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<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Molecular Microbiology</td></tr>
<tr><td>Code</td><td>PMB708</td><td>Year of study</td><td colspan="4"></td></tr>
<tr><td>Course teacher</td><td>Ana Maravić, PhD, Associate Professor
Elma Vuko, PhD, Assistant Professor</td><td>Credits (ECTS)</td><td colspan="4">5</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>Mandatory</td><td>Percentage of application of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">This course covers the molecular, cell biology and genetics of microorganisms including bacteria, yeast and bacteriophages. Understanding molecular-biological characteristics of viruses and subviral pathogens, their taxonomic position and the impact on living organisms.Replication, evolution and gene expression will be examined. The course also includes a study of the current global problem of antibiotic resistance.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After completing the course the students will be able to:
• describe molecular genetic processes in prokaryotic organisms
• discuss topics in current molecular microbiology research in a meaningful way
• Present scientific literature to others,
• understand relevant molecular genetic methods and their applicability and limitations
• practically apply molecular genetic technologies
• interpret experimental results in a scientific way for a given target group.
• Propose alternative approaches to the problem of antibiotic resistance in light of its impact on society
• Analyze the basic characteristics of the viruses and their impact on living organisms
• Analyze cytopathological changes caused by animal or plant viruses and methods of healing and protection
• Understand the occurrence and significance of subviral pathogens</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (30 hours):
1. Introduction to virology (2 hours)
2. Virus structure and symmetry (2 hours)
3. Plant viruses (2 hours)
4. Animal viruses (2 hours)
5. Subviral pathogens: viroids, satellites, prions (2 hours)
6. Bacterial cell organization, metabolism and growth (2 hours)
7. Structure, replication, expression, and organisation of genes in bacteria</td></tr>
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<tr><td></td><td colspan="6">(2 hours)
8. Regulation of gene expression; cellular differentiation in prokaryotes (2 hours)
9. Mutations and suppression of mutations (2 hours)
10. Recombination in bacteria (2 hours)
11. Plasmids (2 hours)
12. Transposons (2 hours)
13. Gene technology and its applications (2 hours)
14. Molecular mechanisms of antibiotic resistance (2 hours)
15. Molecular biology of the yeast Saccharomyces cerevisiae (2 hours)

Seminars (15 hours) will deal with most relevant topics from molecular microbiology.

Exercises (15 hours):
1. Viral cell inclusions. Purification of the virus. Application of spectrophotometry and serological reactions in virology. Isolation and analysis of viral nucleic acids (3 hours)
2. Ways of DNA extraction from different matrices (3 hours)
3. Use of quantitative real-time PCR principle in detecting bacterial contamination and antibiotic resistance (5 hours)
4. Introduction to genetics of yeast (4 hours)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ 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
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Class attendance (70%), Seminar (100%), Exercise (100%)</td></tr>
<tr><td rowspan="6">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>Class attendance</td><td>0.5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0.5</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>2</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>2</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Active participation of students in the classroom is scored as follows: inadequate (1) student does not participate actively in the classes; a sufficient (2) student actively participates in teaching only after the question is asked, a good (3) student occasionally actively participates in the lessons but hardly makes independent conclusions; very good (4) student often actively participates in teaching and often makes independent conclusions; an excellent (5) student almost always actively participates in teaching, critically reflects and independently brings conclusions. A written exam is deemed to be passed if the student achieves at least 60% of the total number of points. Scoring: <60% of</td></tr>
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<tr><td></td><td colspan="3">students did not satisfy; 60-69% sufficient (2); 70-79% good (3); 80-89% very good (4); 90-100% excellent (5). The final grade is the average grade of attendance in the classroom, seminar, practical work and written exam.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Persing DH, Tenover FC, Hayden RT, Ieven M, Miller MB, Nolte FS, Tang Y-W, van Belkum A. (2016) Molecular Microbiology: Diagnostic Principles and Practice, Third Edition. ASM Press, SAD.</td><td></td><td></td></tr>
<tr><td>Ream W, Geller B, Trempy J, Field K (2013) Molecular Microbiology Laboratory, Second edition, Academic Press, SAD:</td><td></td><td></td></tr>
<tr><td>Presečki V, Mlinarić-Galinović G, Punda-Polić V, Lukić A.(2002) Virologija. Medicinska naklada, Zagreb</td><td></td><td></td></tr>
<tr><td>Carter JB, Saunders VA (2013) Virology: Principles and Applications, 2nd ed. Wiley, UK.</td><td></td><td></td></tr>
<tr><td>Relevant scientific articles</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- Flint J, Vincent R, Racaniello VR, Rall GF, Skalka AM , Enquist LW (2015) Principles of Virology (Volume I Molecular Biology). ASM Press, NW, Washington, DC, USA
- Flint J, Vincent R, Racaniello VR, Rall GF, Skalka AM , Enquist LW (2015) Principles of Virology (Volume II Pathogenesis and Control). ASM Press, NW, Washington, DC, USA</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">At the end of the semester, the evaluation of subject and teacher will be conducted through an anonymous student survey. Results will be used to monitor the quality of the course and achievement of the learning outcomes.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
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