

Course: 5642

CONTINUUM MECHANICS (ADVANCED SOLID MECHANICS)

GENERAL INFORMATION

1st semester

Credits: 4CU-6UC

Lectures: R 08:30-10:30; F 12:00-14:00

INSTRUCTOR(S)

MIGUEL A. SERNA

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COURSE OBJECTIVE

The course presents the basic theory of stress and strain and its application to advanced topics in the field of solid mechanics. Specific topics include: theory of stress and strain; stress-strain-temperature relations; torsion of noncircular bar and hollow thin-wall members; bending and torsion of open thin-wall members; stability analysis for columns and beam-columns; nonlinear material response and yield criteria; plastic analysis of beams and frames.

TEXTBOOK

Advanced Mechanics of Materials

Arthur P. Boresi, Richard J. Schmidt

ISBN: 0-471-43881-2

Publisher: John Wiley & Sons

Hardcover

681 Pages

Published 2003



REFERENCES

S.P. Timoshenko, and J.N. Goodier, "Theory of Elasticity", 3rd ed., McGraw-Hill.

GRADING

Class attendance and discussions:	10%
Homework:	20%
Tensile structure practice work	10%
Midterm exam	25%
Final Exam:	35%

COURSE SYLLABUS

Week	Day	Date	Class Type	Topic	Assigned Reading
(1)	R	25/09	Lecture	Analysis of Stress (I)	Ch2: 2.1 to 2.2
	F	26/09	Lecture	Analysis of Stress (II)	Ch2: 2.3 to 2.5
(2)	R	02/10	Lecture	Deformation and Strain (I)	Ch2: 2.6 to 2.7
	F	03/10	Lecture	Deformation and Strain (II)	Ch2: 2.8 to 2.9
(3)	R	9/10	Discussion	Conclusion of Deformation and Strain	
	F	10/10	Lecture	Linear Elasticity (I)	Ch3: 3.1 to 3.2
(4)	R	16/10	Lecture	Linear Elasticity (II)	Ch3: 3.3 to 3.5
	F	17/10	Discussion	Conclusions of Linear Elasticity	
(5)	R	23/10	Lecture	Bidimensional Elasticity (I)	Course notes
	F	24/10	Lecture	Bidimensional Elasticity (II)	Course notes
(6)	R	30/10	Lecture	Experimental Methods in Elasticity	Course notes
	F	31/10			
(7)		06/11	Lecture	Applied Elasticity: Torsion (I)	Ch6: 6.1 to 6.3
		07/11	Lecture	Applied Elasticity: Torsion (II)	Ch6: 6.4 to 6.7
(8)	R	13/11	Lecture	Applied Elasticity: Torsion (III)	Ch6: 6.8 to 6.9
	F	14/11	Discussion	Conclusions of Torsion	
(9)	R	20/11		Midterm Exam	
	F	21/11	Lecture	Curved beams	Ch9: 9.1 to 9.4
(10)	R	27/11	Lecture	Beams on Elastic Foundations	Ch10: 10.1 to 10.3
	F	28/11	Lecture	Structural Stability (I)	Course notes
(11)	R	04/12	Lecture	Structural Stability (II)	Course notes
	F	05/12	Lecture	Structural Stability (III)	Course notes
(12)	R	11/12	Discussion	Conclusion of Structural Stability	
	F	12/12	Lecture	Plasticity (I)	Ch4: 4.1 to 4.5
(13)	R	18/12	Lecture	Plasticity (II)	Ch4: 4.6 to 4.4
	F	19/12	Lecture	Applied Plasticity (I)	Course notes
(14)	R	8/01	Lecture	Applied Plasticity (II)	Course notes
	F	9/01	Discussion	Conclusion of Plasticity	
(15)	R	15/01	Lecture	Numerical solutions for elasticity and plasticity problems (I)	Course notes
	F	16/01	Lecture	Numerical solutions for elasticity and plasticity problems (II)	Course notes
				Final Exam	

