INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT GENIE CIVIL ET URBANISME
CIVIL ENGINEERING AND URBANISM
INSA Campus LyonTech - 8 rue des Sports
Batiment Eugène Freyssinet - 69621 VILLEURBANNE
Phone 0472438889

Mechanical Design

Advanced structural analysis - 2

IDENTIFICATION

CODE : GCU-4-S1-EC-EAS2
ECTS : 1.0

HOURS

Lectures :	4.0 h
Seminars :	6.0 h
Laboratory :	0.0 h
Project :	0.0 h
Teacher-student contact :	10.0 h
Personal work :	13.0 h
Total :	23.0 h

ASSESSMENT METHOD

- Written exam

TEACHING AIDS

On-line documents

TEACHING LANGUAGE

French

CONTACT

M. GRANGE Stephane
stephane.grange@insa-lyon.fr

AIMS

This sheet falls within the Course Unit GCU-S7-STRUCT-3 (Structures - 3) and contributes to:

General Skills in Science for the Engineer:
A1 - Analyze a real or virtual system (or problem) (level 2)
A2 - Operate a model of a real or virtual system (level 2)

Skills specific to the speciality domain :
C7 - Building structure (design, dimension and control a...) (level 1)
C8 - Civil Engineering Structures (design, dimension and control a...) (level 1)

By allowing the student to work and be assessed on the following knowledge:
-solve non linear structures and materials concerning plasticity, plastic hinges, limit kinematic analysis

By allowing the student to work and be assessed on the following abilities:
-developing knowledges assumption of displacement field using the principe of virtual power (PV*P)
-solve non linear beam element structures (with plasticity, plastic hinges)

CONTENT

Non linear behaviour : Incremental method for the analysis of perfect elastoplastic structures composed of beams ; limit analysis method (kinematic analysis)

BIBLIOGRAPHY

TIMOSHENKO S. Théorie des plaques et des coques. Beranger, 1951.
TIMOSHENKO S. Théorie de la stabilité élastique. Beranger, 1947.
MASSONNET C., CESCOTTO S. Mécanique des matériaux. Eyrolles, 1980
MANDEL J. Propriétés mécaniques des matériaux : rhéologie, plasticité. Eyrolles, 1978.
MASSONNET C., SAVE M. Calcul plastique des constructions. Centre belgo-luxembourgeois d'information de l'acier, 1967.

PRE-REQUISITE

Continuum Solid Mechanics
Initiation to structural analysis
Structural analysis methods