

**Course Syllabus****I. General Information**

Course name	Laboratory techniques
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BSc
Form of studies (full-time, part-time)	part-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible	Dr hab. Konrad Kubiński
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Type of class ( <i>use only the types mentioned below</i> )	Number of teaching hours	Semester	ECTS Points
lecture			3
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	no
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**II. Course Objectives**

C1 - Theoretical familiarize students with selected laboratory techniques used in biotechnology
C2 - Practical familiarize students with basic laboratory techniques
C3 - Teaching observation skills, questioning, designing experiments, discuss the results and present proposals
C4 - the ability to use sophisticated laboratory equipment

**III. Course learning outcomes with reference to programme learning outcomes**

Symbol	Description of course learning outcome	Reference to programme learning outcome
<b>KNOWLEDGE</b>		
W_01	describes issues in the field of laboratory techniques to understand and interpret basic natural phenomena and processes	K_W02
W_02	presents knowledge in the field of laboratory techniques used in biotechnology	K_W05
W_03	presents the principles of health, safety work and ergonomics in laboratory techniques	K_W09
<b>SKILLS</b>		
U_01	applies techniques in the field of biotechnology	K_U01
U_02	carries out observations in the field of laboratory techniques	K_U02
U_03	designs and performs research tasks or expertise in the field of laboratory techniques	K_U15
U_04	learns independently in a targeted manner in the field of laboratory techniques	K_U17
<b>SOCIAL COMPETENCIES</b>		
K_01	is prepared to evaluate his own knowledge and skills in the field of laboratory techniques	K_K04

**IV. Course Content**

Basic laboratory utensils and accessories. Operation of automated pipette. Operation of laboratory balance. Preparation of one- and multi-component solutions / buffers of specific volume, concentration (molar, percentage) and pH. Work with small volumes of solutions. Selected techniques of disintegration of eukaryotic and prokaryotic cells. Centrifugation as a separation technique for cell components. Types of rotors and centrifuges. Selected types of liquid chromatography used in biotechnology. Ion exchange chromatography. Affinity chromatography. Gel filtration. Selected electrophoretic techniques. DNA electrophoresis. SDS-PAGE protein electrophoresis. Western Blotting.

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

Symbol	Didactic methods <i>(choose from the list)</i>	Forms of assessment <i>(choose from the list)</i>	Documentation type <i>(choose from the list)</i>
<b>KNOWLEDGE</b>			
W_01	Analysis	Test	Evaluated Test
W_02	Analysis	Test	Evaluated test
W_03	Analysis	Test	Evaluated test
<b>SKILLS</b>			
U_01	Classes	observations card	observations card
U_02	Classes	observations card	observations card
U_03	Classes	observations card	observations card

U_04	Classes	observations card	observations card
<b>SOCIAL COMPETENCIES</b>			
K_01	Classes	observations card	observations card

### VI. Grading criteria, weighting factors.....

2 written tests

<b>Degree</b>	<b>Degree criteria</b>	
<b>Very good (5)</b>	the student realizes the assumed learning outcomes to a very good degree	Student demonstrates knowledge of the content of education at the level of 91-100 %
<b>More than good (4,5)</b>	the student realizes the assumed learning outcomes to a more than good degree	Student demonstrates knowledge of the content of education at the level of 86-90 %
<b>good (4)</b>	the student realizes the assumed learning outcomes to a good degree	Student demonstrates knowledge of the content of education at the level of 71-85%
<b>Good enough (3,5)</b>	the student realizes the assumed learning outcomes to a good enough degree	Student demonstrates knowledge of the content of education at the level of 66-70%
<b>sufficient (3)</b>	the student realizes the assumed learning outcomes to a sufficient degree	Student demonstrates knowledge of the content of education at the level of 51-65%
<b>unsufficient (2)</b>	the student realizes the assumed learning outcomes to an unsufficient degree	Student demonstrates knowledge of the content of education at the level of 51%

### VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	45
Number of hours of individual student work	30

### VIII. Literature

Basic literature
Wilson K., Walker J., Principles and techniques of biochemistry and molecular biology, Cambridge University Press, New York, 2010.

Bonner P., Hargreaves A., Basic bioscience laboratory techniques, Wiley-Blackwell, 2011.  
Meah M., Kebede-Westhead E., Essential laboratory skills, Wiley-Blackwell, 2012