**COURSE DESCRIPTION (SYLLABUS)**

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| 1. | Course:<br><br>**Medical Biotechnology** |
| 2. | Language of instruction:<br><br>**English** |
| 3. | Faculty:<br><br>**Faculty of Biotechnology** |
| 4. | Course/module code: |
| 5. | Course/module type (*mandatory* or *elective*):<br><br>**elective - choice limited to Industrial and Medical Biotechnology** |
| 6. | Programme:<br><br>**Biotechnology** |
| 7. | Study cycle (*1st/2nd*):<br><br>**1st cycle** |
| 8. | Year:<br><br>**3rd** |
| 9. | Semester  (*autumn* or *spring*)<br><br>**autumn** |
| 10. | Form of tuition and number of hours:<br><br>Lecture: **30 h** |
| 11. | Coordinator(s):<br><br>**Daniel Krowarsch, PhD** |
| 12. | Initial requirements (*knowledge, skills, social competences)*:<br><br>**Knowledge in the field of structure and function of proteins, nucleic acids, microbiology, biochemistry.** |
| 13. | Objectives:<br><br>**The main objective of the course is to present modern biotechnology, in particular with the application of biotechnology in diagnostics and therapy.** |
| 14. | Content:<br><ul><li>**Microorganisms in biotechnology, biology, selection, improvement, kinetics of microbial growth.**</li><li>**Bioreactor design, bioprocess control and optimization.**</li><li>**Downstream processing, disintegration methods, bioproducts purification and**</li></ul> |

|  | formulation. |  |
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|  | • Insect and mammalian cell culture.<br>• Enzyme biotechnology, enzymes from plants, animals and microorganisms.<br>• Recombined proteins: overexpression, purification, refolding, principles of protein design.<br>• Recombinant proteins of high value, therapeutic proteins.<br>• Biotransformations and bioproducts: amino acids, organic acids, microbial polysaccharides and lipids, antibiotics and biodegradable plastics.<br>• Basic information about bionanotechnology and business of biotechnology. |  |

| 15. | Learning outcomes:<br><br>Knowledge:<br>• **student can make a qualitative and quantitative description of selected bioprocesses;**<br>• **student knows the basic concepts, terms and methods used in biotechnology;**<br>• **student has knowledge of the basic techniques and tools used in biotechnology;**<br>• **student is able to link theoretical knowledge of biotechnology with its practical application in industry and health care.**<br>Skills:<br>• **student reads and understands the scientific literature in the field of biotechnology;**<br>• **student is able to take advantage of the scientific books, papers and online resources to obtain information on biotechnology.**<br>• **student makes the synthesis of information in the field of biotechnology from a variety of sources.**<br>• **student uses proper language and scientific terminology in discussions with experts in the field of biotechnology.**<br>Social competences:<br>• **student understands the need for continuing education throughout the live.**<br>• **student recognizes and addresses the ethical problems associated with the field of biotechnology.** | Outcome symbols:<br><br>K1_W01<br><br>K1_W06<br><br>K1_W08<br><br>K1_W09<br><br><br>K1_U03<br><br>K1_U04<br><br><br>K1_U08<br><br><br>K1_U09<br><br><br>K1_K01<br><br>K1_K04 |

| 16. | Recommended literature:<br><br>• **Basic Biotechnology, Colin Ratledge and Bjorn Kristiansen, Cambridge University Press.**<br>• **Molecular Biotechnology, Bernard R. Glick, Jack J. Pasternak and Cheryl L. Patten, ASM Press.** |

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| 17. | Methods of verification of the assumed learning outcomes:<br><br>**written exam** | | |
| 18. | Conditions of earning credits:<br><br>**positive exam result** | | |
| 19. | Student's workload: | | |
| | Activity | | Number of hours for the activity |
| | Hours of instruction (as stipulated in study programme):<br>• lecture | | 30 h |
| | Student's own work:<br>• reading the literature<br>• preparation for the exam | | 60 h |
| | Total number of hours: | | **90 h** |
| | Number of ECTS: | | **4 ECTS** |