STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
(-)	**1010621261010657085**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**3 / 6**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
Virtual Design Engineering	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **1** Classes: **-** Laboratory: **1** Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	As for all students after the completion of the fifth semester of FWMT - Mechanics
2	**Skills**	As for all students after the completion of the fifth semester of FWMT - Mechanics
3	**Social competencies**	As for all students after the completion of the fifth semester of FWMT - Mechanics

Assumptions and objectives of the course:

Introduction to the FEM for static structural issues based on the DSM. The acquisition of practical knowledge and skills to use specialized software.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. knows the basic methods, techniques and tools used in solving numerical engineering tasksin the field of mechanics - [T1A_W07]
2. has a structured, theoretically founded general knowledge covering key issues in computational mechanics (in particular FEM) - [T1A_W03]
3. has a basic knowledge on developments in computational mechanics - [T1A_W05]

Skills:

1. is able to obtain information from literature, databases and other properly selected sources (also in English); is able to integrate the information obtained, to make interpretations and draw conclusions - [T1A_U01]
2. has a the ability to self-learning - [T1A_U05]
3. is able to plan and carry out computer simulations to interpret the results and draw conclusions - [T1A_U08]
4. is able to use analytical and simulation methods and tools to formulate and solve engineering tasks - [T1A_U09]
5. is able to assess the usefulness of routine methods and tools to solve simple engineering tasks specific to computational engineering, and select and apply appropriate methods and tools - [T1A_U15]

Social competencies:

1. understands the need for lifelong learning; is able to inspire and organize the learning process of others - [T1A_K01]
2. is able to interact and work in a group, taking different roles - [T1A_K03]
3. is able to properly identify priorities from the implementation of tasks specified by himself or others - [T1A_K04]

Assessment methods of study outcomes

Oral and written tests. Evaluation of the results individual simulations.

Course description

The course covers the concept of Finite Element Method, FEM formulation and computer applications of FEM. It explains the concept of computational mechanics in applications to linear elasticity theory, the problems of spatial discretization, creating local and global matrices, boundary conditions and solving computer generated equations. FEM is demonstrated on the simplest of elements (eg. rods and beams).

Basic bibliography:

1. O.C. Zienkiewicz: Metoda Elementów Skończonych. WNT Warszawa 1977
2. J. Kruszewski, E. Wittbrodt, Z. Walczyk: Drgania układów mechanicznych w ujęciu komputerowym, T II, zagadnienia wybrane, Seria Wspomaganie Komputerowe CAD/CAM, WNT-Warszawa, 1996
3. M. Kleiber: Komputerowe Metody Mechaniki Ciał Stałych, PWN 1995, ISBN 83-01-11740-0
4. E. Rusiński, Metoda Elementów Skończonych.COSMOS/M, WKŁ Warszawa 1994

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	15
2. Fixation of the lecture	2
3. Preparing to pass (lecture)	3
4. Participation in completing (lecture)	1
5. Preparation for laboratory exercises	9
6. Participation in laboratory exercises	15
7. Strengthening exercises and report content	5
8. Consultation	2
9. Preparing to pass (lab.)	2
10. Participation in completing (lab.)	1

Student's workload

Source of workload	hours	ECTS
Total workload	55	2
Contact hours	34	2
Practical activities	32	2