

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Computer Simulations MES		Code 1010401251010411240
Field of study TECHNICAL PHYSICS	Profile of study (general academic, practical) general academic	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 5
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 5 100%
Responsible for subject / lecturer: dr inż. Sylwester Przybył email: sylwester.przybyl@put.poznan.pl tel. 061 665-32-46 Faculty of Technical Physics ul. Nieszawska 13A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Physics, mathematics and informatics at the level reached after the second year of studies on technical physics
2	Skills	The ability to solve simple problems in physics. The skill of writing simple computer programs in C++.
3	Social competencies	Understanding of the role of MES computational software in the development of new technological solutions.
Assumptions and objectives of the course: Getting the ability of creation of mathematical models describing various problems such as: heat exchange, fluid flow, deformation of mechanical system, shapes of electric and magnetic fields and solving the problems with the use of the Comsol software.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. The student has a systematic, based on theory, knowledge necessary to describe and analyze: heat exchange, fluid flow, deformation of mechanical system, shapes of the electric and magnetic fields. - [K_W01,K_W03,K_W05]		
Skills: 1. The student is able to apply the methods and mathematical models explained during the course to analyze and describe: : heat exchange, fluid flow, deformation of mechanical system, shapes of the electric and magnetic fields. - [K_U01,K_U09,K_U19]		
Social competencies: 1. The student is able to think on his/her own. - [K_K02]		
Assessment methods of study outcomes		

<p>Written test concerning the problems described during the lectures.</p> <p>Laboratory exercises 80 min. colloquium at the end of the semester. During the colloquium student works on a problem chosen by him/her-self . The work is performed under the supervision of the person leading the exercises. The work is evaluated according to its difficulty.</p> <p>Realization and defense of an individual project. The activity during the exercises is also evaluated.</p>		
Course description		
<p>1) Electrical potential and charge density 2) Stationary flow of an incompressible, non-viscous fluid. 3) Heat conduction. 4) Diffusion in two dimensional systems. 5) Stress and strain in the mechanical systems. 7) The resistance of a resistor of an arbitrary shape. 8) Magnetic field around a wire of an arbitrary shape. 9) Electromagnet with a ferromagnetic core.</p>		
Basic bibliography:		
<p>1. Kącki E. Równania różniczkowe cząstkowe w zagadnieniach fizyki i techniki, WNT, Warszawa, 1995 2. Griffiths D. J. Podstawy elektrodynamiki, PWN, Warszawa, 2006 3. Rawa H., Elektryczność i magnetyzm w technice, PWN, Warszawa, 1994</p>		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	30	
2. Laboratory exercises	30	
3. Development of computer programs	20	
4. Preparation to the final colloquium	15	
5. Preparation to the defense of the final project	13	
6. Consultations	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	110	5
Contact hours	62	3
Practical activities	30	1