

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Some Issues in Modern Physic</b>		Code <b>1010612211010404071</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Railway Transport</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>2</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art		ECTS distribution (number and %)
<b>Responsible for subject / lecturer:</b>  Prof. dr hab. Bronisław Susła email: bronislaw.susla@put.poznan.pl tel. tel. 61 665 3192 Technical Physics ul. Nieszawska 13A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Fundamentals and an extended knowledge of physics and mathematics - secondary school level
2	<b>Skills</b>	Basic knowledge of mathematics and physics. Skill of self - education and some physical problems solution.
3	<b>Social competencies</b>	Student should be ready to hard work and has good relationship with team. Understand the need and knows the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development.
<b>Assumptions and objectives of the course:</b> - Students will obtain knowledge of fundamental physics phenomena and their theoretical description in the field of: mechanics, heat and molecular physics, electricity and magnetism, optics and modern physics.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. The student should obtain knowledge of on basic method applied in solution of standard advanced problems - [K2A_W02] - [K2A_W02]		
<b>Skills:</b> 1. Applied basic physical laws and solving some issues in modern physical problems - [K1A_U01] - [K1A_U01]		
<b>Social competencies:</b> 1. Is able to act in a professional manner, comply with the rules of professional ethics and respect for cultural diversity K2A_KO3 - [K2A_KO3]		
<b>Assessment methods of study outcomes</b>		
-Written and oral examination, tests during which students should presents their knowledge of both theoretical and practical skills.		
<b>Course description</b>		

<p>-Nowadays information technology is based on semiconductor and ferromagnetic materials. Introduction and review of electronic devices in macroscopic scale. Quantum nature of the nanoworld . Introduced a variety of devices important in today?s nanotechnology. These have included semiconductor devices, tunnel junctions, magnetic devices and optical and electrical storage devices. Recently, a new branch of physics and nanotechnology , called magnetoelectronics, spintronics, or spin electronics, has emerged, which aims at simultaneously exploiting both the charge and the spin of electronics in the same devices. The aim of this lecture is to present basic ideas and recent developments in the new field of spintronics and also present new ideas.</p>		
<p><b>Basic bibliography:</b></p>		
<p><b>Additional bibliography:</b></p>		
<p><b>Result of average student's workload</b></p>		
<p><b>Activity</b></p>	<p><b>Time (working hours)</b></p>	
<p>1. Preparatio to pas an examination</p>	<p>50</p>	
<p><b>Student's workload</b></p>		
<p><b>Source of workload</b></p>	<p><b>hours</b></p>	<p><b>ECTS</b></p>
<p>Total workload</p>	<p>50</p>	<p>2</p>
<p>Contact hours</p>	<p>30</p>	<p>1</p>
<p>Practical activities</p>	<p>20</p>	<p>1</p>