Course name:
Molecular biology

ECTS	4
Course status	*facultative*
Course final assessment /evaluation of outcomes	*exam*
Prerequisite	*knowledge of genetics and biochemistry on the level of undergraduate agricultural/natural studies*

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 hab. Marek Szklarczyk, prof. UAK

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	R, P

		EPB2_K05	
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:		25 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	
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 – 15%;* *- 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%.*	

References:

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

Structure of learning outcomes

Area of academic study: R – agricultural, forestry and veterinary sciences	1	ECTS**
Area of academic study: P – biological sciences	3	ECTS**

Structure of student activity

Contact hours		53	hrs.	2.1	ECTS**
Including:	lectures	20	hrs.		
	classes and seminars	25	hrs.		
	consultations	4	hrs.		
	participation in research	0	hrs.		
	obligatory traineeships	0	hrs.		
	participation in examination	4	hrs.		
e-learning		0	hrs.	0	ECTS**
student own work		47	hrs.	1.9	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