COURSE DESCRIPTION (SYLLABUS)

1.	Course: **PCR Method - Technique and Application**
2.	Language of instruction: **English**
3.	Faculty: **Faculty of Biotechnology**
4.	Course/module code: **29-BT-S2-E1-EngPCRc**
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: **Teresa Olczak, Prof.**
12.	Initial requirements (knowledge, skills, social competences) regarding the course/module and its completion **Bases of molecular biology techniques.**
13.	Objectives: **Knowledge about theory and practical application of PCR.**
14.	Content: • **amplification of DNA fragments using standard PCR reaction (basis of PCR method, components of reaction mixture, conditions of PCR reaction, types of thermocyclers);** • **separation of PCR products in agarose gels using electrophoresis;** • **standard and modified primers design (types of primers, bases of their design);** • **design of site-directed and random mutagenesis based on PCR reaction (bases of selected methods, components of reaction mixture, types of primers and bases of their design, conditions of PCR reaction);** • **5'RACE and 3'RACE method (base of the method and its application, conditions of PCR reaction, types of primers and bases of their design);** • **RT and RT-PCR reactions (conditions of working with RNA, bases of the methods, conditions of RT and PCR reactions);** • **real-time PCR (base of the method, types of primers and their design, conditions of**

<table>
<tr><td></td><td colspan="2">PCR reaction and methods of labelling of PCR products);
• gene expression analysis (base of the method and its application, types of primers, methods of calculation and statistical analysis).</td></tr>
<tr><td>15.</td><td>Learning outcomes:
• acquiring the advanced knowledge about PCR basis,
• learning the terminology and nomenclature of practical application of PCR,
• developing the ability of using the professional literature in English dealing with PCR,
• developing the independent learning skills of subjects presented during the course,
• developing the ability of preparing experiments' protocols,
• developing the ability of analysis and presentation of results.</td><td>Outcome symbols:
K_W01, K_W02, K_W03, K_W05, K_W06, K_W07, K_W09,
K2_U01, K_U02, K_U03, K_U04, K_U05, K_U06,
K_K01, K_K02, K_K03, K_K05, K_K06, K_U07</td></tr>
<tr><td>16.</td><td colspan="2">Recommended literature:
• JM Berg, JL Tymoczko, L Stryer, Biochemistry, Palgrave Macmillan, 2011
• J Sambrook, DW Russel, Molecular Cloning. A laboratory manual, Cold Spring Harbor Laboratory Press, 2001 or later.
• Protocols provided with kits and chemicals.</td></tr>
<tr><td>17.</td><td colspan="2">Methods of verification of the assumed learning outcomes:
• partial tests,
• written test.</td></tr>
<tr><td>18.</td><td colspan="2">Conditions of earning credits:
• partial tests,
• written test.</td></tr>
<tr><td rowspan="5">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></td><td>Number of ECTS:</td><td>2 ECTS</td></tr>
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