Course code: ……. **Plan position:** ……

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	**Physics**
Field of studies	Chemical Technology
Level of studies	First degree
Profile of studies	General academic
Form of studies	Stationary
Specialty	1. Chemical process technology 2. Bioengineering 3. Chemistry and technology of cosmetics
Unit responsible for the field of studies	Faculty of Chemical Technology and Engineering
Name and academic degree of teacher(s)	Prof. Adam Gadomski, Dr Jacek Siódmiak, Dr Natalia Kruszewska
Introductory courses	
Introductory requirements	Background of physics from secondary school and basic knowledge of algebra

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
summer	30	15	30				10

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	The student knows the basic laws of mechanics, thermodynamics, optics and electromagnetism and should be able to explain selected physical phenomena using mathematical apparatus.	K_W02	P6S_WG
SKILLS			
U1	He works individually and in a team.	K_U02	P6S_UO P6S_UK
U2	He uses knowledge in the field of mathematics, statistical physics and computer programs that support the implementation of tasks to develop measurement results. Can describe physical phenomena using mathematical apparatus.	K_U05	P6S_UW

U3	He performs physical experiments in the field of mechanics, thermodynamics, optics, and electromagnetism and interprets the obtained results.	K_U06	P6S_UW
U4	Indicates the physical properties of materials.	K_U12	P6S_UW
SOCIAL COMPETENCES			
K1	He understands the need for training and improving his competences professional.	K_K01	P6S_KK

3. TEACHING METHODS

A. Traditional methods used

Multimedia lectures. Laboratory experiments and calculations (classes) performed by students under supervision of academic staff.

4. METHODS OF EXAMINATION

Lectures - written exam, classes - submit reports , laboratory - submit reports.

5. SCOPE

Lectures	Basic terminologies of physics, basic and derived physical quantities, basic physical interactions. Classical mechanics: kinematics, equations of motion, dynamics, laws of linear and angular momentum conservation, law of energy conservation, forces in inertial and non-inertial systems (Euler equations for a symmetrical rigid body). Fluid mechanics: elements of hydrostatics and hydrodynamics, laminar and turbulent flows, Newton's law for fluids. Mechanics: (visco)elastic properties of bodies, elements of strength of materials. Thermodynamics of closed, isolated and open systems, laws of thermodynamic, thermodynamic flux-force relations; the law of Fick, Fourier and Ohm; entropy and its production. Electromagnetism: static and dynamic sources of the electromagnetic field, elements of spectroscopy. Maxwell's equations of electromagnetism in a vacuum and in media. Equation of electromagnetic wave, transmission of the wave in optical fiber. Elements of modern physics (atomic model, de Broglie waves) and theory of relativity (Lorenz transformation, relativistic dynamics, relationship between energy and speed of an electromagnetic wave).
Classes	Physical units and their conversion. Kinematics and dynamics. Conservation laws. Thermodynamics. Elements of electromagnetism. Thermodynamic process; basic transformations of perfect and semi-perfect gases, reversible and irreversible processes.
Laboratory classes	Statistical analysis of measured data and observations. Measuring instruments. Structure of matter. Elements of general mechanics. Fluid mechanics. Elements of thermodynamics. Elements of geometric and wave optics.

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation	Report
W1		x	x			
U1				x	x	

U2				x		
U3				x		
U4				x		
K1		x	x			

7. LITERATURE

Basic literature	1. Halliday D., Resnick R., Walker J., Fundamentals Of Physics, chap. 1-5, Wiley, 2004. 2. Landau L.D., Lifshitz E.M., Course of Theoretical Physics, Mechanics: Volume 1, Butterworth-Heinemann, 1976.
Supplementary literature	1. Feynman R, Leighton R, Sands M., The Feynman Lectures on Physics, Pearson P T R, 1970. 2. Wilson J.D., Physics Laboratory Experiments, D C Heath & Co, 1998. 3. Harizanova R., Nedev S., Laboratory Manual: General Physics - part I, UCTM-Sofia, 2012. 4. Online openstax textbooks: openstax.org

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	75
	Supervision hours	45
Student's own work	Preparation for classes	40
	Reading assignments	45
	Other (preparation for exams, tests, carrying out a project etc)	45
Total student workload		250
	Number of ECTS points	**10**