Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Theory of Structures				
TEACHER: Antonio D. Lanzo				
e-mail: antonio.lanzo@unibas.it		website:		
Language: italian				
ECTS: 6	n. of hours: 54	Academic year: 2014/15	Campus: Potenza	Semester: First

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.

TEACHING METHODS (please tick one or more options)

X Theoretical lessons
X Tutorials in classroom

TEXTBOOKS

- A. D. Lanzo, Analisi delle Travature Elastiche: Metodi ed Applicazioni, AracneEditrice, Roma, 2007. (isbn 978-88-548-1162-1)
- A. D. Lanzo, Introduzione all'analisi nonlineare delle strutture, dispense, Potenza, 2010.
- Slides from lectures.

ON-LINE EDUCATIONAL MATERIAL

web address:

LEARNING OUTCOMES

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

REQUIREMENTS

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

EVALUATION METHODS (please tick one or more options)

X Written examination
X Oral examination

DETAILED CONTENT

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.

EXAMINATION SESSIONS (FORECAST)

9.2.2026, 23.2.2016, 28.6.2016, 19.7.2016, 19.9.2016

SEMINARS BY EXTERNAL EXPERTS YES □ NO X