

**A COURSE SYLLABUS – DOCTORAL SCHOOL**  
REGARDING THE QUALIFICATION CYCLE FROM 2024/2025 TO 2027/2028

<b>GENERAL INFORMATION ABOUT COURSE</b>				
Course title	<b>DOCTORAL SEMINAR</b>			
Name of the unit running the course	Doctoral School at University of Rzeszów			
Type of course ( <i>obligatory, optional</i> )	obligatory subject			
Year and semester of studies	year I -IV, semester: I - VII			
Discipline	biotechnology			
Language of Course	Polish/English language			
Name of Course coordinator	dr hab. Anna Lewińska, prof. UR			
Name of Course lecturer	dr hab. Anna Lewińska, prof. UR			
Prerequisites	knowledge of biochemistry, cell biology, molecular biology, materials engineering. Knowledge of the English language to be able to read scientific texts freely and conduct scientific discussions in this language.			
<b>BRIEF DESCRIPTION OF COURSE</b> (100-200 words)				
<p>The aim of the seminar is to prepare the doctoral student by the supervisor to conduct independent mature scientific activity in the future, including the identification of research problems on the basis of the available literature on biotechnology in the broad sense, including biomedicine, the appropriate formulation of hypotheses and research objectives (general and specific objectives), adequately selecting research methods and techniques to solve scientific problems, acquiring the ability to accurately draw conclusions on the basis of obtained experimental data in the laboratory, writing scientific papers and a doctoral dissertation, including in English, and presenting one's own research results (multimedia presentation) and conducting scientific discussion also in English. The seminar also aims to convince the doctoral student of the importance of establishing scientific collaborations and applying for external funds to finance their own research ideas.</p>				
<b>COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES</b>				
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,...)
<b>Knowledge (no.)</b>	knows and understands, has knowledge			
<b>P8S_WG1</b>	Professional literature on the theoretical basis of the dissertation issues, as well as current experimental data in the field of biotechnology in the broadest sense, and especially therapy-induced senescence, the application of senolytics and nanomaterials in senotherapy.		seminar	oral statement, discussion,
<b>P8S_WG2</b>	Directions of development of biotechnology research based on analysis of the latest discoveries in world biomedicine.		seminar	oral statement, discussion,
<b>P8S_WG3</b>	Conceptual grid of biotechnology and biomedicine in the broadest sense, both in		seminar	oral statement, discussion,

	Polish and English .					
<b>Skills (no.)</b>	can					
<b>P8S_UW1</b>	He is able to diagnose research problems, formulate research hypotheses and define the objectives of biotechnology research with a proposal of methodology to answer the research questions posed in the field of biomedicine and can accurately draw conclusions on the basis of experimental research.		seminar		oral statement, discussion, written works,	
<b>P8S_UW2</b>	He is able to review the literature to propose solutions to specific research problems in the field of modern biotechnology based on modern research techniques.		seminar		oral statement, discussion, written works	
<b>P8S_UW3</b>	Apply acquired theoretical knowledge to interpret experimental data with their critical evaluation.		seminar		oral statement, discussion, written works,	
<b>P8S_UK6</b>	Present one's own experimental data in the form of a multimedia presentation, critically evaluate them on the basis of the available professional literature in English, and undertake a mature scientific discussion of one's own results in the field of biomedicine.		seminar		oral statement, discussion, written works	
<b>Social competence (no.)</b>	is ready to					
<b>P8S_KK1</b>	Critically evaluate one's own scientific achievements against the background of the achievements of world biotechnology with particular emphasis on the analysis of the contribution of own research to the development of medical biotechnology.		seminar		oral statement, discussion, written works	
<b>P8S_KK3</b>	Indicate proposals for the application of the knowledge possessed in the field of medical biotechnology.		seminar		oral statement, discussion, written works	
<b>LEARNING FORMAT – NUMBER OF HOURS</b>						
Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS

I - VII	-	-	-	-	7 x 15 hrs - 105 hrs.	14
<b>METHODS OF INSTRUCTION</b>						
Scientific discussion, multimedia presentation, analysis of available literature - work with text, data analysis - selection of appropriate analytical tools, development of a scientific project						
<b>COURSE CONTENT</b>						
<b>Seminar:</b>						
<b>semester I</b>						
Topic: Analysis of the literature on the dissertation topic using available biomedical publication databases, e.g. PubMed - selection of the most relevant English-language articles and development of the theoretical foundations of the doctoral dissertation: melanoma biology and therapy						
Topic: analysis of the literature on the dissertation topic using available biomedical publication databases, e.g. PubMed - selection of the most relevant English-language articles and development of the theoretical foundations of the dissertation topic: cellular senescence and senolysis						
Topic: analysis of the literature on the dissertation topic using available biomedical publication databases, e.g. PubMed - selection of the most relevant English-language articles and development of the theoretical foundations of the dissertation: application of nanotechnology in senotherapy						
<b>semester II</b>						
Topic: Formulation of the research hypothesis and research objectives (general objectives, specific objectives)						
Topic: Critical evaluation of research techniques and methods that can be used to answer the formulated research problems - selection of an adequate research methodology: part 1						
Topic: Critical evaluation of research techniques and methods that can be used to answer the formulated research problems - selection of an adequate research methodology: part 2						
<b>semester III</b>						
Topic: Analysis of own research - graphical and statistical elaboration with their adequate interpretation: part 1						
Topic: Analysis of own research - graphical and statistical elaboration with adequate interpretation: part 2						
Topic: Analysis of own research - graphical and statistical elaboration with their adequate interpretation: part 3						
<b>semester IV</b>						
Topic: Presentation of own research - multimedia presentation with scientific discussion in English: part 1						
Topic: Presentation of own research - multimedia presentation with scientific discussion in English: part 2						
Topic: Presentation of own research - multimedia presentation along with scientific discussion in English: part 3						
<b>semester V</b>						
Topic: Development of scientific manuscripts in English: part 1						
Topic: Development of scientific manuscripts in English: part 2						
Topic: Developing scientific manuscripts in English: part 3						
<b>semester VI</b>						
Topic: Analysis of own research - graphical and statistical elaboration with adequate interpretation: part 4						
Topic: Analysis of own research - graphical and statistical elaboration with their adequate interpretation: part 5						
Topic: Presentation of own research - multimedia presentation with scientific discussion in English: part 4						
<b>semester VII</b>						
Topic: Presentation of own research - multimedia presentation with scientific discussion in English: part 5						
Topic: Final graphical and statistical processing of research results, attempted interpretation, preparation of dissertation: part 1						
Topic: Final graphical and statistical elaboration of research results, attempt of interpretation, preparation of dissertation: part 2						
<b>COURSE ASSESSMENT CRITERIA</b>						
Credit after each semester based on coursework (multimedia presentations), discussions and activity in class. Possible semester grades are: 2.0, 3.0, 3.5, 4.0, 4.5, 5.0.						
Percentage requirements for the grading scale: In order to obtain a passing grade, the conversion factor for the corresponding percentage of points obtained is applied:						

- **up to 50% - insufficient**, (the doctoral student does not make progress in scientific research, does not expand his knowledge, does not study the readings, does not participate in substantive discussion, does not fulfill his scientific duties);
- **51% - 60% - sufficient**, (the doctoral student makes negligible progress in scientific research, expands knowledge, studies primary literature, the discussion held is limited to a narrow range of substantive knowledge, fulfills basic scientific duties);
- **61% - 70% - sufficient plus**, (the doctoral student makes progress in scientific research, expands knowledge, studies basic literature, substantively participates in discussion, fulfills scientific duties);
- **71% - 80% - good**, (the doctoral student makes significant progress in scientific research, expands knowledge, studies primary and secondary literature, substantively participates in discussion, fulfills all scientific duties);
- **81% - 90% - good plus**, (the doctoral student makes significant progress in scientific research, systematically expands knowledge, studies primary and supplementary literature, substantively participates in discussion, fulfills all scientific duties);
- **91% - 100% - very good** (the doctoral student makes significant progress in scientific research, systematically expands knowledge, studies basic, complementary and beyond the obligatory literature, substantively participates in discussion, fulfills all scientific duties).

**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	<b>7 x 15 hrs - 105 hrs.</b>
Other contact hours involving the teacher (consultation hours, examinations)	<b>6</b>
Non-contact hours – student’s own work (preparation for classes or examinations, project, etc.)	<b>309</b>
<b>Total number of hours</b>	<b>420</b>
<b>Total number of ECTS credits*</b>	<b>14</b>

**INSTRUCTIONAL MATERIALS**

Compulsory literature:	PubMed biomedical journal database ( <a href="https://pubmed.ncbi.nlm.nih.gov/">https://pubmed.ncbi.nlm.nih.gov/</a> )
Complementary literature:	PubMed biomedical journal database ( <a href="https://pubmed.ncbi.nlm.nih.gov/">https://pubmed.ncbi.nlm.nih.gov/</a> )

\*(1 ECTS CREDIT CORRESPONDS TO 25 - 30 HOURS OF THE TOTAL WORKLOAD OF A DOCTORAL STUDENT, NEEDED TO ACHIEVE THE ESTABLISHED EFFECTS).

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Date and signature of the Course lecturer

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Approved by the Head of the Department or an authorised person