COURSE DESCRIPTION CARD - SYLLABUS

Course name
Frames and supporting constructions part 1

Course

Field of study	Year/Semester
Construction and Exploatation of Means of Transport	3/6
Area of study (specialization)	Profile of study
Machines	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
9	9	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:	Responsible for the course/lecturer:
dr hab. inż. Tadeusz Pawłowski	mgr inż. Jacek Marcinkiewicz
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Faculty of Civil and Transport Engineering	Faculty of Civil and Transport Engineering
ul. Piotrowo 3, 60-965 Poznan	ul. Piotrowo 3, 60-965 Poznań

Prerequisites

Knowledge: Knows the basic laws and calculation methods in the field of mechanics and strength of materials. He knows the rules of technical drawing.

Skills: He can solve typical calculating tasks in the field of mechanics and strength of materials. Is able to use CAD programs to create technical drawings.

Social competences: He can work in a group.

Course objective

Learning the principles of shaping and construction of load-bearing machines. Getting to know the

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principles of strength calculations of supporting structures of working machines. Optimization of load-bearing structures.

Course-related learning outcomes

Knowledge

1. Knows the basic principles of shaping the load-bearing structures of agricultural and construction machines.

2. Knows the basic methods of calculating the supporting structures of machines.

Skills

1. Is able to model a machine frame in a 3D graphic system and train its 2D technical drawings.

2. Is able to carry out frame calculations using the FEM method and interpret their results.

Social competences

1. Is able to cooperate in a group of designers.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of the performance of the supporting structure model by the student and carrying out strength calculations using the available FEM system.

Programme content

Functions of the supporting structure. Basic types of load-bearing structures. Beams and frames, trusses, skeletal and shell structures, boxes. Principles of shaping load-bearing structures. Principles of shaping construction nodes. Optimization of load-bearing structures. Objective function and constraints. Calculations of load-bearing structures with regard to permissible stresses, permissible deformations, limit state Dynamics of load-bearing structures. Static and dynamic stability. Case study. Examples of construction and calculation of load-bearing structures of selected machines.

Teaching methods

1. Lecture with multimedia presentation.

2. Laboratory - making a model of the load-bearing structure and carrying out strength calculations using the available FEM system.

Bibliography

Basic

1. Praca zbiorowa pod red. Zabrodzkiego J.: Grafika komputerowa. Metody i narzędzia. WN-T, Warszawa, 1994.

2. Kruszewski J., Sawiak S., Wittbrodt L.: Wspomaganie komputerowe CAD/CAM. Metoda sztywnych elementów skończonych w dynamice konstrukcji. WN-T, Warszawa, 1999.

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3. Perkowski P.: Technika symulacji cyfrowej. WN-T, Warszawa, 1980.

Additional

1. Zienkiewicz O.C.: Metoda elementów skończonych. Arkady, Warszawa, 1972.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	18	1,0
Student's own work (literature studies, preparation for tutorials, preparation for exam) [1]	32	1,0

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[1] delete or add other activities as appropriate