<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">Biophysics</td></tr>
<tr><td>Code</td><td>PMP141</td><td>Year of study</td><td colspan="3">GU-1</td></tr>
<tr><td>Course teacher</td><td>Larisa Zoranić, PhD, Associate Professor</td><td>Credits (ECTS)</td><td colspan="3">6,0</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>15</td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of application of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Basic understanding of protein structure and function applying the physical principles and models, starting from the description of the conformational changes and molecular interactions in biological macro-molecules, towards more complex systems and their role in cellular processes.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Basic knowledge in molecular biology, biochemistry, classical mechanics, electrodynamics and statistical mechanics.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">On completion of this course a student should be able to:
1. Ability to recognize and articulate the foundational assumptions and main ideas of simple and some of the more advanced physical models that describe structure and function of proteins
2. Ability to recognize and articulate the foundational assumptions and main ideas of physical models that describe biological processes in some simple cases
3. Solve problems frequently encountered in biophysics in some simple cases
4. Develop a critical understanding of scientific investigation in biophysics and ability to describe and present such research</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Introduction, molecular forces in biological structures
2. Biological macromolecule. Models in biology
3. Cells and structures with them. Hemoglobin as a model protein
4. Mechanical and chemical equilibrium. Configurational energy. Structures as free-energy minimizers
5. Statistical mechanics approach. Equlibrium constants
6. Ligand-Receptor Binding. The Hill Function
7. Two-State Systems: Global transitions in proteins
8. Molecular associations. Allosteric interactions
9. Structure of macromolecules. Mechanical properties.
10. Macromolecules as random walks and as a rigid body
11. Modelling of the protein structure
12. Electrical signals in cell. Ion permeation and membrane potential.
13. Transport processes across membrane. Action potentials.
14. Diffusion
15. Chemical kinetics</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ homework assignments</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Active participation in classes and assignments. Solving given physics problem for seminar and its presentation.</td></tr>
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<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
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<tr><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th></tr>
<tr><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Experimental work</td><td></td></tr>
<tr><td>Oral exam</td><td></td><td>Report</td><td></td><td>Homework assignments</td><td></td></tr>
<tr><td>Seminar essay</td><td>2</td><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td></td><td>Practical training</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td>1</td><td>Project</td><td></td><td></td><td></td></tr>
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<tr><td>Grading and evaluating student work in class and at the final exam</td><td>The conditions for passing the exam are: passed colloquium or written exams, written and presented assignments related to specific topics, written and held seminar. The grade is concluded according to the evaluation of the student's commitment in class, the grade of the written part and the grade of the seminar.</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>[1] Physical Biology of the Cell, Rob Phillips, Jane Kondev, Julie Theriot and Hernan G. Garcia, Garland Science, Taylor & Francis Group, 2013.</td><td>0</td><td></td></tr>
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</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>[1] Molecular and Cellular Biophysics, Meyer B. Jackson University of Wisconsin Medical School , Cambridge University Press 2006 .
[2] Bioenergetika, rad membranskih proteina Juretić Davor, Informator, Zagreb, 1997.
[3] Glaser, R. “Biophysics”. Springer-Verlag, Berlin, 2001.
[4] Fersht, A. “Structure and mechanism in protein science”, Freeman and Company, New York, 1998.
[5] Volkenshtein, M.V. “Biophysics”, Mir Publishers, Moscow 1983.
[6] Hill, T.L. Free “Energy Transduction in Biology”, Academic Press, New York 1977.
[7] Molekularna biofizika , Antonio Šiber, script, 2012.
[8] Scientific articles</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>Students’ evaluation via anonymous questionnaires at the end of the course. The survey is conducted according to the rules of the University of Split.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td></td></tr>
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