COURSE TITLE	PHYSICS IN COMPUTING					
Course code	SRC102	Year of study	1.			
Lecturer(s)	Jelena Ružić, senior lecturer	ECTS (Number of credits allocated)	5			
Associates	Stjepan Knežević, lecturer	Total lesson hours per semester	Lecture	Seminar	Practical	Laboratory
			45			30
Course status	Core	Percentage share of e-learning	35%			

COURSE DESCRIPTION

Course Objectives	● understanding the deterministic nature of the fundamental laws of physics underlying techniques (computer science) ● understanding the limits of determinism and usefulness of random variables in the description of nature (quantum physics, deterministic chaos, complexity).
Course enrolment requirements and entry competencies required for the course	None
Learning outcomes On successful completion of this course, student should be able to:	1. practically apply kinetic and dynamic concepts and laws in the context of mechanics and waves 2. recognise introductory concepts in the field of quantum physics 3. model simple physical situations (solving difference equations) 4. understand several presentation types (diagrams, graphs, tables, formulas, Euclidean and fractal geometry) and transition from one type of presentation into another 5. apply acquired concepts and procedures to familiar situations within fields of technology
Course content	Modeling of physical phenomena: intuitive and formal models, application in other spheres; physical magnitudes and measurements; fractals. Kinematics: description of particle motion (diagram, table illustration, graphic illustration, formula). Dynamics: Newtonian laws, difference equations, fluid resistance. Rotational motion: description of rotational motion. Laws of preservation, energy, momentum and angular momentum. Equilibrium. Elasticity.Gravitation: Kepler's laws, Newton's law of gravitation, high and low tide, rockets. Oscillation: description of oscillatory motion, harmonic oscillation, damped and forced vibration, quality factor, resonance. Waves: emergence of waves, plane wave, interference of waves, standing waves. Sound: variation of acoustic pressure, level of sound volume in db, Doppler's effect, Fourier's theorem. Fluids: kinetic-molecular theory, internal energy and temperature, laws of thermodynamics, entropy, transport phenomena, Bernoulli equation. Electromagnetic waves: electric field and potential, electrical resonant circuit, flat electromagnetic wave, spectrum of e-m waves. Light: mirrors and lenses, eye and camera, diffraction, resolving power – computer graphics. Structure of Matter-introduction to quantum physics: the

	photoelectric effect, Bohr model of the atom, electron diffraction and waves, quantum tunneling. Atoms and molecules: Structure of matter. Radioactivity. Elementary particles. Complexity. Deterministic chaos. Laboratory exercises based on computer(COACH5, LabPro software package LoggerPro3, Arduino) allow data collection and analysis of the physical phenomena being studied in course.

Types of teaching:	lecture □ seminars and workshop practical combined e-learning □ field research	□ self-study multimedia laboratory □ mentoring work □ (others)
Student obligations	Attending classes, seminar, exams.	

Monitoring student work (enter the share in ECTS credits for each activity so that the total number of ECTS credits corresponds to the credit value of the course):						
	Class attendance	2,5	Research		Practical work	
	Experimental work		Report		(others)	
	Essay		Seminar		(others)	
	Self-study	2	Workshop		(others)	
	Project		Office hours, mid-term exams and final exam	0,5	(others)	

Assessment and evaluation of student work during classes and at the final exam

CONTINUOUS ASSESSMENT		
Continuous testing indicators	Performance A_i (%)	Grade ratio k_i (%)
Final examination (oral)	50 - 100	10
Laboratory work	50-100	30
First mid-term exam	50-100	30
Second mid-term exam	50-100	30

Students who have not passed the exam through colloquiums take the final exam consisting of a written part.

FINAL ASSESSMENT		
Indicators checks (all the final exam terms)	Performance A_i (%)	Grade ratio k_i (%)
Final examination (written)	50 - 100	60
Final examination (oral)	50 - 100	10
Previous activities (Laboratory work)	50 - 100	30

<table>
<tr><td></td><td>The grade (in percentages) is formed on the basis of all indicators that describe the level of student activities according to the relation:
$$Grade\,(\%) = \sum_{i=1}^{N} k_i A_i$$
k_i - weighting factor for each activity,
A_i - success in percentage achieved for a particular activity,
N - total number of activities.

<table>
<tr><th colspan="3">PERFORMANCE AND GRADE</th></tr>
<tr><th>Percentage</th><th>Criteria</th><th>Grade</th></tr>
<tr><td>50% - 61%</td><td>basic criteria met</td><td>sufficient (2)</td></tr>
<tr><td>62% - 74%</td><td>average performance with some errors</td><td>good (3)</td></tr>
<tr><td>75% - 87%</td><td>above average performance with minor errors</td><td>very good (4)</td></tr>
<tr><td>88% - 100%</td><td>outstanding performance</td><td>outstanding (5)</td></tr>
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<tr><td>Required reading</td><td>1. Ružić Jelena, Knežević Stjepan: Fizika (on moodle)</td></tr>
<tr><td>Optional reading</td><td>1. Halliday, Resnick: Fundamentals of Physics
2. Benjamin Crowell: Light and Matter, http://www.lightandmatter.com/books.html</td></tr>
<tr><td>Quality monitoring to ensure the acquisition of established learning outcomes</td><td>● Records of class attendance and success in performing student obligations
● Updating detailed course curricula
● Supervision of teaching activities
● Continuous quality control of all parameters of the teaching process in accordance with the Action Plans
● Semester-based student survey in accordance with the "Ordinance on the procedure of student evaluation of teaching work at the University of Split" (UNIST, Centre for Quality Improvement).</td></tr>
<tr><td>Other information</td><td></td></tr>
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