Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Theory of Structures			
ACADEMIC YEAR: 2019/20			
TYPE OF EDUCATIONAL ACTIVITY: Characterizing			
TEACHER: Antonio D. Lanzo			
e-mail: antonio.lanzo@gmail.com		website:	
phone: (+39) 0971 205055		mobile (optional):	
Language: italian			
ECTS: 6	n. of hours: 54 (32 lessons and 22 tutorials/practice)	Campus: Potenza Scuola di Ingegneria Civil Engineering	Semester: first

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Knowledge of the main types of non-linear behavior of structures, the relative mechanical modeling and the main computational methods of analysis.

Topics:

Plasticity Theory. Plastic behavior of frames. Theorems of limit analysis. Limit analysis of frames. Plastic shakedown. Instability of structures. The Euler pin-ended buckling beam problem. General theory of stability. The Koiter's perturbation method of buckling and post-buckling behavior. Numerical analysis strategy of nonlinear structures.

PRE-REQUIREMENTS

Students must have successfully completed the basic course of structural mechanics and a course on matrix structural analysis.

SYLLABUS

Introduction: Some structural engineering problems. Some elements of calculus of variations. Elements of Mechanics: basic formulation of the static elastic problem.

Plasticity theory: Plastic behavior of materials. Yiels criteria. The flow-theory of plasticity. Plastic behavior of frames. Theorems of limit analysis. Limit analysis of frames. Plastic shakedown. Melan's theorem. The Haar-Karman variational formulation. Numerical strategy of analysis: the initial stress method and the arch-lenght method.

Instability of structures: Introduction to the nonlinear behavior of slender structures. The Euler pin-ended buckling beam problem. Concepts of stability and instability of equilibrium. General theory of stability. The Koiter's perturbation method of buckling and post-buckling behavior. Numerical analysis strategy of slender structures.

TEACHING METHODS

Theoretical lessons, Classroom tutorials,.

EVALUATION METHODS

Intermediate verifications, Written examination, Oral examination.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- A. D. Lanzo, Analisi delle Travature Elastiche: Metodi ed Applicazioni, AracneEditrice, Roma, 2007. (isbn 978-88-548-1162-1)
- A. D. Lanzo, Analisi nonlineare delle strutture: un approccio computazionale, draft of a tutorial book, Potenza, 2016.
- Slides from lectures.

INTERACTION WITH STUDENTS

Tuesday from 12:30 to 13:30, Wednesday from 9:00 to 12:00. By email: antonio.lanzo@unibas.it...

EXAMINATION SESSIONS (FORECAST)[1]

05/02/2020, 26/02/2020, 26/03/2020, 23/04/2020, 21/05/2020, 25/06/2020, 23/07/2020, 19/09/2020, 22/10/2020, 19/11/2020, 17/12/2020

SEMINARS BY EXTERNAL EXPERTS YES □ NO x□

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.

FURTHER INFORMATION