

Course name: Molecular phylogenetics

ECTS	3
Course status	facultative
Course final assessment /evaluation of outcomes	The grade based on Student's work
Prerequisite	-

Main field of study:

Agriculture and Horticulture, Biology and Biotechnology (Erasmus+)

Educational profile	General academic
Code of studies and education level	bachelor/engineer (SI) or master of science (SM)
Semester of studies	Winter or Summer
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Biotechnology and Horticulture
Name of department offering the course	Department of Plant Biology and Biotechnology
Course coordinator	Dr. Małgorzata Czernicka

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
MF_W1	molecular basis of evolutionary processes	EPB2_W02	R, P
MF_W2	bioinformatic methods used in research in the field of phylogenetics	EPB2_W01	R, P
SKILLS – student is able to			
MF_U1	apply bioinformatic tools to analyze genetic variation within and between species	EPB2_U05	R, P
MF_U2	use different evolutionary models and available databases to explain genetic variation	EPB2_U03 EPB2_U04	R, P
SOCIAL COMPETENCIES – student is ready to:			
MF_K1	individual and team work	EPB2_K02	R, P

Teaching contents

Lectures	15 hours
Topics	<ol style="list-style-type: none"> 1. Evolution of DNA, RNA and protein sequences. 2. Evolution of gene and genome. 3. The molecular clock and phylogenetic dating. 4. Selection and genetic drift at the molecular level. 5. Phylogenetic trees and other models, optimality criteria for selecting phylogenetic hypothesis. 6. Substitution models for DNA and other data types. 7. Evaluation of results from phylogentic analyses.
Accomplished learning outcomes	MF_W1, MF_W2
Means of verification, rules and criteria of	Essay (50% participation in the final mark)

assessment	
Classes:	15 hours
Topics	<ol style="list-style-type: none"> 1. The laboratory provides hands-on experience with several important phylogenetic software packages (MEGA, Phylip, PhyML, MrBayes). 2. Practicals will involve the phylogenetics of virus HIV or human influenza virus. 3. Bioinformatic project.
Accomplished learning outcomes	<i>MF_U1, MF_U2, MF_K1</i>
Means of verification, rules and criteria of assessment	<i>Report (50% participation in the final mark)</i>

References:

Basic	<i>Yang, Z. 2014. Molecular evolution: a statistical approach. Oxford University Press.</i>
Supplementary	Hall B.G. 2008. Phylogentic trees made easy. Sinauer Associates, Sunderland.

Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	1.5	ECTS **
Area of academic study: P – Biological sciences	1.5	ECTS**

Structure of student activity

Contact hours	40	hrs.	1.6	ECTS**
Including:				
lectures	15	hrs.		
classes and seminars	15	hrs.		
consultations	7	hrs.		
participation in research	...	hrs.		
obligatory traineeships	...	hrs.		
participation in examination	3	hrs.		
e-learning	...	hrs.	ECTS**
student own work	35	hrs.	1.4	ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes