 2005



Matrix Analysis of Structures

Robert E. Sennett

ISBN: 1-57766-143-5

Publisher: Waveland Press, Inc.

228 Pages

Published 2000

REFERENCES

William McGuire, Richard H. Gallagher, Ronald D. Ziemian, "Matrix Structural Analysis, With MASTAN2", 2nd ed. Wiley.

José R. González de Cangas, Avelino Samartín, "Calculo de Estructuras", S.P.C.I.C.C.P.

GRADING

Class attendance and discussions:	10%
Case Presentation	10%
Homework:	20%
Midterm exam	30%
Final Exam:	30%

COURSE SYLLABUS

Week	Day	Date	Class Type	Topic
(1)	W	20/02	Lecture	Introduction to Structural Analysis
	F	22/02	Lecture	Analysis of Two-dimensional Trusses. Equilibrium Equations. Determinacy.
(2)	W	27/02	Lecture	Analysis of Two-dimensional Trusses. Compatibility Equations. Constitutive Equations. Force Method. Stiffness Method.
	F	29/02	Lecture	Matrix Analysis of Two-dimensional Trusses.
(3)	W	05/03	Lecture	Energy Methods. Virtual Work.
	F	07/03	Lecture	Unit Load Method. Application to Truss Analysis.
(4)	W	12/03	Lecture	Matrix Analysis of Three-dimensional Trusses.
	F	14/03	Lecture	Modeling with Mastan2.
(5)	W	19/03	Discussion	Conclusion of Analysis of Trusses
(6)	W	01/11	Lecture	Beam Theory Review. M and V diagrams.
	F	02/11	Lecture	Analysis of Frames (I)
(7)	W	02/04	Lecture	Analysis of Frames (II)
	F	04/04	Lecture	Analysis of Frames (III)
(8)	W	09/04	Lecture	Matrix Analysis of Two-dimensional Frames
	F	11/04	Lecture	Matrix Analysis of Three-dimensional Frames
(9)	W	16/04	Discussion	Conclusions of Analysis of Frames
	F	18/04		Midterm Exam
(10)	W	23/04	Lecture	Analysis of Grids (I)
	F	25/04	Lecture	Analysis of Grids (II)
(11)	W	30/05	Lecture	Structures with cables (I)
	F	02/06	Lecture	Structures with cables (II)
(12)	W	07/05	Lecture	Analysis of Arches
	F	09/05	Lecture	The Finite Element Method
(13)	W	14/05	Lecture	FEM Modeling and Analysis of Structures.
	F	16/05	Lecture	Introduction to ANSYS.
(14)	W	21/05	Lecture	Structural Stability Basic Concepts
	F	23/05	Lecture	Case Studies (I)
(15)	W	28/05	Lecture	Case Studies (II)
	F	30/05	Discussion	Conclusion of Special Structures and FEM