



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Plastic processing

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

18

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

### Prerequisites

Basic knowledge of physics, mathematics and mechanics; skills of logical thinking; association of knowledge of many branches; getting and using information from library and internet; social expertise: needs of continuous learning, getting new knowledge

### Course objective

Getting knowledge about applying of chosen numerical method for solving engineering problems

### Course-related learning outcomes

Knowledge

1. Has basic knowledge of the strength of materials, including the basics of the theory of elasticity and plasticity, stress hypotheses, calculation methods for beams, membranes, shafts, joints and other simple



structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in mechanical structures. [M1\_W11].

2. Has basic knowledge of manufacturing techniques used in the engineering industry, such as casting, forming, reducing and incremental machining, welding and other joining techniques, cutting, coating and surface treatments. [M1\_W14].

3. Has basic knowledge of tribological processes occurring in machines, i.e. friction, lubrication and wear. [M1\_W17].

#### Skills

1. Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

[M1\_U01].

2. Can search in catalogs and on manufacturers' websites ready-made machine components to be used in his own projects. [M1\_U02].

3. Can interact with other people as part of teamwork (also of an interdisciplinary nature). [M1\_U26].

#### Social competences

1. Is ready to critically assess his knowledge and received content. [M\_K01].

2. Is ready to initiate actions for the public interest. [M1\_K04].

3. Is ready to fulfill professional roles responsibly, including:

- observing the rules of professional ethics and requiring this from others,

- caring for the achievements and traditions of the profession. [M1\_K06].

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test (positive for min. 50,1% correct answers). Less than 50,0% - ndst, in range (50,1%-60,0%) - dst, (60,1% -70,0%) - dst+, (70,1% - 80%) - db, (80,1% - 90,0%) - db+, more than 90,1% - bdb) done at the end of semester.

#### Programme content

1. Theoretical background of plastic forming of metals and metal alloys (stress tensor, yield conditions, mechanisms of plastic deformations).

2. Materials in metal forming. Changes of properties of materials under plastic processes'

3. Estimation of plastic or elastic state of materials based on Huber or Tresca hypotheses.

4-7. Technological operation of sheets forming (cutting, bending, stamping).

8-10. Technological operations of rods forming (forging, rolling, extrusion).



11. General informaton about tools materials and technical greases (in plastic processes). Defects in workpieces obtained by plastic processes and method to avoid them.

12, 13. Calculation of cutting and bending processes parameters.

14, 15. Determining of stamping process parameters.

### Teaching methods

Lectures: multimedia presentation, comments ; discussion;

### Bibliography

#### Basic

1. Erbel S., Kuczyński K., Marciniak Z.:Obróbka plastyczna. Warszawa: PWN 1986.
2. Morawiecki M., Sadok L., Wosiek E.: Teoretyczne podstawy technologicznych procesów przeróbki plastycznej, Wyd. Śląsk, 1986
3. Z. Marciniak: KONSTRUKCJA TŁOCZNIKÓW, Ośrodek Techniczny A. Marciniak, Warszawa, 2002.

#### Additional

1. Erbel S.,Golatowski T.,Kuczyński K., Marciniak Z. i inni: Technologia obróbki plastycznej na zimno. Warszawa: SIMP-ODK 1983. Muster A.: KUCIE MATRYCOWE,
2. Muster A.: KUCIE MATRYCOWE Projektowanie procesów technologicznych, Oficyna Wydawnicza Politechniki Poznańskiej, Warszawa 2002.
3. Zalecenia do obróbki plastycznej metali. Instytut Obróbki Plastycznej ? Poznań.
4. M. Ustasiak, P. Kochmański: OBRÓBKA PLASTYCZNA Materiały pomocnicze do projektowania, Politechnika Szczecińska, Szczecin, 2004.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	18	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	32	1,0

<sup>1</sup> delete or add other activities as appropriate