


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Molecular evolution (lecture)		13.1.0557	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	second tier studies (MA)
Intercollegiate Faculty of Biotechnology UG-MUG	Biotechnology	form	full-time
		specialty	all
		specialization	all
Teaching staff			
prof. dr hab. Jarosław Marszałek			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture			
The realization of activities			
Number of hours			
Lecture: 30 hours			
The academic cycle			
2021/2022 summer semester			
Type of course		Language of instruction	
obligatory		english	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
		Final evaluation	
		Examination	
		Assessment methods	
		written exam with open questions	
		The basic criteria for evaluation	
		Exam covers contents shown in the box 'Course contents'. Simple percentage index contained in the Rules and Regulations for Studies at the UG determines the course completion norm. Exam questions concern all effects shown in the syllabus in the box 'The learning outcomes'	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
B. Prerequisites			
Knowledge in the field of Biochemistry, Molecular Biology, Microbiology, Biophysics, General Chemistry, Organic Chemistry, Genetics			
Aims of education			
<p>Acquainting students with the molecular aspects of evolution and experimental and bioinformatics methods used in evolutionary research. It will be shown that theory of evolution allows to link seemingly distant areas of biomedical research in a uniform way.</p> <p>Within the framework of the course the student will:</p> <ul style="list-style-type: none"> understand evolutionary processes and mechanisms of evolution on the molecular level (K_W01) acquire an ability to interpret research results in the context of theory of molecular evolution. Ability to interpret phylogenetic trees. Ability to create evolutionary scenarios of biological phenomena occurring on the molecular level. <p>Social competence.</p> <p>During the lecture there are discussed social issues which can be explained in the light of evolution: the notion of the human race, the evolutionary basis for the emergence of races; the lack of the background for 'racism'. Evolutionary links between organisms, including kinship of humans and animals and the resulting moral principles concerning the treatment of animals by humans. Understanding the phenomenon of acquiring resistance by pathogens and the significance of social behaviors for these processes</p>			

Course contents Genetic variability on the molecular level: genes, genetic code, mutations, Genetic variability on the population level. Natural selection and neutral evolution. Dynamics of changes of DNA sequences and the molecular clock. Phylogenesis and molecular taxonomy: application of bioinformatics methods. Evolution of proteins. Evolution of genomes. Examination of ancient DNA. Practical significance of natural selection: evolution in a lab	
Bibliography of literature Łatwe drzewa filogenetyczne. Hall Barry (2008) Warszawa, Wyd. UW Markery molekularne, historia naturalna i ewolucja. Avise John C (2008) Warszawa. Wyd. UW Bioinformatyka i ewolucja molekularna. Paul G. Higgins, Tersa K. Attwood (2008) Warszawa, PWN Bioinformatyka-podręcznik do analizy genów i białek. A.D. Baxevanisa i B.F.F. Ouellette'a (2004) Warszawa PWN The course tutor renders accessible a set of PDF files containing current review publications and selected experimental publications linked with the content of the lecture. This set is updated every year.	
The learning outcomes (for the field of study and specialization) K_W01 K_W02 K_W03 K_U03	Knowledge K_W01 Understands complex biological phenomena on the molecular level, knows their significance for biotechnology and their relationships with other areas and disciplines of science K_W02 Possesses a deepened knowledge in the field of related scientific areas and disciplines allowing him to see connections and dependencies in nature, in particular those essential for biotechnology K_W03 Possesses knowledge in the field of selected issues currently discussed in biotechnological literature and problems concerning related scientific areas and disciplines significant for biotechnology
	Skills K_U03 Knows the English language to an extent that allows him/her to understand an utterance and read with understanding scientific literature and simple reviews in the fields of science and scientific disciplines connected with biotechnology; can prepare a short written review and an oral presentation in English, concerning particular issues of biotechnology and related scientific areas and disciplines.
	Social competence Students participating in the class learn how to express their opinion about the influence of scientific knowledge on social issues such as religion, human races, and human place in natural world in a creative but tactful way. Students develop abilities to use independent and creative thinking to discuss and solve scientific or social problems using the evolutionary theory. The historical approach to the development of evolutionary theory presented during the class demonstrates to students the value of perpetual learning, as the only way to maintain up to date knowledge of any scientific problem.
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