COURSE DESCRIPTION (SYLLABUS)

1.	Course: **Metabolism of Nucleic Acids**
2.	Language of instruction: **English**
3.	Faculty: **Faculty of Biotechnology**
4.	Course/module code: **29-BT-S1-E3-EnMNA**
5.	Course/module type (*mandatory* or *elective*): **mandatory**
6.	Programme: **Biotechnology**
7.	Study cycle (*1st/2nd*): **1st cycle**
8.	Year: **2nd**
9.	Semester *(autumn* or *spring):* **autumn**
10.	Form of tuition and number of hours: Lectures: **20 h** Learning methods: **multimedia presentations**
11.	Course coordinator(s): **Małgorzata Heidorn-Czarna, PhD**
12.	Initial requirements *(knowledge, skills, social competences)*: **Knowledge about the structure of nucleic acids and genome organization in prokaryotic and eukaryotic organisms.**
13.	Objectives: **The aim of the course is to gain basic knowledge at a molecular level about the structure and metabolism of nucleic acids as well as about the regulation of transfer of genetic information from genes to proteins. The principles about DNA replication, mutation, repair as well as RNA transcription, posttranscriptional modifications and protein synthesis will be explained. The course also covers the characteristic features of nuclear and organellar genetic code as well as regulation of gene expression at different levels.**
14.	Content:

	1. Discovery of DNA as a genetic material. **2. Replication of DNA (general description of replication machinery, replication in bacteria and eukaryotic organisms).** **3. Control of replication and differences between replication in prokaryotes and eukaryotes.** **4. Transcription (structure of gene and transcript in prokaryotes and eukaryotes, promoters, bacterial and eukaryotic RNA polymerase).** **5. Regulation of transcription and maturation of RNA in eukaryotes and prokaryotes..** **6. Genetic code.** **7. Protein synthesis, composition of prokaryotic and eukaryotic ribosomes, general mechanism of translation.** **8. Differences between translation in prokaryotes and eukaryotes.** **9. DNA mutations and repair.**	
15.	Learning outcomes: Student: • **makes a qualitative and quantitative description of the basic biological phenomena and processes connected with nucleic acids and gene expression;** • **has extensive knowledge in the field of biochemistry and molecular biology; knows the structure, function and metabolism of nucleic acids; can integrate the knowledge gained at the level of the whole cell metabolism;** • **knows the basic concepts, terms, techniques used in biochemistry and molecular biology regarding nucleic acids and gene expression; is versed in the development of the above-mentioned fields;** • **reads and understands the scientific literature in the field of biochemistry and molecular biology of nucleic acids in English;** • **takes advantage of the online resources and literature to obtain information on molecular biology;** • **learns a given subject related to the structure and metabolism of nucleic acids as well as gene expression by himself;** • **understands the need for continuing education throughout the whole life, including broadening knowledge in molecular biology/biotechnology;**	Outcome symbols: K1_W01 K1_W05 K1_W06 K1_U03 K1_U04 K1_U12 K1_K01

<table>
<tr><td></td><td>• recognizes the importance of knowledge and expert opinions in solving cognitive and practical problems</td><td>K1_K02</td></tr>
<tr><td>16.</td><td colspan="2">Recommended literature:
• B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter „Molecular Biology of the Cell” (2008) published by Garland Science, 5th edition.
• H. Lodish, A. Berk, Ch.A. Kaiser, M. Krieger, M.P. Scott, A. Bretscher, H. Ploegh, P. Matsudaira „Molecular Cell Biology” (2012) published by W.H. Freeman and Company, 7th edition.
• J.D. Watson, T.A. Baker, S.P. Bell, A. Gann, M. Levine, R. Losick „Molecular Biology of the Gene” (2013) published by Prentice Hall, 7th edition.
• B. Lewin, J.E. Krebs, E.S. Goldstein, S.T. Kilpatrick (2014) „Genes XI”, published by Jones & Bartlett, 11th edition.</td></tr>
<tr><td>17.</td><td colspan="2">Methods of verification of the assumed learning outcomes:
Written exam</td></tr>
<tr><td>18.</td><td colspan="2">Conditions of earning credits:
Completion of the lecture is based on a written exam result.</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):
• lecture: 20 h
• consultation: 5 h</td><td>25 h</td></tr>
<tr><td>Student’s own work:
• reading set literature: 8 h
• preparing for the exam: 17 h</td><td>25 h</td></tr>
<tr><td>Total number of hours:</td><td>50 h</td></tr>
<tr><td></td><td>Number of ECTS:</td><td>3 ECTS</td></tr>
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