

Course name: Molecular biology

ECTS	6
Course status	<i>facultative</i>
Course final assessment /evaluation of outcomes	<i>exam</i>
Prerequisite	<i>knowledge of genetics and biochemistry on the level of undergraduate agricultural/natural studies</i>

Main field of study:

Agriculture and Horticulture, Biology and Biotechnology (Erasmus+)

Educational profile	<i>general academic</i>
Code of studies and education level	<i>bachelor/engineer (SI) or master of science (SM)</i>
Semester of studies	<i>winter or summer</i>
Language of instruction	<i>English</i>

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 hab. Marek Szklarczyk, prof. URK

Learning outcomes

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands:			
MOB_W1	basic genome features	EPB2_W02	R, P
MOB_W2	processes including the flow of genetic information within the cell	EPB2_W02	R, P
MOB_W3	types of protein modification and mechanisms of protein sorting	EPB2_W02	R, P
MOB_W4	basics of cell signaling	EPB2_W02	R, P
MOB_W5	processes creating genetic and epigenetic variation	EPB2_W02	R, P
SKILLS – student is able to:			
MOB_U1	prepare samples of genomic and phage DNA	EPB2_U01 EPB2_U05	R, P
MOB_U2	perform DNA electrophoresis in agarose and polyacrylamide gel	EPB2_U01 EPB2_U05	R, P
MOB_U3	perform simple genetic modifications of bacterial cells and assess their efficiency	EPB2_U01 EPB2_U05	R, P
MOB_U4	use DNA amplification and hybridization as well as interpret results of these experiments	EPB2_U01 EPB2_U05	R, P
MOB_U5	exploit selected computer software for the analysis of nucleotide and amino acid sequences	EPB2_U01 EPB2_U04	R, P
SOCIAL COMPETENCIES – student is ready to:			
MOB_K1	team work	EPB2_K02 EPB2_K05	R, P
MOB_K2	follow the rules of safe laboratory practice	EPB2_K02 EPB2_K04	R, P

Teaching contents

Lectures	20 hours
Topics	Genomes DNA replication Gene expression – transcription and translation Protein sorting and post-translational modifications

	Cell signaling Epigenetic phenomena Mutations and DNA repair DNA recombination
Accomplished learning outcomes	MOB_W1, MOB_W2, MOB_W3, MOB_W4, MOB_W5
Means of verification, rules and criteria of assessment	Evaluation is based on test questions, in order to earn a positive mark at least 51% of answers must be correct. Contribution to the final grade from the course – 65%.
Classes:	35 hours
Topics	Isolation and restriction of plant genomic DNA DNA electrophoresis and blotting Polymerase chain reaction (PCR) Use of phage vectors Sequence analysis of DNA and proteins PCR primer design Recent discoveries in molecular biology (literature query).
Accomplished learning outcomes	MOB_U1, MOB_U2, MOB_U3, MOB_U4, MOB_U5, MOB_K1, MOB_K2
Means of verification, rules and criteria of assessment	Evaluation is based on: - individual reports from laboratory activities, contribution to the final grade from the course – 10%; - two tests from the laboratory topics (at least 51% of correct answers to earn a positive mark), contribution to the final grade from the course – 20%; - presentation of literature review – 5%.

References:

Basic	McLennan A et al. (2012) <i>Molecular biology – BIOS instant notes</i> , 4th edn. Garland Science Brown T (2012) <i>Introduction to genetics – a molecular approach</i> , 1stedn. Garland Science Krebs JE, Goldstein ES, Kilpatrick ST (2011) <i>Lewin's genes X</i> , 10thedn. Jones and Bartlett Publishers
Supplementary	Brown TA (2017) <i>Genomes 4</i> , 4th edn. Garland Science Russell PJ (2013) <i>iGenetics: Pearson new international edition</i> , 3rd edn. Pearson Education Limited <i>Trends in Genetics</i> . Elsevier (journal)

Structure of learning outcomes

Area of academic study: agriculture and horticulture	3.0 ECTS**
Area of academic study: biological sciences	3.0 ECTS**

Structure of student activity

Contact hours	63 hrs.	2.5 ECTS**
Including:	lectures	20 hrs.
	classes and seminars	35 hrs.
	consultations	4 hrs.
	participation in research	... hrs.
	obligatory traineeships	... hrs.
	participation in examination	4 hrs.
e-learning	... hrs.	... ECTS**
student own work	87 hrs.	3.5 ECTS**

*areas of academic study in the fields of: P – biological sciences; R – agriculture and horticulture

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