



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Services engineering [S2MiBP1E-PE>IU]

### Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Product Engineering

Profile of study

general academic

Level of study

second-cycle

Course offered in

english

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

prof. dr hab. inż. Zbigniew Kłos  
zbigniew.klos@put.poznan.pl

### Lecturers

### Prerequisites

**KNOWLEDGE:** Student has the basic knowledge from his/her field of study, specialization, preliminary seminar and area of diploma work. **SKILLS:** Student possesses ability of integrating and interpreting obtained information, of drawing the conclusions, elaborating simple engineering tasks **SOCIAL COMPETENCES:** Student has the consciousness of the validity of different form of communication, especially in reporting results of engineering tasks

### Course objective

Subject is intended for mechanical engineering students of Product Engineering specialization, absoluees of B.Sc. studies, who want to broaden their education by the issues connected with creation of industrial products - technical objects or industrial processes (services) in their whole life cycle. The goal of study is to prepare young adepts, future product engineers, to formulate and solve problems leading to create more sustainable industrial products. The basics for this proposal is considering the analyzed products in their whole life cycle, starting from design and finishing at disposal stage.

### Course-related learning outcomes

Knowledge:

He knows the modern engineering methods of computer graphics and the theoretical basis of engineering calculations using the finite element method.

Has extended knowledge of modern construction materials such as carbon plastics, composites, ceramics, in terms of their construction, processing technology and applications.

Has a general knowledge of the principles and methods of constructing working machines, in particular the methods of functional and strength calculations, mathematical optimization of mechanical structures and modeling of machine structures in 3D systems.

#### Skills:

He can correctly select the optimal material and its processing technology for typical parts of working machines, taking into account the latest achievements in material engineering.

Can perform a medium complex design of a working machine or its assembly using modern CAD tools, including tools for spatial modeling of machines and calculations using the finite element method.

He can design the technology of exploitation of a selected machine with a high degree of complexity.

#### Social competences:

He is ready to critically assess his knowledge and received content.

Is willing to think and act in an entrepreneurial manner.

Is ready to fulfill professional roles responsibly, taking into account changing social needs, including:

- developing the professional achievements,
- maintaining the ethos of the profession,
- observing and developing the rules of professional ethics and acting towards the observance of these rules.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Performing a practical task (project) with the use of different tools supporting analysis and creation, ended with the written report

### Programme content

This subject activate them through education in the task system with design form, as well as technical and research activities and development of communication skills with verbal, text, graphics and multimedia measures. Therefore some knowledge leading to possess the knowledge and skills in these fields is delivered. Taking into consideration specificity of specialization 'Product Engineering' some basic knowledge on environment in which technical objects work, its elements and relations between them is presented. Other aspects like legal and economical aspects of sustainable development, economy of used elements of technical objects and vehicles are optionally added.

### Teaching methods

Project

### Bibliography

Basic:

1. Abele E., Anderl R., Birkhofer H., Environmentally-friendly product development. Springer, London 2005
2. Tools and methods of competitive engineering. Ed. I. Horvath, F. Mandorli, Z. Rusak, Delft University of Technology, Delft 2010

Additional:

1. Abele E., Anderl R., Birkhofer H., Environmentally-friendly product development. Springer, London 2005
2. Tools and methods of competitive engineering. Ed. I. Horvath, F. Mandorli, Z. Rusak, Delft University of Technology, Delft 2010

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00