STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Physics**		Code **1010101211010410007**
Field of study **Environmental Engineering First-cycle Studies**	Profile of study (general academic, practical) **general academic**	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) **full-time**	
No. of hours Lecture: **15** Classes: **15** Laboratory: **15** Project/seminars: **-**		No. of credits **5**
Status of the course in the study program (Basic, major, other) **basic**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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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 phenomenon?s - [[K_ W02]]

Skills:

1. apply the basic physical laws and simple models in the solving of the uncomplicated problems - [[K_U01]]
2. make plan and perform standard measurements of the basic physical phenomenon and evaluate the conditions disturbing measurement - [[K_U01]]
3. give quantity and quality analyses of simple physical experiments - [[K_U01]]
4. formulate simple conclusions on the basis of the calculation results and measurements - [[K_U01]]
5. 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%

Laboratory?s reports, answer the questions (written and oral): student is able to distinguish between different kinds of errors and also calculate uncertainty in more complicated situations and besides these abilities student is also able to use laboratory equipment?s and find out uncertainty calculate total or logarithmic differential; student is able recalculate units and give graphical analysis of results (linear regression) and student knows how to present uncertainties on graphs, student knows how correctly present data with uncertainties, student is able to find out conclusion concerning measured value with value from literature tables.

Classes activity evaluation: moderation engagement of student in the problem solving, student is interested in problem solving

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 07458, 2000

Result of average student's workload

Activity	Time (working hours)
1. Share in the lectures	15
2. Share in the classes	15
3. Share in the lab.	15
4. Preparation for classes	28
5. Preparation for test	6
6. Preparation for lab.	28
7. Homework reports for lab.	28
8. Consultations	3
9. Preparation for examination	12
10. Examination period	3

Student’s workload

Source of workload	hours	ECTS
Total workload	153	5
Contact hours	51	2
Practical activities	74	3