

COURSE ID SHEET



Course No. **5026**

NTUA

Semester:

2

Core

X

Elective

Specialization

Title:

ENGINEERING MECHANICS

Aim:

The aim of the course is to introduce the student to basic concepts of Mechanics, such as Statics, (Equilibrium Equations of a body, Supports, Internal forces), Theory of Elasticity, (Tensor of Stress and Strain, Displacements) and Strength of Material, (Axial loads, Torsion, Bending).

Content:

Vectors. Forces, Moments, Distributed Loads, Centers of Mass. Degrees of Freedom, Supports types, Free Body diagrams, Equilibrium Equations, 2-D and 3-D Applications. Reaction Forces and Moments, Internal Forces and Moments. Trusses, Solution Methods of Joints and Ritter Sections. Beams and Frames, Axial and Shear Forces, Bending Moment, (N, Q, M diagrams).
Stresses, Normal and Shear Stresses, The Tensor of Stresses. Equilibrium equations. Rotated Axes. Principal Axes and Principal Stresses. Plane Stress State. Mohr's Circle. Strains, Normal and Shear Strains, The Tensor of Strain. Plane Strain State. Generalized Hooke law. Thermal Stresses. Moments of Inertia.
Axial Loads. Simple Torsion Theory, Elastoplastic Torsion. Simple Bending Theory.

Hours per semester:

LECTURE	39	EXERCISES	-	LABORATORY	-	HOME-WORK	81	TOTAL HOURS: 120
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Student performance /evaluation:

Written examination at the end of the semester.