



## Subject card

Subject name and code	Introduction to Contemporary Biotechnology, PG_00037395						
Field of study	Biotechnology						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2020/2021		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Microbiology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Roman Kotłowski					
	Teachers	dr hab. inż. Roman Kotłowski dr hab. inż. Anna Brillowska-Dąbrowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
Introduction to Contemporary Biotechnology - Moodle ID: 7105 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7105">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7105</a>							
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM		
	Number of study hours	15	1.0	34.0	50		
Subject objectives	The aim of lecture is transmission of knowledge in the field of leading development directions in biotechnology.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W08	Student has knowledge about application biotechnological methods in pharmaceutical, industrial and plant biotechnology.			[SW1] Assessment of factual knowledge		
	K6_U08	Student can use specialist terms in modern biotechnology. Student understands the scientific publications of this subject and is able to analyze them properly.			[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	Biotechnology - definitions. History and development of biotechnology. Industrial biotechnology. Biotechnology in public health. Microorganisms as "cell-factories". Extremophilic microorganisms and their importance for the developmet of biotechnology. Expression microarrays in investigations of etiology of Crohn's Disease. Human microbiome. Current biotechnological productions of useful proteins in diagnosis and molecular biology. Molecular diagnostic. Definition and the range of applications in different medical fields and specialties. Molecular diagnosctic in forensic medicine - markers, methods and applications. Introduction in epigenetics. Epigenetic for biotechnological drugs and molecular diagnostics. Mammals regeneration. Models of Mammals regeneration. New drugs and therapies in regeneration. New generation vaccines. Molecular diagnostic <i>in vitro</i> . Recombinant proteins in diagnostic. Basic informations about new tools in medical biotechnology.						
Prerequisites and co-requisites	The student should have basic knowledge of biology and chemistry.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Quiz	60.0%			100.0%		

Recommended reading	Basic literature	<p>1: Podstawy Biotechnologii. Pod redakcją: Ratledge C., Kristiansen B. Wydawnictwo PWN, 2017.</p> <p>2: Podstawy Wybranych Procesów Biotechnologicznych. Fiedurek J. Wydawnictwo UMCS, 2004.</p> <p>3: Sass P, Sosnowski P, Podolak-Popinigis J, Górnikiewicz B, Kamińska J, Deptuła M, Nowicka E, Wardowska A, Ruczyński J, Rekowski P, Rogujski P, Filipowicz N, Mieczkowska A, Peszyńska-Sularz G, Janus Ł, Skowron P, Czupryn A, Mucha P, Piotrowski A, Rodziejcz-Motowidło S, Piłkuła M, Sachadyn P. Epigenetic inhibitor zebularine activates ear pinna wound closure in the mouse. <i>EBioMedicine</i>. 2019 Aug;46:317-329. DOI: 10.1016/j.ebiom.2019.07.010.</p> <p>4: Stanisławska-Sachadyn A, Borzyszkowska J, Krzemiński M, Janowicz A, Dziadziuszko R, Jassem J, Rzyman W, Limon J. Folate/homocysteine metabolism and lung cancer risk among smokers. <i>PLoS One</i>. 2019 Apr 2;14(4):e0214462. DOI: 10.1371/journal.pone.0214462.</p> <p>5: Kotłowski R, Bernstein CN, Sepehri S, Krause DO. High prevalence of <i>Escherichia coli</i> belonging to the B2+D phylogenetic group in inflammatory bowel disease. <i>Gut</i>. 2007 May;56(5):669-75. DOI: 10.1136/gut.2006.099796.</p> <p>6: Olszewski M, Grot A, Wojciechowski M, Nowak M, Mickiewicz M, Kur J. Characterization of exceptionally thermostable single-stranded DNA-binding proteins from <i>Thermotoga maritima</i> and <i>Thermotoga neapolitana</i>. <i>BMC Microbiol</i>. 2010 Oct 15;10:260. DOI: 10.1186/1471-2180-10-260.</p> <p>7: Holec-Gąsior L, Ferra B, Czechowska J, Serdiuk IE, Krzywiński K. A novel chemiluminescent immunoassay based on original acridinium ester labels as better solution for diagnosis of human toxoplasmosis than conventional ELISA test. <i>Diagn Microbiol Infect Dis</i>. 2018 May; 91(1):13-19. DOI: 10.1016/j.diagmicrobio.2017.12.022.</p> <p>8: Zalewska B, Piatek R, Konopa G, Nowicki B, Nowicki S, Kur J. Chimeric Dr fimbriae with a herpes simplex virus type 1 epitope as a model for a recombinant vaccine. <i>Infect Immun</i>. 2003 Oct;71(10): 5505-13. DOI: 10.1128/iai.71.10.5505-5513.2003.</p> <p>9: Krawczyk B, Samet A, Leibner J, Sledzińska A, Kur J. Evaluation of a PCR melting profile technique for bacterial strain differentiation. <i>J Clin Microbiol</i>. 2006 Jul;44(7):2327-32. DOI: 10.1128/JCM.00052-06.</p> <p>10: Ciesliński H, Długotecka A, Kur J, Turkiewicz M. An MTA phosphorylase gene discovered in the metagenomic library derived from Antarctic top soil during screening for lipolytic active clones confers strong pink fluorescence in the presence of rhodamine B. <i>FEMS Microbiol Lett</i>. 2009 Oct;299(2): 232-40. DOI: 10.1111/j.1574-6968.2009.01756.x.</p> <p>11: Wanarska M, Kur J. A method for the production of D-tagatose using a recombinant <i>Pichia pastoris</i> strain secreting <math>\beta</math>-D-galactosidase from <i>Arthrobacter chlorophenolicus</i> and a recombinant L-arabinose isomerase from <i>Arthrobacter</i> sp. <i>Microb Cell Fact</i>. 2012 Aug 23;11:113. DOI: 10.1186/1475-2859-11-113.</p> <p>12: Kur J, Koob M, Burkiewicz A, Szybalski W. A novel method for converting common restriction enzymes into rare cutters: integration host factor-mediated Achilles' cleavage (IHF-AC). <i>Gene</i>. 1992 Jan 2;110(1):1-7. DOI: 10.1016/0378-1119(92)90437-t.</p>
	Supplementary literature	1: <i>Biotechnology and Chemistry of Antibiotics</i> . Chmiel A., Grudziński S., PWN, 1998.
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>1. Microbiom means:</p> <p>a) Bacteria, Eukaryota and viruses populated human organism;</p> <p>b) genes and genomes of microbiota containing plasmids, indicating genetic potential of population;</p> <p>c) genes and genomes of microbiota including host metabolism products;</p> <p>d) microorganisms species in the human GI-tract.</p> <p>2. Grey biotechnology means:</p> <p>a) industrial applications of biotechnology;</p> <p>b) application of biotechnological methods in medicine;</p> <p>c) application of biotechnology in agriculture and food production;</p> <p>d) application of biotechnology in environmental protection.</p>	
Work placement	Not applicable	