ELASTICITY

Instructors: **Assoc. Prof. Panos Gourgiotis**
pgourgiotis@mail.ntua.gr, *zisis@mail.ntua.gr*
Spring Semester: *M.Sc. Analysis and Design of Structures*
Class: Friday 11:00-13:00
Office Hours:

Textbook: NO Textbook
Recommended Reading:
[1] Sadd, M.H. (2009). *Elasticity: theory, applications, and numerics*. Academic Press.
[2] Barber, J.R. (2002). *Elasticity*. Dordrecht: Kluwer Academic Publishers.
[3] Timoshenko, S.P. and Goodier, S.N. (1969). *Theory of Elasticity*. McGraw-Hill.
[4] Gurtin, M.E. (1973). *The Linear Theory of Elasticity*. In: Truesdell, C. (eds) Linear Theories of Elasticity and Thermoelasticity. Springer, Berlin, Heidelberg
[5] Chou, P.C. and Pagano, N.J. (1992). *Elasticity: tensor, dyadic, and engineering approaches*. Courier Corporation.

CONTENTS

Elements of Tensor Analysis. Traction. Stress Tensor. Balance Laws. Equations of Motion and Equations of Equilibrium. Strains and Rotations. Equations of Compatibility. Constitutive Elasticity Equations. Generalized Hooke's Law. Anisotropy – Isotropy. Strain Energy. Energy Theorems and Methods. Formulation of Boundary Value Problems. Two-Dimensional Problems. Plane Strain and Plane Stress. Airy's Stress Function. Antiplane Strain. Stress-Concentration Problems. Williams' Technique. Self-Similar Problems. Flamant-Boussinesq and Kelvin Problems. Extension, torsion, and flexure of elastic cylinders.