Course Syllabus

I. General Information

Course name in English	OMICS technologies
Course name in Polish	Techniki OMICS
Programme	Bioanalytical technologies
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	MSc
Form of studies (full-time, part-time)	full-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible	dr hab. inż. Andrea Baier

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture	15	I	6
tutorial			
classes	45	I	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Knowledge in biochemistry, genetics, microbiology

II. Course Objectives

C1 - To acquaint students with various aspects of biotechnology and bio-engineering using omics technologies
C2 - Provides key insights into omics approaches in personalized and precision medicine
C3 - information how one can utilize omics data in molecular biology, biotechnology and human health care

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		

W_01	Has knowledge in specific methods used in genomics, proteomics and metabolomics used in analytical processes	K_W01, K_W02
W_02	Knows statistical methods necessary to analyse biological data and is able to apply other specialized computer software	K_W04
W_03	Knows and applies the principles of H&S	K_W07
	SKILLS	
U_01	Applies specialized research methods necessary for the analysis of proteins, genes and metabolites	K_U01
U_02	Performs statistical analysis crucial for interpretation of experimental results	K_U04
U_03	Is able to collect and interpret research data and to write short publications describing research procedures and own results as well as to draw conclusions	K_U06, K_U14
U_04	Is able to evaluate threats for the environment from the application of new and modern technologies as well as to plan and apply appropriate working conditions to ensure safety in the laboratory	K_U12, K_U15
	SOCIAL COMPETENCES	
K_01	Takes care on laboratory equipment and carries out experiments according to procedures and safety rules	K_K03
K_02	Complies with the generally recognized safety technology and occupational health rules	K_K05

IV. Course Content

Lecture:
1: Familiarizing students with the course syllabus and the content of the course, Introduction into Omics techniques
2: Omics approaches in microbial and viral biotechnology
3: Omics approaches in Plant tissue engineering and biocontrol technology
4: Omics approaches in Algal and fungal biotechnology
5: Omics approaches in Pharmaceutical biotechnology
6: Omics approaches in Industrial and Bioprocess technology
7: Lab-on-a-chip technology and its application
8: Biomedical engineering: the recent trends

Lab Classes:
Introduction, H&S rules
Techniques for nucleic acid engineering
Techniques for Protein engineering
Protein and metabolite identification

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
	KNOWLEDGE		
W_01	Conventional lecture	Written test	Evaluated written test/test

W_02	Conventional lecture	Written test	Evaluated written test/test
W_03	Conventional lecture	Written test	Evaluated written test/test
SKILLS			
U_01	Laboratory classes	Test of practical skills	Rating card/Observation report
U_02	Laboratory classes	report	Report printout/file
U_03	Laboratory classess	report	Report printout/file
U_04	Laboratory classes	Report Observation	Report printout/file Observation report
SOCIAL COMPETENCIES			
K_01	Laboratory classes	Observation	Observation report
K_02	Laboratory classes	Observation	Observation report

VI. **Grading criteria, weighting factors.....Student workload**

Lecture: Written exam - 90%, participation in lectures - 10%

Classes: written tests – 60 %, 20% reports, 20% work during classes

Mark	**Evaluation criteria**	
very good (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 95-100%
over good (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 85-94 %
good (4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 75-84%
quite good (3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 65-74%
sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficient level	the student demonstrates knowledge of the education content at the level of 55-64%
insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficient level	the student demonstrates knowledge of the education content below the level of 55%

VII Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	69 (60 + 9 individual consultation)
Number of hours of individual student work	**81**

VII. **Literature**

Basic literature
D. Barh, V. Azevedo: Omics Technologies and Bio-engineering, Volume 1: Towards Improving Quality of Life, Academic Press D. Barh, V. Azevedo: Omics Technologies and Bio-engineering, Volume 2: Towards Improving Quality of Life, Academic Press
Additional literature
H. Issaq, T. Veenstra: Proteomic and Metabolomic Approaches to Biomarker Discovery, Academic Press