



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machines [S1MiBP1>MASZ]

### Course

Field of study

Mechanical and Automotive Engineering

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

compulsory

### Number of hours

Lecture

60

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

dr hab. inż. Maciej Bajerlein

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### Lecturers

### Prerequisites

1 Knowledge Basic knowledge of general mechanics, physics and technical drawing. 2 Skills Ability of logical and creative thinking, using the Internet and library resources 3 Social competencies understands the need for continuous learning and acquiring new knowledge

### Course objective

1 Knowledge Basic knowledge of general mechanics, physics and technical drawing.

### Course-related learning outcomes

Knowledge:

Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.

Has basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations.

Has basic knowledge of the technical mechanics of fluids, i.e. ideal liquids and gases, Newtonian and

non-Newtonian viscous liquids, theory of thermal-flow machines.

#### Skills:

Can search in catalogs and on manufacturers' websites ready-made machine components to be used in his own projects.

Can use computer office packages for editing technical texts, including formulas and tables, technical and economic calculations using a spreadsheet and running a simple relational database.

Can draw a diagram and a simple machine element by hand in accordance with the rules of technical drawing.

#### Social competences:

Is ready to critically assess his knowledge and received content.

Is ready to initiate actions for the public interest.

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.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Pass the course on the basis of a written work

### Programme content

Simplified design of the machine records . Hulls and superstructures . Propulsion systems . Working bodies of the machine. Shafts and axles. Spring - types , functions, applications. Bearings , sliding bearings . Seal of bearing . Wheels and gearing - the basic message . Gears friction . Clutch types of functions . Brakes, types , principles of operation. Classification engine . Reciprocating internal combustion engines of two and four-stroke . Construction of crank - piston mechanism and timing . Lubrication and cooling motors. Power supply and exhaust of the engine. Topping engines . Emission of toxic substances - catalysts . Engines, turbines and rocket . Turbine types , the essence of action. Pumps, distribution , construction , principle of operation. Gyms - distribution function of elements. Non-conventional energy equipment . Heat pumps - principle of operation , applications. Construction Technology . Transport machines including heavy working machines and equipment handling . Propulsion systems cranes, jib cranes and conveyors . Motor vehicles , an outline of the construction and function of the basic systems : brake, suspension , drive train.

### Course topics

The use of basic inseparable and detachable connections in machine construction. Welded, welded, riveted, pressed and glued connections. Tolerances, fits, roughness (economic criteria). Bolted and form-fit connections. Axles and shafts. The course of the shaft shaping process. Methods of lubrication and supplying lubricants to friction nodes. Central lubrication systems. Sliding and rolling bearings and their selection. Parameters of gear transmissions. Correction of teeth and teeth. Strength calculations of cylindrical gears with straight teeth. Characteristics of belt and chain transmissions and the principles of their calculations. Design, manufacturing, transport and operational conditions of clutches and brakes. Functional tasks and division of elastic elements. Flexible rubber elements.

### Teaching methods

The lecture is conducted using a Power Point presentation and a classical board

### Bibliography

Basic

1. Jan Kijewski, Andrzej Miller -Maszynoznawstwo

2. J. Gronowicz - Maszynoznawstwo ogólne

3. J. Łęgiewicz - Poznaj samochód

Additional

1. Z. Tomaszewski - Wprowadzenie do techniki

## Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	2,00