

A COURSE SYLLABUS – DOCTORAL SCHOOL

REGARDING THE QUALIFICATION CYCLE FROM 2025/2026 TO 2028/2029.

REGARDING THE QUALIFICATION CYCLE FROM 2024/2025 TO 2027/2028.

REGARDING THE QUALIFICATION CYCLE FROM 2023/2024 TO 2026/2027.

GENERAL INFORMATION ABOUT COURSE				
Course title		OPTIONAL SPECIALISED SUBJECT: The latest trends in molecular research in science and diagnostics.		
Name of the unit running the course		Doctoral School at the University of Rzeszów		
Type of course (<i>obligatory, optional</i>)		optional specialised		
Year and semester of studies		year: I, II, III, semester: II, IV, VI		
Discipline		medical sciences		
Language of Course		Polish/English		
Name of Course coordinator		Prof. Izabela Zawlik, PhD		
Name of Course lecturer		Prof. Izabela Zawlik, PhD		
Prerequisites		In-depth knowledge of molecular research in diagnostics and science. Knowledge of English at B2 CEFR level,		
BRIEF DESCRIPTION OF COURSE (100-200 words)				
<p>The aim of the OPTIONAL SPECIALISED SUBJECT: The latest trends in molecular research in science and diagnostics is to organise doctoral students' knowledge of molecular research in various diseases, with particular emphasis on cancer. Examples of innovative technologies and research conducted in the field of understanding the molecular basis of diseases will be presented. The effects of previous research work in the personalisation of therapy and the opportunities and barriers to the development of molecular technologies will be analysed. The course also aims to consolidate knowledge, skills and social competences on achievements in the field of molecular biology.</p>				
COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES				
Learning outcome	The description of the learning outcome defined for the course	Relation to the degree programme outcomes (symbol)	Learning Format (Lectures, classes,...)	Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,...)
<i>Knowledge (NO.)</i>	<i>Knows and understands, expresses knowledge</i>			
P8S_WG1	He has extensive theoretical knowledge backed by research experience and is familiar with the current state of molecular research, which he uses to objectively assess existing applications in medicine.	P8S_WG	lecture, workshops	Colloquium, presentation, written exam
P8S_WG2	Has extensive knowledge and is familiar with the latest global scientific achievements and has knowledge of global development trends in molecular research in science and diagnostics.	P8S_WG	lecture, workshops	Colloquium, presentation, written exam
P8S_WG3	They know, understand and use terminology specific to the discipline of health sciences and related disciplines in	P8S_WG	lecture, workshops	Colloquium, presentation, written exam

	the field of molecular diagnostics in Polish and in a foreign language that is leading in the discipline.			
P8S_WK1	Has knowledge of the impact of technical and technological progress on the advancement of civilisation, including the discovery of new opportunities related to the development of personalised therapy and advances in molecular diagnostics, the use of diagnostic, prognostic and predictive markers.	P8S_WK	lecture, workshops	Colloquium, presentation, written exam
Skills (no.)	Able to			
P8S_UW1	Based on interdisciplinary knowledge in the field of medical sciences and health sciences, in the field of genetics and molecular biology, is able to formulate and set ambitious research goals related to research on the development of new personalised therapies and early molecular diagnostics. Is able to identify and improve research methods, techniques and tools, as well as draw constructive conclusions based on the results of research work.	P8S_UW	lecture, workshops	Colloquium, presentation, written exam
P8S_UW2	Based on available interdisciplinary scientific publications, they are able to identify and solve a research problem that can be used to create a new element of their academic output.	P8S_UW	lecture, workshops	Colloquium, presentation, written exam
P8S_UW3	Can use their interdisciplinary knowledge and research experience to analyse and evaluate scientific achievements, expert opinions and other studies, formulating opinions on this basis, including critical judgements.	P8S_UW	lecture, workshops	Colloquium, presentation, written exam
P8S_UK6	They are able to carry out and present scientific work, actively participate in the national and international scientific and professional community, communicating in a foreign language at level B2 of the Common European Framework of Reference for Languages.	P8S_UK	lecture, workshops	Colloquium, presentation, written exam
Social competence (no.)	Ready to			
P8S_KK3	Is ready to exchange ideas, conduct substantive scientific discussions and solve cognitive and practical problems using their knowledge of the scientifically explored discipline of health sciences in the field of molecular biology.	P8S_KK	lecture, workshops	Colloquium, presentation, written exam
LEARNING FORMAT – NUMBER OF HOURS				

Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
II, IV and VI	-	15	-	-	-	2
METHODS OF INSTRUCTION						
<ul style="list-style-type: none"> - lecture - multimedia presentation - seminar - project; - discussion. 						
COURSE CONTENT						
<p>Seminar: Substantive description of the course content:</p> <p>Topic 1 – Modern genetic and molecular methods used in scientific and diagnostic research. Modern trends in scientific research, translational medicine.</p> <p>Topic 2 – Personalised medicine. Personalised therapy in sporadic cancers – discussion based on selected examples, e.g. ovarian cancer, colorectal cancer, lung cancer and melanoma</p> <p>Topic 3 – Genetic basis of cancer transformation. Genes with high, medium and low penetrance. Genetic, diagnostic, prognostic and predictive tests. Genetic basis of metastasis.</p> <p>Topic 4 – Genetic testing in the diagnosis of hereditary cancer syndromes and their interpretation. Pathogenic genetic variants and genetic variants without clinical significance.</p> <p>Topic 5 – The use of liquid biopsy in the diagnosis of diseases.</p> <p>Topic 6 – Molecular basis of gene and cell therapy.</p> <p>Topic 7 – Disorders of epigenetic regulation of gene expression. Epigenetic therapies.</p> <p>Topic 8 – Scientific research and molecular diagnostics in haematological oncology.</p>						
COURSE ASSESSMENT CRITERIA						
<p>The examination takes place after each semester of the course.</p> <p>Examination requirements:</p> <ul style="list-style-type: none"> - active and consistent work by the doctoral student; - active participation in classes <p>The doctoral student prepares two works in the form of a multimedia presentation related to selected topics discussed in the lecture. The works should be original presentations. The works should be completed in physical form, ready for display and copied to files on the electronic platform of the remote class group.</p> <p>Very good grade:</p> <ul style="list-style-type: none"> - very high activity and engagement during classes, - visible ability to lead discussions and draw constructive conclusions, - very high substantive value of the presentation; - attendance at least 4/5 of the total number of classes; - active use of the suggested literature, expanded and deepened on one's own. <p>Good plus grade:</p> <ul style="list-style-type: none"> - high activity during classes; - high substantive value of presentations; - attendance at least 4/5 of the total number of classes; - visible satisfactory ability to lead discussions and draw conclusions; - active use of the recommended literature. 						

Good rating:

- satisfactory activity during classes;
- satisfactory content value of the presentation;
- attendance of at least 4/5 of the total number of classes;
- moderate ability to lead discussions and draw conclusions;
- satisfactory use of the proposed literature.

Satisfactory with a plus:

- moderate activity level during classes
- relatively low substantive value of the presentation;
- attendance of at least 3/5 of the total number of classes;
- moderately weak ability to lead a discussion and draw conclusions;
- moderate use of the proposed literature.

Sufficient grade:

- low level of activity during classes
- poor substantive value of the presentation;
- attendance of at least 3/5 of the total number of classes;
- poor ability to lead a discussion and draw conclusions;
- occasional use of the proposed literature.

Failing grade:

- lack of activity during classes;
- unacceptable content value of the presentation;
- lack of ability to lead a discussion and draw conclusions;
- absence for more than 3/5 of the total duration of classes;
- failure to use the proposed literature.

**TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES
– NUMBER OF HOURS AND ECTS CREDITS**

Activity	Number of hours
Scheduled course contact hours	15
Other contact hours involving the teacher (consultation hours, examinations)	1
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	44
Total number of hours	60
Total number of ECTS credits	2 ECTS

INSTRUCTIONAL MATERIALS

Compulsory literature:	<ol style="list-style-type: none"> 1. Molecular Cell Biology. Harvey Lodish, Arnold Berk, Chris A. Kaiser, Angelika Amon, Hidde Ploegh, Anthony Bretscher, Monty Krieger, Kelsey C. Martin Published: 25 June, 2016 2. Current Topics in Molecular Diagnostics and Precision Medicine, An Issue of the Clinics in Laboratory Medicine, 1st Edition. Gregory J. Tsongalis. 11/2022
Complementary literature:	1. Molecular Diagnostics: Past, Present, and Future. George P. Patrinos, Phillip B. Danielson, Wilhelm J. Ansorge. 2017

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**(1 ects credit correspondes to 25–30 hours of total workload of the doctoral student, needed to achieve the intended outcomes)*

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Date and signature of the subject instructor

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Approval of the Head of the Unit or an authorized person