

Course type: **Theory of elasticity and plasticity**

Prerequisites: theoretical mechanics, strength of materials, structural mechanics

Assessment: written test

Aims and objectives: The course is intended to emphasize the importance of theory of elasticity and plasticity in engineering practice

The course is aimed to strengthen the theoretical background of practical problems.

Teaching methods: lecture and exercise

Course content: Analysis of stress and strain. Definition and notation of components of stress and strain. Principal stresses and strains. Generalizes Hooke's Law. Differential equations of equilibrium. Solution in polar and cartesian co-ordinates. Plane stress and plane strains. Solution of two dimensional problems using Airy's stress function. in rectangular and polar co-ordinates . Classical theory of thin plates. Rectangular and circular plates. Introduction to plasticity. Tresca and Von Mises criterion of yielding. Limit analysis

Learning outcomes: The course gives ability to formulate and solve plane problems of elasticity and to understand the notion of limit load.

Bibliography:

a) basic references:

Marian Paluch, Podstawy teorii sprężystości i plastyczności z przykładami, Wyd. Polit. Krakowskiej 2006

Nowacki W., Teoria sprężystości, PWN, 1973.

Timoshenko S., Goodier J. M., Teoria sprężystości, Arkady, 1951.

b) supplementary references:

Lesław Brunarski, Marek Kwieciński Wstęp do teorii sprężystości i plastyczności, Warszawa 1976