POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer aided structural design [S2Bud1-BDMiK>KWPB]

Course

Field of study	Year/Semester
Civil Engineering	1/2
Area of study (specialization)	Profile of study
Road, Bridge and Railway Engineering	general academic
Level of study	Course offered in
second-cycle	polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	30	0

Tutorials	Projects/seminars	
0	0	

Number of credit points
3,00

Coordinators	Lecturers
dr hab. inż. Wojciech Siekierski	
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Prerequisites

geology, geotechnics, steel structures, concrete structures, strength of materials, structure mechanics

Course objective

transfer of knowledge in the field of selected issues of computer-aided design in road, bridge and railway construction

Course-related learning outcomes

Knowledge:
a) has in-depth knowledge of the algorithms of operation of selected computer programs supporting the analysis and design of building structures and useful for planning and managing construction projects, including BIM (Building Information Modeling) technology
b) has advanced detailed knowledge of material strength issues, material and structure modeling; has knowledge of the theoretical basis of the Finite Element Method and general principles of nonlinear calculations of engineering structures
c) knows the principles of design, construction and operation of selected buildings in an extensive way,

Skills:
a) is able to assess and list the loads acting on simple and complex construction objects,
b) is able to design elements and connections in complex construction objects, working individually or in a team
c) can perform classic static and dynamic analysis and stability analysis of rod structures (trusses, frames and tendons) statically determinate and indeterminate and surface structures (shields, plates, membranes and shells)
d) is able to correctly define a computer computational model and conduct an advanced linear analysis of complex buildings, their elements and connections, and apply basic techniques of non-linear calculations along with a critical evaluation of the results of numerical analysis
e) use advanced specialized tools in order to search for useful information, communication and in order to obtain software supporting the designer and organizer of building engineering works.

Social competences:
a) is responsible for the reliability of the obtained results of his work and the work of his team
b) is ready to independently supplement and expand knowledge in the field of modern processes and technologies in construction
c) is aware of the need to improve professional and personal competences, is ready to critically evaluate the knowledge and content received

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
lecture: written test; pass mark: 50% of points
laboratory: correct execution of the assigned exercise; pass mark: 50% of points

Programme content

areas of computer-aided design, design support software, methods of numerical analysis in the field of road, bridge and railway construction, computational models of models for road, bridge and railway structures/buildings

Teaching methods

lecture: multimedia presentation supported by the content provided on the blackboard laboratory: performing the task given by the teacher.

Bibliography

Basic
Madaj A., Wołowicki W., Podstawy projektowania budowli mostowych, WKŁ, Warszawa, 2007
Kmita J., Bień J., Machelski C.: Komputerowe wspomaganie projektowania mostów, WKŁ, Warszawa, 1989
Błazik-Borowa E., Podgórski J.: Wprowadzenie do metod elementów skończonych w statyce konstrukcji inżynierskich. IZT, Lublin 2001
Lisowski A.: Obliczanie konstrukcji na ciągłym podłożu sprężystym. PWN, Warszawa 1974
Sadecka L.: Metoda różnic skończonych i metoda elementów skończonych w zagadnieniach mechaniki konstrukcji i podłoża. Studia i monografie z. 258, 2010
Szcześniak W.: Statyka, dynamika i stateczność nawierzchni i podtorza kolejowego. Przegląd podstawowych pozycji literatury. Prace Naukowe Politechniki Warszwskiej. Seria Budownictwo, z. 129, 1995
Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50