



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic of Machin Design [S1Trans1>PKM]

### Course

Field of study

Transport

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

30

Laboratory classes

0

Other

0

Tutorials

30

Projects/seminars

30

### Number of credit points

7,00

### Coordinators

dr inż. Dariusz Torzyński

dariusz.torzynski@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge of the strength of materials, material science, manufacturing techniques, mechanics, metrology. Skills: logical thinking, recording the structure in the form of technical documentation. Understanding the need to learn and acquire new knowledge

### Course objective

Understanding the basics of an engineer's constructional knowledge, acquiring construction skills, acquiring the ability to apply basic sciences, strength, materials science and manufacturing techniques for shaping objects, learning the general principles of building assemblies and machine elements.

### Course-related learning outcomes

Knowledge:

1. The student has ordered and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues in this discipline of transport engineering.

2. The student has a basic knowledge of patents, the copyright and related rights act and the act on the protection of personal data and technology transfer, in particular with regard to transport solutions.

### Skills:

1. The student is able - in accordance with the given specification - to design (create a model of a fragment of reality), formulate a functional specification in the form of use cases, formulate non-functional requirements for selected quality characteristics) and implement a device or a widely understood system in the field of means of transport, using appropriate methods, techniques and tools.
2. The student is able to design elements of means of transport using data on environmental protection.

### Social competences:

1. The student understands that in technology, knowledge and skills very quickly become obsolete.
2. The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: credit on the basis of exam of general and detailed knowledge presented during classes in the subject.

Tutorials: pass based on tests on solving simple construction tasks.

Projects: credit based on the presented effects of own design works and oral justification of their form.

### Programme content

1. Design and construction - object, subject, process, need.
2. Structure modeling - machine as a technical system, design tasks, types of structures, construction features, construction evaluation criteria, construction rules.
3. Loads in machines - definitions, division, time distributions, effects of occurrence, load analysis.
4. Systematics of connections in machine building. Welded, riveted and threaded connections - applications, rules of forming connections, calculations, normalization.
5. Shafts and axles - purpose, construction, principles of shaping, calculations.
6. Shaft-hub connections - shape connections, friction connections - rules of shaping, force distribution, calculations.
7. Bearings - rolling and slide bearings - application, construction, division, calculations.
8. Drive systems - characteristics, types, structure, kinematics.
9. Gear transmissions - geometry, loads, strength calculations.
10. Cable transmission - pulleys - geometry, loads, tension in the belts.
11. Couplings and brakes - types, functions, basics of calculations.

### Course topics

Getting to know typical connections used in machine construction and drive system components, principles of building elements and assemblies of machines and methods of their design.

### Teaching methods

1. Lecture: presentation illustrated with examples given on the blackboard, solving problems.
2. Tutorials: problem solving, discussion.
3. Projects: individual project work of the student.

### Bibliography

#### Basic

1. Podstawy konstrukcji maszyn, praca zb. pod red. Zb. Osińskiego, PWN, W-wa, 1999.
2. Podstawy konstrukcji napędów maszyn, praca zb. pod red. B. Branowskiego, Wydawnictwo Politechniki Poznańskiej, Poznań, 2007.
3. Podstawy konstrukcji maszyn, praca zb. pod red. M. Dietricha, WNT, W-wa, 1999.

#### Additional

1. G. Pahl, W. Beitz.: Nauka konstruowania, WNT, W-wa, 1984.
2. L. Kurmaz, O. Kurmaz: Podstawy konstruowania węzłów i części maszyn, Wydawnictwo Politechniki

Świętokrzyskiej, Kielce 2011.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	180	7,00
Classes requiring direct contact with the teacher	90	3,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	90	3,50