



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Joining and assembly

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### Course

Field of study

Product Lifecycle Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

English

Requirements

elective

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### Number of hours

Lecture

15

Tutorials

-

Laboratory classes

-

Projects/seminars

15

Other (e.g. online)

-

### Number of credit points

2

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### Lecturers

Responsible for the course/lecturer:

prof. Assoc. Olaf Cizak

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Faculty of Mechanical Engineering

Piotrowo Street No 3, 60-965 Poznań

Responsible for the course/lecturer:

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### Prerequisites

The student starting this subject should have a basic knowledge of production engineering (including organization and economics) and mechanical engineering - program basis for first-cycle studies in the



field of management and production engineering. Student should also be able to obtain information from specified sources and be ready to cooperate in a team.

### Course objective

Providing students with theoretical and practical knowledge about connection and assembly technology used in machine construction. The goal is to provide basic knowledge about the technology and organization of assembly processes used in production systems. Developing students' skills to solve conceptual problems in assembly design.

### Course-related learning outcomes

#### Knowledge

The student has knowledge about:

- the type and technology of connections used in machine construction.
- the essence and significance of the technological process of assembly in the production system
- producibility evaluation from the point of view of assembly technology
- forms of organization of assembly technological processes
- main and additional operations used in assembly technological processes.

#### Skills

The student should be able to:

- assess the product's productability from the point of view of assembly technology using the DFA method
- develop an assembly design for the selected product.

#### Social competences

Students should be able to cooperate in a group, express their assessment and justify it, act in accordance with the principles of ethics.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The written examination covers the whole course.

Project: the evaluation includes project development, presentation and discussion in a group of students. Progress in the developing of the project is verified at each class, the next tasks to be determined by the lecturer.

### Programme content

Lecture: Mechanical Assembly (MA), Major classes of MA (manual, mechanical, automatic and robotic systems, Flexible Assembly Systems - FAS), Impact of Design on Product Cost, Design for Assembly and Disassembly (DFA-D), Part Handling, Orientation and Feeding, Joining (eg. Threaded Fasteners, Rivets,



Interference Fits (Press fitting, Shrink and expansion fits, Snap fits, Retaining rings, Stitching, Stapling, Molding Inserts and Integral Fasteners, Integral Fasteners: Lanced tabs, Seaming, Beading, Welding, Brazing, Soldering and other) with Aspects of Cost, Quality, Producibility, Rate and Flexibility.

Project: developing an assembly design for the selected set of machines.

### Teaching methods

Lecture: multimedia presentation illustrated with video, problem discussion.

Project: solving practical problems, searching for and using knowledge sources, teamwork, discussion.

### Bibliography

#### Basic

- Whitney, Daniel E., Mechanical Assemblies: Their Design, Manufacture, and Role in Product Development. New York, NY: Oxford University Press, 2004, ISBN: 9780195157826.
- Speck, James A., Mechanical Fastening, Joining, and Assembly, CRC Press Taylor&Francis Group, 2015, ISBN 9781482276558
- Zorowski, Carl F., Design for Assembly: assembly definition, part sequencing, product guidelines, part feeding and insertion, product redesign process, quantifying assembly improvement, 2016, CreateSpace Publishing, ISBN 9781539423201

#### Additional

- Automotive Mechanical Assembly: Intermediate, 2016, 3G E-Learning LLC, ISBN 9789351157762
- Automotive Mechanical Assembly: Advanced, 2016, 3G E-Learning LLC, ISBN 9789351157755

### 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/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	20	1,0

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

