COURSE DESCRIPTION (SYLLABUS)

1.	Course: **Molecular Biology Techniques- advanced course**	
2.	Language of instruction: **English**	
3.	Faculty: **Faculty of Biotechnology**	
4.	Course/module code: **29-BT-S2-E1-EngMBT**	
5.	Course/module type (*mandatory* or *elective*): **mandatory**	
6.	Programme: **Medical Biotechnology**	
7.	Study cycle: **2nd cycle**	
8.	Year: **1st**	
9.	Semester (*autumn* or *spring*): **Autumn**	
10.	Form of tuition and number of hours: **Laboratory, 30 h**	
11.	Name, Surname, academic title: **Anna Kulma, Prof.**	
12.	Initial requirements (knowledge, skills, social competences) regarding the course/module and its completion: **Basic knowledge of nucleic acid biochemistry and their analytical methods.**	
13.	Objectives: **The aim of this course is to broaden the knowledge of molecular biology techniques, in particular gene cloning, and gain the ability to use them in laboratory practice.**	
14.	Content: **Isolation, purification, qualitative and quantitative analysis of nucleic acids (RNA, genomic and plasmid DNA), prokaryotic and eukaryotic vectors, methods of cloning into vectors using both TOPO cloning system and with use of restriction enzymes and ligation, transformation methods of prokaryotic and eukaryotic organisms, selection and analysis of transformants, sequencing techniques and sequence analysis.**	
15.	Learning outcomes: • **The student possess advanced knowledge of biochemistry and molecular biology. The student knows the techniques of molecular biology and can apply them in practice.** • **The student has the ability to plan research in**	Outcome symbols:

	genetic engineering and molecular biology. • **The student has the ability to self-educate in the field of selected thematic areas; reads with understanding scientific literature in the field of molecular biology; understands the need to learn throughout life; understands the need for systematic familiarization with professional literature in order to broaden and deepen knowledge.** • **The student has the ability to critically analyse and select information, especially from electronic sources, including sequential and literature databases.** • **The student collects and interprets experimental data, on the basis of which he synthesizes and formulates appropriate conclusions and can present the results of his own experiments in writing.** • **The student is able to interact, collaborate and work as part of a team in order to plan research and solve problems.** • **The student knows the basic principles of occupational health and safety and ergonomics procedures in the laboratory; knows and follows the rules of working with genetically modified organisms; the student has the ability to assess the risks arising from research techniques used in biotechnology; can organize a safe workplace.**	K_W01, K_W02, K_W03, K_W05, K_W07, K_W09, K_U01, K_U02, K_U03, K_U04, K_U06, K_U09 K_K01, K_K02, K_K05, K_K06
16.	Recommended literature: • **J Sambrook, DW Russel, Molecular Cloning. A laboratory manual, Cold Spring Harbor Laboratory Press, 2001 or later**. • **Short Protocols in Molecular Biology. Fifth edition. F.M. Ausubel, R. Brent, R.E. Kingston, D.D. Moore, J.G. Seidman, J. A. Smith, K. Struhl, Wiley 2002.** • **MolecularBiology 2nd ed , Robert Weaver *et al*., McGraw Hill, 2002.** • **Online handbooks provided by life-science and biotechnological companies eg. Molecular Biology Handbook MERCK:** https://www.sigmaaldrich.com/technical-documents/articles/biology/introduction-to-molecular-biology.html • **Protocols provided with kits and chemicals.**	
17.	Methods of verification of the assumed learning outcomes: • **written report,** • **written test.**	
18.	Conditions of earning credits: • **continuous control of attendance and control of progress in the subject matter of**	

<table>
<tr><td></td><td colspan="2">classes,
• written report,
• written test.</td></tr>
<tr><td rowspan="6">19.</td><td colspan="2">Student’s workload:</td></tr>
<tr><td>Activity</td><td>Number of hours for the activity</td></tr>
<tr><td>Hours of instruction (as stipulated in study programme):</td><td>30 h</td></tr>
<tr><td>Student’s own work:
• preparation for classes,
• reading of the indicated literature,
• preparing a report,
• preparation for tests</td><td>30 h</td></tr>
<tr><td>Total number of hours:</td><td>60 h</td></tr>
<tr><td>Number of ECTS:</td><td>2 ECTS</td></tr>
</table>