

COURSE GUIDE

<u>Subject name</u>	Physics I
<u>Course of study</u>	Quality and Production Management
<u>The form of study</u>	Full-time
<u>Level of qualification</u>	Fisrt
<u>Year</u>	I
<u>Semester</u>	I
<u>The implementing entity</u>	Department of Physics, Faculty of Production Engineering and Materials Technology
<u>The person responsible for preparing</u>	Dr inż. Marcin Jarosik
<u>Profile</u>	General academic
<u>Course type</u>	Basic
<u>ECTS points</u>	3

TYPE OF TEACHNING – NUMBER OF HOURS PER SEMESTER

LACTURE	CLASS	LABORATORY	PROJECT	SEMINAR
15	15			

COURSE AIMS

- C1. Expanding the knowledge and complementing of physics phenomena and the laws governing these phenomena.
- C2. Understanding of the laws of physics in the word of modern technology.
- C3. Mastering the ability of applying the laws of physics to solve problems.

ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

- 1. Basic knowledge of physics laws.
- 2. Knowledge of the mathematics at the level of secondary school.

LEARNING OUTCOMES

- EU 1- student has knowledge of the achievements and prospects of modern physics.
- EU 2- student acquired knowledge of physical phenomena and the laws governing them.
- EU 3- student has the ability to analyze physical phenomena based on the laws of physics.
- EU 4- student is able to solve problems regarding the application of the laws of physics.

COURSE CONTENT

Type of teaching – LECTURE	Number of hours
W 1 Program and aim of the lecture. Basic and supplementary literature. Ways of assessment. Achievements and perspectives of modern physics.	1
W 2 – Scalars, vectors and tensors in physics	1
W 3 – Inertial and non-inertial systems. Kinematics of motion in the Cartesian and spherical coordinate system with the use of differential and integral calculus	2
W 4 – Newton’s dynamic laws. Friction and inertia forces.	2
W 5 – Dynamics of the rigid body	2
W 6 – Work, power, energy. Principles of conservation in mechanics.	2
W 7 – Vibrating movement – simple harmonic oscillator, models	2
W 8 – Damped and forced harmonic oscillator	2
W 9 – Assembling of parallel and perpendicular vibrations. Amplitude and phase modulation	1
Type of teaching – CLASSES	Number of hours
C 1 Program. Basic and supplementary literature. Ways of assessment. Physical quantities, measurement of them and their units. International System of Units.	1
C 2 – Exercises referred to vector calculations	1
C 3 – Kinematics of straight and curvilinear movement	2
C 4 – Distribution of forces and movement equations. Inclined plane.	2
C 5 – The second principle of dynamic for the rotational movement of the rigid body. Angular momentum. Steiner Thorem.	1
C 6 – Test I	1
C 7 – Momentum and angular momentum. The work and mechanical energy. Principles of conservation of physical quantities.	2
C 8 – The mass suspended on the spring. Physical and mathematical pendulum. The energy of oscillator.	1
C 9 – Calculation of vibrations parameters of damped and forced oscillators	1
C 10 – Longitudinal and transverse waves. Stationary waves.	1
C 11 – Psychophysical parameters of sounds. Doppler effect.	1
C 12. Final test. Summary of the activities.	1

TEACHNING TOOLS

1. Lecture with the use of audiovisual media.
2. Sets for demonstrations of physics experiments.
3. Problems for individual solving and with help of teacher during classes.
4. Textbooks.

WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

- F1. Assessment of individual coursework.
 P1. Assessment of final test.

STUDENT WORKLOAD

Form of activity		Average number of hours for realization of the activity		
		[h]	ECTS	ECTS
Contact hours with the teacher	LECTURE	15	0.6	1.0
Preparing to test		10	0.4	
Contact hours with the teacher	CLASSES	15	0.6	1.2
Preparing to classes		15	0.6	
Getting Acquainted with the indicated literature		15	0.6	0.6
Consultation		5	0.2	0.2
TOTAL NUMBER OF HOURS / ECTS CREDITS FOR THE COURSE		75	3	

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Basic resources:

1. Wybourne B. „Physics as a Journey”, Wydaw. Uniwersytetu Mikołaja Kopernika, Toruń, 1998.
2. Physics: For Scientists and Engineers 6TH EDITION by Raymond A. Serway and John W. Jr. Jewett. Brooks/Cole Publishing Co.,2004.
3. S.J. Ling, J. Sanny, W. Moebis, University Physics Vol.1, OpenStax, Rice University 2016. <http://cnx.org/content/col12031/1.10>

Supplementary resources:

1. Jarosik M, Szcześniak R, Durajski A, Kalaga J, Leoński W.: „Influence of External Extrusion on Stability of Hydrogen Molecule and its Chaotic Behavior”, Chaos **28**, 013126 (2018); <https://doi.org/10.1063/1.5008986>
2. I. A. Wrona, M. W. Jarosik, R. Szcześniak, K. A. Szewczyk, M. K. Stala, W. Leoński, „Interaction of the hydrogen molecule with the environment: stability of the system” arXiv:1902.10520 2019, <https://arxiv.org/pdf/1902.10520>
3. Sodolski H.: „Selected Problems in Physics”, Wydaw. Politechniki Gdańskiej, Gdańsk, 1996.
4. Dziliński K., Wysocki J., “Solid State Physics in Modern Materials Research: PHYSICS 2010”, Wydaw. Wydz. Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej PCz, 2010.

TEACHERS (NAME, SURNAME, E-MAIL, ADDRESS)

1. Employees of Institute of Physics in Częstochowa University of Technology

MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program (PRK)	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_U01	C2	W1	1, 3	P1
EU2	K_W01, K_U01	C1	W2-W9	1, 2	F1, P1
EU3	K_U01	C2	W2-W9	1, 2	F1, P1
EU4	K_U02	C1, C3	C2-C11	3	F1, P1

FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	Student does not possess knowledge of the achievements and prospects of modern physics	Student possesses poor knowledge of the achievements and prospects of modern physics	Student possesses systematic knowledge of the achievements and prospects of modern physics	student possesses systematic and wide knowledge of the achievements and prospects of modern physics
EU2	Student did not acquire knowledge of physical phenomena and the laws governing them	Student acquired partial knowledge of physical phenomena and the laws governing them	Student acquired knowledge of physical phenomena and the laws governing them	Student acquired advanced knowledge of physical phenomena and the laws governing them
EU3	Student has not the ability to analyze physical phenomena based on the laws of physics	Student has the limited ability to analyze physical phenomena based on the laws of physics	Student has the fair ability to analyze physical phenomena based on the laws of physics	Student has the advanced ability to analyze physical phenomena based on the laws of physics
EU4	Student is unable to solve problems regarding the application of the laws of physics	Student in some cases is able to solve problems regarding the application of the laws of physics	Student in most cases is able to solve problems regarding the application of the laws of physics	Student in all cases is able to solve problems regarding the application of the laws of physics

ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - presented to students during first classes, if required by the formula classes are sent electronically to the e-mail addresses of individual dean groups.
2. Information about the place of classes - Information can be found on the website of the Faculty of Management.
3. Information about the timing of classes (day of the week / time) - Information can be found on the website of the Faculty of Management
4. Information about the consultation (time + place) - Information can be found on the website of the Faculty of Production Engineering and Materials Technology

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Coordinator