

Opis zajęć (syllabus)

Nazwa zajęć/ <i>Course title:</i>	Biologia molekularna	ECTS	6
Nazwa zajęć w j. angielskim/ <i>Course title in English:</i>	Molecular biology		
Zajęcia dla kierunku studiów/ <i>Degree program name:</i>	Biotechnologia		

Język kursu/ <i>Course language:</i> English		Poziom studiów/ <i>Study level:</i> I	
Typ studiów/ <i>Form of studies:</i> <input checked="" type="checkbox"/> intramural <input type="checkbox"/> extramural	Status zajęć/ <i>Course status</i> <input type="checkbox"/> podstawowe/ <i>Basic</i> <input checked="" type="checkbox"/> kierunkowe/ <i>major</i>	<input checked="" type="checkbox"/> obowiązkowe/ <i>mandatory</i> <input type="checkbox"/> do wyboru/ <i>elective</i>	Semestr/ <i>Semester:</i> 3 <input checked="" type="checkbox"/> semestr zimowy/ <i>winter semester</i> <input type="checkbox"/> summer semester
Rok akademicki/ <i>Academic year:</i> 2022/2023		Numer katalogowy:	BBT_BTa-1S-3Z-22

Koordinator zajęć/ <i>Course coordinator:</i>	Ks dr hab inż. Marcin Wiśniewski		
Prowadzący zajęcia/ <i>Teachers responsible for the course:</i>	dr hab. Inż. Piotr Bąska, dr inż. Ewa Długosz, mgr inż.. Mateusz Pękacz, dr Agnieszka Sałamaszyńska - Guz, ks. dr hab. Marcin Wiśniewski		
Założenia, cele i opis zajęć/ <i>Aims, objectives and description of the course:</i>	<p>Objectives of the course: To acquaint students with the basic issues in the field of molecular biology of the cell, regulation of gene expression, and basic methods of genetic engineering, as well as with examples of the application of these methods in diagnostics, therapy, prevention and epidemiology of diseases.</p> <p>Lecture topics: Molecular biology as a science that studies the meaning of nucleic acids. DNA - structure and properties; DNA - organization in a prokaryotic and eukaryotic cells. The size and structure of the genome of various organisms (DNA and RNA viruses, prokaryotes and eukaryotes); DNA replication in pro and eukaryotic cells, replication stages and enzymes involved in this process; Models of DNA replication, regulation of replication, DNA repair systems; Transcription process and its characterisation in prokaryotes and eukaryotes; RNA maturation. RNA editing. The stages of gene expression in pro and eukaryotes; Mobile genetic elements, part 1; Mobile genetic elements part 2; Molecular probes, their types, construction and application; Translation process, its characterisation and regulation in pro- and eukaryotes; Post-translational modifications. Systems of protein translocation in cells; Control of gene expression; Study of gene expression at the level of nucleic acids and proteins; DNA sequencing; Evolution of genomes</p> <p>Topics of laboratory exercises: 1) DNA isolation methods, assessment of DNA purity and concentration, 2) DNA electrophoresis 3) RNA isolation methods, 4) Restriction enzymes - basic tools of molecular biology, 5) and 6) PCR and its modifications, 7) Hybridization, 8) Protein analysis methods: SDS-PAGE, Western blotting, ELISA</p>		
Formy dydaktyczne, liczba godzin/ <i>Teaching forms, number of hours:</i>	a) Lecture; number of hours: 30; b) Laboratory classes; number of hours 30;		
Metody dydaktyczne/ <i>Teaching methods:</i>	Lectures: multimedia presentations. Classes: laboratory experiments, problem solving; discussion; the possibility of using distance learning when necessary		
Wymagania formalne i założenia wstępne/ <i>Formal requirements and prerequisites</i>	The scope of knowledge in the subject of biology at the general secondary school level, extended profile. Theoretically, passing the extended matura exam in biology should prepare student for the subject.		
Efekty uczenia się/ <i>Learning outcomes:</i>	treść efektu przypisanego do zajęć/ <i>the content of the effect assigned to the course:</i>	Odniesienie do efektu kierunkowego/ <i>Relation to the course outcomes</i>	Siła dla ef. kier*/ <i>Impact on the course outcomes *</i>
Wiedza (absolwent zna i rozumie) / <i>Knowledge: (the graduate knows and understands)</i>	W1	Student knows the molecular basis of the functioning of organisms; structure-function relationships at the level of macromolecules (nucleic acids, proteins, polysaccharides, lipids); principles of transmission and expression (expression) of genetic information	K_W03 K_W05 K_W06 K_W13 3 2 3
	W2	Student knows and understands the principles of the basic techniques of molecular biology	K_W07 K_W04 3 3
Umiejętności (absolwent potrafi) / <i>Skills: (the graduate is able to)</i>	U1	Student is able to perform a comparative analysis of gene expression in prokaryotic and eukaryotic organisms	K_U01 K_U03 K_U05 K_U21 3 3 2 2
	U2	Student is able to perform a comparative analysis of gene expression in prokaryotic and eukaryotic organisms	K_U01 K_U03 3 3

			K_U04	1
			K_U05	2
			K_U17	3
			K_U21	2
Kompetencje (absolwent jest gotów do) /Competences: (The graduate is ready to)	K1	Student is ready to apply the acquired knowledge to the development of research projects in the field of molecular biology	K_K07 K_K05 K_K03	2 1 3
Treści programowe zapewniające uzyskanie efektów uczenia się: /Program contents ensuring the achievement of the learning outcomes:		To acquaint students with the basic issues in the field of molecular biology of the cell, regulation of gene expression and basic methods of genetic engineering, as well as with examples of the application of these methods in the diagnosis, therapy, prevention and epidemiology of diseases.		
Sposób weryfikacji efektów uczenia się/ Methods of the verification of the learning outcomes:		colloquium during laboratory classes, colloquium at the end of classes, written exam,		
Szczegóły dotyczące sposobów weryfikacji i form dokumentacji osiągniętych efektów uczenia się /Details on the verification methods and of the ways of documenting the learning outcomes:		Periodic written assignments (50%) / content of the exam (50%). Possibilities of using distance learning when necessary (read e.g. pandemic)		
Elementy i wagi mające wpływ na ocenę końcową/Elements and weights influencing the final grade:		The final grade is the arithmetic mean of the grades obtained from the exercises and the examination part.		
Miejsce realizacji zajęć/ Teaching place:		Lecture hall, classroom 2114, building 23, if necessary, online classes (Teams)		
Literatura/Literature Literatura podstawowa: (1) T.A. Brown, Genomy. PWN 2009 and newer (2) R. J. Epstein, Biologia molekularna człowieka CZELEJ; 2006 ISBN:8389309645 (3) B. Alberts, D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter, Podstawy biologii komórki. PWN 2005 (4) Berg J.M., Tymoczko J.L. Stryer L., Biochemia, PWN, Warszawa 2009 (5) Węgleński P. (red.). 2008. Genetyka molekularna PWN. Warszawa Literatura uzupełniająca: (1) Bal J (red), Biologia molekularna w medycynie. Elementy genetyki klinicznej, PWN, Warszawa 2007 (2) Clark D., Molecular biology. Elsevier, 2010 (3) Lewin. Genes VIII, Oxford University Press, 2006				
UWAGI/ANNOTATIONS				

*) 3 – zaawansowany i szczegółowy, 2 – znaczący, 1 – podstawowy/ 3 – significant and detailed, 2 – considerable, 1 – basic,

Wskaźniki ilościowe charakteryzujące moduł/przedmiot/Quantitative summary of the course:

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych dla zajęć efektów uczenia się - na tej podstawie należy wypełnić pole ECTS /Estimated number of work hours per student (contact and self-study) essential to achieve the presumed learning outcomes - basis for the calculation of ECTS credits:	112 h
Łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia/ Total number of ECTS credits accumulated by the student during contact learning:	2.4 ECTS

