# MATHEMATICAL METHODS IN ELASTICITY - THE COMPLEX POTENTIALS TECHINQUE

**Instructor**: **Associate Professor Christos F. Markides,** *markidih@mail.ntua.gr*
**Class**: Wednesdays 2:10-4:40 p.m. at
**Office Hours:-**

**Textbook: NO Textbook**
**Recommended Reading:**

1) Muskhelishvili, N. I. Some basic problems of the mathematical theory of elasticity, Noordhoff, Groningen, The Netherlands, 1963.

## CONTENTS

- Plain strain, Generalized plane stress.
- Stress function.
- Complex representation of stresses and displacements.
- Finite and infinite multiply connected regions.
- Solution by power series (Circular disc under diametric parabolic compression, Circularly perforated infinite plate under uniaxial tension, Circular ring (tube) under uniform internal and external pressure).
- Conformal mapping.
- Cauchy integrals.
- Application of conformal mapping and Cauchy integrals to the solution of problems of plane elasticity for regions mapped on to a circle and on to the plane with the circular hole (Circular disc under concentrated and distributed forces, Plate with an elliptic hole under biaxial loading at infinity, Bending of a beam with an elliptic hole, Stretching of a strip (beam) with an edge notch).
- The problem of linear relationship for sectionally holomorphic functions - application to the problem of contact of two elastic bodies, and to the boundary problem of the infinite plate with straight cuts.