POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Methodology of constructing machines for earth and road works [S2MiBP1-MR>MKMdRZiD1]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
1/2

Area of study (specialization)
Heavy-duty Machines

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr inż. Konrad Włodarczyk
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Lecturers

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:

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. Heuritic 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	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00