STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Physics**		Code **1010134211010410007**
Field of study **Environmental Engineering Extramural First-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **16** Classes: **14** Laboratory: **-** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **4 100%** **4 100%**

Responsible for subject / lecturer:

Prof. dr hab. Grażyna Białek-Bylka
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ul. Piotrowo 3 60-965 Poznań

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in physics and mathematics (basic level of elementary and secondary school)
2	**Skills**	Skills in solving of elementary problems of physics on the basis of personal knowledge and information from known sources
3	**Social competencies**	Understanding of the necessity of the broadening of the self -competence and readiness to cooperate in group

Assumptions and objectives of the course:

As a result of teaching general physics course at the University of Technology one ought expect good background in physics as outcome giving a base for the logical presentation and understanding technical problems.

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

Knowledge:

1. give definitions of the basic physical formulas and examples of their application - [[K_ W02]]
2. explain the basic physical laws and explain conditions for their application - [[K_ W02]]
3. explain the goal and the significance of the models in the explanation of the physical phenomenons - [[K_ W02]]

Skills:

1. apply the basic physical laws and simple models in the solving of the uncomplicated problems - [K_U01]
2. use the literature and also other sources of knowledge - [K_U05]

Social competencies:

1. actively take part in the solving problems and is independent and capable to extend self-competences - [K_K01]
2. responsible collaborate in the team - [K_K03]
3. behave according to the ethic roles - [K_K02]

Assessment methods of study outcomes

Written examination and test: pass 50.1%-70.0%, good 70.1%-90.0%, very good from 90.1%
Classes activity evaluation: moderation engagement of student in the problem solving and student is very interested in the results of calculation

Course description

Mechanics: kinetics and dynamics, the law of conservation of energy, gravitational potential energy and escape velocity, power, stable and unstable equilibrium, linear momentum and collisions (momentum and its relation to force, conservation of momentum, elastic and inelastic collisions, centre of mass), rotational motion (rotational dynamics, angular momentum and its conservation, rotational kinetics energy).

Electricity and magnetism: electric charge & charge conservation, insulators and conductors, Coulomb?s law, the electric field (point charge, dipole), motion of a charge particle in an electric and magnetic field, Gauss law and its application, electric potential, capacitance and resistance, circuits.

Wave optics: wave nature of light and wave-matter interactions (reflection and refraction, interference, diffraction, polarization),

Quantum optics: photon theory of light and the photoelectric effect, wave-particle duality, wave nature of matter and de Broglie?a hypothesis, laser.

Theory of relativity: relativity of time intervals and length (time dilatation and the twin paradox, length contraction), Newtonian mechanics and relativity (four-dimensional space-time, Galilean and Lorentz transformations, relativistic mass, energy and mass.

Basic bibliography:

1. D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics , J. Wiley & Sons, Inc., New York, Chichester, Brisbane, Toronto; Singapore, 1997

Additional bibliography:

1. D. C. Giancoli, Physics for Scientists & Engineers, Prentice Hall, Upper Saddle River, New Jersey, 2000

Result of average student's workload

Activity	Time (working hours)
1. Share in the lectures	15
2. Share in the classes	15
3. Preparation for classes	42
4. Preparation for test	26
5. Consultations	2
6. Preparation for examination	32
7. Examination	3

Student’s workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	35	1
Practical activities	14	0