



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Methodology of constructing machines for earth and road works

Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

9

Laboratory classes

9

Other (e.g. online)

0

Tutorials

9

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Łukasz Gierz

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tel. 61-6652225

Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

mgr inż. Jacek Marcinkiewicz

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tel. 61-6652882

Wydział Inżynierii Lądowej i Transportu

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Prerequisites

Knowledge: Has a basic knowledge of the construction and operation of earth and road machinery

Skills: Can use office software and basic CAD software

Social competences: Has basic communication skills and teamwork

Course objective

Systematizing general knowledge about construction and practicing how to use it to solve construction problems on specific examples from earth and road works machinery



Course-related learning outcomes

Knowledge

Has extensive knowledge of the processes taking place in the surface layer of machine structural elements and surface engineering methods.

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 develop a technical description, offer and design documentation for a complex machine from a selected group of machines.

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 ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.

Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam including a set of descriptive questions, a final project of classes

Programme content

General machine construction algorithms. Formulating design requirements for earth and road machinery. Searching for design solutions, industry catalogs, patents, solutions available on the market. Heuristic techniques. Optimization in constructing machines for earth and road works - criteria functions and limitations. Geometric modeling. Strength calculations, selection of materials

Teaching methods

1. Lecture with multimedia presentation
2. Exercises - project



Bibliography

Basic

1. Pahl g. Beitz W. Nauka konstruowania WNT
2. Pieczonka K. Inżynieria maszyn roboczych OWPW

Additional

1. Tarnowski W. Optymalizacja i polioptymalizacja w technice, Koszalin, 2011
2. Praca Zbiorowa red. Jan Szlagowski. Automatyzacja pracy maszyn roboczych. Metodyka i zastosowania

Breakdown of average student's workload

	Hours	ECTS
Total workload	45	3,0
Classes requiring direct contact with the teacher	27	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	18	1,0

¹ delete or add other activities as appropriate