



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metal forming

Course

Field of study

Biomedical Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

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 metal forming applying in manufacturing and exploitation of machines elements; recognise tools and machines used for metal forming.

Course-related learning outcomes

Knowledge

1. He/she has well-founded theoretical general knowledge about manufacturing technologies. He/she knows how to describe processes of manufacturing engineering materials, techniques of creating metals and alloys, machining and advanced technologies of subtractive machining, modern formation techniques [K_W11].

Skills

1. He/she knows how to assess usefulness of methods and tools routinely used to solve engineering tasks of a practical character typical for materials engineering and select and use the right methods and tools. [K_U18].

2. He/she knows how to solve technical problems using laws of mechanics and carry out strength analyses of machine elements and mechanical systems [K_U15].

Social competences

1. He/she is well aware of the necessity for continuous learning and knows how to inspire and organize the process of learning of other people [K_K01].

2. He/she is well aware of the social role of a graduate of a technical university, understands the need to formulate and inform the public through mass media about technical achievements and of other aspects of engineering activity and makes sure that such information and opinions are conveyed in a way that is generally understood [K_K07].

3. He/she knows how to cooperate and work in teams assuming various roles within [K_K03].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Written test of general questions (positive note for minimum 50.1% correct answers: <50% - ndst, [50.1% - 60.0%]- dst, [60.1% -70.0%]- dst+, [70.1% - 80 %]db, [80.1% - 90.0%] - db+, [90.1% - 100%]- bdb) done at the end of semester.

Laboratorium:



Oral or written test of questions related to each experiment done in laboratory, written report of each experiment (according to lecturer instructions). To get credit every exercise must be passed (test and report).

Programme content

Lecture:

1. Theoretical knowledge about plastic forming of metal (plastic conditions, yield point, mechanism of plastic deformations).
2. Technological operation of sheets forming (cutting, bending, stamping) and rods (forging, rolling, extrusion).
3. material used in metal forming.
4. Changing of material parameters (characteristics) during plastic forming.
5. Information about tool materials and technological greases.
6. Imperfections in workpieces obtained in metal forming.
7. Technological processes - examples.

Laboratorium:

1. Characteristics of metal forming machines.
2. Sheet cutting using guillotine and disc scissors.
3. Stamping of cylindrical drawpiece using hydraulic press.
4. Open forging using gravity hammer and die forging using screw press; extrusion using hydraulic press.
5. Stamping rectangular workpiece using hydraulic press.
6. Longitudinal and transverse rolling.
7. Estimation of material characteristics (tensile test, Erichsen test).

Teaching methods

Lecture:

Multimedia presentation (images, graphs, videos, simulations)

Laboratorium:

Perform of experiments - presentation of results, practical work of students - preparing of reports including results of problem solutions, 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	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) ¹	20	1,0

¹ delete or add other activities as appropriate