Course name: Bioinformatics

ECTS	*6*
Course status	*facultative*
Course final assessment /evaluation of outcomes	*exam*
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 inż. Małgorzata Czernicka, 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:			
BI_W1	advanced tools and algorithms used in solving bioinformatic problems	EPB2_W01 EPB2_W02	R, P
SKILLS – student is able to:			
BI_U1	use specialized databases containing DNA, RNA and protein sequence data	EPB2_U03	R, P
BI_U2	apply bioinformatic tools to analyze biological data	EPB2_U04	R, P
SOCIAL COMPETENCIES – student is ready to:			
BI_K1	individual work while respecting the work of others	EPB2_K02	R, P

Teaching contents

Lectures	20 hours
Topics	1. Introduction to bioinformatics. Biological databases. Introduction to bioinformatic systems. 2. The role bioinformatics in the sequencing projects (NGS). 3. Nucleotide and protein sequence alignment algorithms. 4. Bioinformatic methods applied in molecular phylogenetics. 5. Structural bioinformatics of macromolecules.
Accomplished learning outcomes	*BI_W1*
Means of verification, rules and criteria of assessment	one choice test (30% participation in the final mark)
Classes:	20 hours
Topics	1. Exploration of bioinformatic databases. 2. NGS data analysis. 3. Sequence similarity search using Blast. 4. Multiple alignment of DNA and protein sequences. 5. Small RNA analysis. 6. Structural analysis of protein sequences. 7. Bioinformatic project.
Accomplished learning outcomes	*BI_U1, BI_U2, BI_K1*

Means of verification, rules and criteria of assessment	test of the acquired bioinformatic skills (problem task)(30% participation in the final mark)
Seminar:	20 hours
Topics	1. Oral presentations of topics in the field of bioinformatics. 2. Presentations of students' final projects.
Accomplished learning outcomes	*BI_W1, BI_U1, BI_K1*
Means of verification, rules and criteria of assessment	oral presentation in the field of bioinformatics (20% participation in the final mark) and presentation of the results of the final project (20% participation in the final mark)

References:

Basic	Arthur M. Lesk. 2019. Introduction to bioinformatics. Oxford University Press
Supplementary	Zvelebil M, Braum J.O. 2007. Understanding bioinformatics. Garland Science, New York Krawetz S.A., Womble D.D. 2003. Introduction to bioinformatics: A theoretical and practical approach. Humana Press, Totowa, New Jersey

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		70	hrs.	2.8	ECTS**
Including:	lectures	20	hrs.		
	classes and seminars	40	hrs.		
	consultations	4	hrs.		
	participation in research	…	hrs.		
	obligatory traineeships	…	hrs.		
	participation in examination	6	hrs.		
e-learning		…	hrs.	….	ECTS**
student own work		80	hrs.	3.2	ECTS**

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

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