

Title Theory of Plastisity	Code 10102521110102102601
Field Material Engineering	Year / Semester 1 / 1
Specialty -	Course elective
Hours Lectures: 1 Classes: - Laboratory: 1 Projects / seminars: -	Number of credits 2
	Language polish

Lecturer:

- Jerzy Zielnica, D. Sc., Ph. D., Eng.,
tel. +48(61) 6652319
e-mail: jerzy.zielnica@put.poznan.pl

Piotr Wasilewicz, D. Sc.
tel. +48(61) 6652044
e-mail: piotr.wasilewicz@put.poznan.pl

Faculty:

Faculty of Mechanical Engineering and Management
ul. Piotrowo 3
60-965 Poznań
tel. (061) 665-2361, fax. (061) 665-2363
e-mail: office_dmef@put.poznan.pl

Status of the course in the study program:

- Basic course of the study program.

Assumptions and objectives of the course:

- Getting acquainted with basing knowledge in the theory of plasticity and its application in structural analysis.

Contents of the course (course description):

- Stress and strain state, stress and strain tensors in 3-D space.
Stress-strain relations for linear-elastic bodies. Tension test modeling.
The work of plastic deformation, Tresca-St.Venant and Huber-Mises-Hencky yield conditions. The fundamental theories of plasticity: the Nadai-Hencky-Iliuszyn theory of small elastic-plastic deformations, Levy-Mises and Prandtl-Reuss
J2 incremental theory of plasticity. Plane stress and plane strain in perfectly plastic body, slip lines. Elastic-plastic torsion of bars, bending of elastic-plastic beams.
Introduction to limit load analysis of bar structures.
Laboratory tests: Material's plasticity measures derived from static strength tests under tension. Strain-hardening exponent. The influence of tension test ratio.
The influence of initial length measure on elongation at break.
The influence of compressed specimen height on tension test diagram.
Verification of Huber-Mises material failure theory.
Relation between tensional strength and hardness.

Introductory courses and the required pre-knowledge:

- The knowledge of fundamentals in strength of materials, applied mechanics and statics.

Courses form and teaching methods:

- Lectures supported by laboratory tests.

Form and terms of complete the course - requirements and assessment methods:

- Written evaluation of knowledge and reports.

Basic Bibliography:

Additional Bibliography: