

Course code:

Plan position:

1. INFORMATION ABOUT THE COURSE

A. Basic information

Name of course	Experimental Biology
Field of studies	Biotechnology / Biology / Life Sciences
Level of studies	First-cycle (Bachelor) / Second-cycle (Master)
Profile of studies	general academic
Form of studies	Full-time / Part-time
Specialty	
Unit responsible for the field of studies	Faculty of Animal Breeding and Biology, Department of Biotechnology and Animal Genetics
Name and academic degree of teacher(s)	Justyna Durślewicz, PhD
Introductory courses	general biology, biochemistry, genetics
Introductory requirements	basic knowledge of cell biology, genetics and chemistry

B. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
Winter / summer			25				5

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	The student knows the principles of working in a molecular biology laboratory and methods of collection and storage of biological material.		
W2	The student understands the fundamentals of molecular biology techniques, including nucleic acid isolation, PCR, RT-qPCR, and protein analysis methods.		
SKILLS			
U1	The student is able to perform basic laboratory techniques such as DNA/RNA isolation, quantitative and qualitative analysis, RT-qPCR, and basic protein analysis (Western blot). The student is able to analyze and interpret results of molecular experiments and draw appropriate conclusions.		
SOCIAL COMPETENCES			

K1	The student follows laboratory safety rules and demonstrates responsibility in experimental work. The student is prepared to work individually and in a team and is capable of critical evaluation of experimental results.		
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3. TEACHING METHODS

Presentations, discussions, exercises

4. METHODS OF EXAMINATION

Colloquium, presentation

5. SCOPE

Laboratories	<p>Principles of work in a molecular biology laboratory.</p> <p>Safety regulations (BHP) and Good Laboratory Practice (GLP).</p> <p>Collection, preparation, and storage of biological material for molecular analysis.</p> <p>Basics of cell culture (aseptic techniques, culture conditions, cell passaging).</p> <p>Isolation of nucleic acids (DNA and RNA) from biological material.</p> <p>Quantitative and qualitative analysis of nucleic acids (spectrophotometry, electrophoresis).</p> <p>Reverse transcription (RT) – cDNA synthesis.</p> <p>Polymerase Chain Reaction (PCR) – principles and reaction setup.</p> <p>Real-time PCR (qPCR) – quantitative gene expression analysis.</p> <p>Analysis of qPCR results (Ct values, amplification curves, normalization).</p> <p>Protein analysis – Western blot technique (electrophoresis, transfer, detection).</p> <p>Processing and interpretation of experimental results.</p>
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6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation
W1			X			
W2			X			
U1			X		X	
K1			X		X	

7. LITERATURE

Basic literature	<p>Molecular Biology of the Cell – Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., & Walter, P. (2022). <i>Molecular Biology of the Cell</i> (7th ed.). Garland Science.</p> <p>Molecular Biology of the Gene – Watson, J. D., Baker, T. A., Bell, S. P., Gann, A., Levine, M., & Losick, R. (2014). <i>Molecular Biology of the Gene</i> (7th ed.). Pearson.</p> <p>Genomes – Brown, T. A. (2017). <i>Genomes 4</i>. Garland Science.</p> <p>Instant Notes in Molecular Biology – Turner, P. C., McLennan, A. G., Bates, A. D., & White, M. R. H. (2018). <i>Instant Notes in Molecular Biology</i> (5th ed.). CRC Press.</p>
Supplementary literature	<p>Molecular Biology of Cancer – Pecorino, L. (2021). <i>Molecular Biology of Cancer: Mechanisms, Targets, and Therapeutics</i> (4th ed.). Oxford University Press.</p> <p>National Center for Biotechnology Information – https://www.ncbi.nlm.nih.gov</p>

**8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING
OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS**

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	25
	Supervision hours	5
Student's own work	Preparation for classes	40
	Reading assignments	25
	Other (preparation for exams, tests, carrying out a project etc)	30
Total student workload		125
Number of ECTS points		5