DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	**Physics for engineers**				
Head of course	**MSc Zvonimir Peranić, Senior Lecturer**				
Study programme	**Professional undergraduate study Occupational Safety**				
Status of a course	Obligatory				
Year of study	1.	**Semester**	I	**ECTS credits**	6
Teaching plan (L + E + S+ Pr)	3+0+2+0				

Goals of a course

Adopt content-based learning outcomes: Particle and body motion: Newton's laws. Work and energy. Gravity. Rigid body. Thermodynamics. Fluid mechanics. Harmonic vibration. Wave movements. Electromagnetic radiation. Speed of light. The development of an atom model. Fundamentals of Quantum Physics. The atomic nucleus. Nuclear forces. Radioactivity.

Conditions for enrolling course

No conditions

Learning outcomes on a level of a study programme which includes course

Outcome 1: Explain the basic principles of mathematics, physics, chemistry, electrical engineering and mechanics required for work in the field of occupational safety and health.
Outcome 2: Perform and interpret measurements in the field of occupational safety in a laboratory and in the work environment.

Expected learning outcomes on a level of a course

1. Interpret and differentiate object movements.
2. Define basic physical terms in mechanics.
3. Interpret the concepts of gravity, weight, friction force and elastic force.
4. Interpret basic principles of fluid statics and dynamics.
5. Interpret changes in gas states.
6. Describe and interpret what oscillations are on the example of a mathematical pendulum and weights on a spring.
7. Distinguish types of waves.
8. Interpret and distinguish radioactive radiation.

Content of a course

Introduction: Physics - principles and importance. Motion of particles and bodies: path, speed and acceleration. Forces and laws of motion. Relative motion. Activity and energy. Gravitation. Mechanics of fluids: still fluids and fluids in motion. Forces in real liquids. Temperature and heat: Change of physical condition. Thermodynamics: first and second rule of thermodynamics. Heat engines. Motion of a solid body: Solid body. Kinetic energy. Quantity motion moment. Action of a force on solid bodies. Centre of gravity. Harmonic oscillation. Damped and forced oscillation. Speed, reflection. Electromagnetic radiation: Electromagnetic oscillation. Origin of electromagnetic waves. Speed of light. Atoms and quantum: Creation of an atom model. Classic and quantum physics. Atomic nucleus: Structure of an atomic nucleus. Nuclear forces. Radioactivity.

Teaching modes	☒ lectures ☐ auditory exercises ☒ seminars and workshops ☐ distance learning ☐ field classes	☒ individual assignments ☐ multimedia and network ☐ laboratory ☐ supervisor's work ☐ other _____
Comments		

Students' obligations

In order to take the exam, it is necessary to pass laboratory exercises (5). Each exercise should be approached with preparation. In preparation, the student describes the method of measurement required for the calculation of

individual tasks, as well as basic theoretical content with the necessary sketches and graphical representations. After that he starts measuring. The data collected through the measurement should be explained. After that, tasks are solved (textually, numerically, graphically ...). If necessary, graphs are interpreted. Successful reasoning is considered a laid-back exercise.

Grading, evaluation and monitoring of students' work continuously during lectures and exams

Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students.

Continuous check-up:

Outcomes	Laboratory exercises	Pre-exam	Assignment s	Test	Threshold	Max
Outcome 1	8	4	3		7,5	15
Outcome 2	7	3	1		5,5	11
Outcome 3	8	4	3		7,5	15
Outcome 4		4	2	5	5,5	11
Outcome 5		3	2	5	5	10
Outcome 6	7	4	2		6,5	13
Outcome 7		4	3,5	5	5,25	12,5
Outcome 8		4	3,5	5	5,25	12,5
Percentage of ECTS	2,4	1,8	0,6	1,2		
Total	30	30	20	20	50 %	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

Outcomes	Written exam	Oral exam	Max
Outcome 1	6	6	12
Outcome 2	5,5	5,5	11
Outcome 3	7	7	14
Outcome 4	6	6	12
Outcome 5	5	5	10
Outcome 6	6,5	6,5	13
Outcome 7	7	7	14
Outcome 8	7	7	14
Percentage of ECTS	3	3	
Total	50	50	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

Range of credits (percentages)	Numerical grade	ECTS grade
90,00 – 100,00	Excellent (5)	A
75,00 – 89,99	Very good (4)	B
60,00 – 74,99	Good (3)	C
50,00 – 59,99	Sufficient (2)	D
0,00 – 49,99	Insufficient (1)	F

Obligatory literature
1. Brumini G, Zuvić-Butorac M. Fizika. Veleučilište u Rijeci, Rijeka, 2008.
Additional literature
1. Textbooks for high school, gymnasiums and the program of four-year vocational schools.