STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Virtual Modeling and Simulation	**1010621261010655994**

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: **2** Classes: **-** Laboratory: **2** Project/seminars: **-**				**3**

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	**3 100%**
Technical sciences	**3 100%**

Responsible for subject / lecturer:	Responsible for subject / lecturer:
prof. dr hab. inż. Marek Morzyński email: Marek.Morzyński@put.poznan.pl tel. 665 2778 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań	dr inż. Witold Stankiewicz email: Witold.Stankiewicz@put.poznan.pl tel. 665 2167 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań

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:

Gaining knowledge of the methods and processes associated with the modeling and computer simulation. 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. 1knows the basic methods, techniques and tools used in solving numerical engineering tasks in the field of mechanics - [T1A_W07]

2. has a structured, theoretically founded general knowledge covering key issues in computational modelling and simulation of phenomena in the field of mechanics - [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 of particular simulations.

Course description

Course provides a general introduction to modeling and computer simulation in mechanics. The student becomes familiar with the principles of model building phenomena. Then selected theoretical issues concerning static and dynamic analysis, matrix vibration analysis, stability analysis, numerical solution of problems of non-stationary computational fluid dynamics are presented . Theoretical issues are illustrated through solutions from selected modeling and numerical calculations systems.

Basic bibliography:

1. J. Kruszewski, E. Wittbrodt, Z. Walczyk: Drgania układów mechanicznych w ujęciu komputerowym, T II, zagadnienia wybrane, Seria Wspomaganie Komputerowe CAD/CAM, WNT-Warszawa, 1996

2. Krystian Kapias: SolidWorks 2001 Plus. Podstawy, , ISBN: 83-7197-888-X

3. G. Kazimierczak, B. Pacula, A. Budzyński: Solid Edge. Komputerowe wspomaganie projektowania, Wydawnictwo Helion 2004, ISBN: 83-7361-174-6

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	30
2. Fixation of the lecture	5
3. Preparing to pass the exam	7
4. Participation in exam	2
5. Preparation for laboratory exercises	7
6. Participation in laboratory exercises	30
7. Strengthening exercises and report content	4
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	90	3
Contact hours	65	2
Practical activities	42	2