

Course title:	Radiobiology
Course title in Polish:	Radiobiologia
Course for discipline:	biology

Semester:	4	Status of course:	faculty	Language:	english
Academic year:	2026/27	Catalog number:	72/2025/26		

Coordinator of course:	dr Kamila Maliszewska-Olejniczak
Lecturer od course:	dr Kamila Maliszewska-Olejniczak
Executing unit:	KFB
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	<p>Purpose: To familiarize students with the basic laws and modern biophysical methods that allow them to understand the mechanisms of phenomena observed in living organisms related to ionizing radiation. To impart the ability to use radiobiological techniques. Formation of skills in the use of software for the analysis of radiobiological data, preparation of graphic interpretation of data.</p> <p>Scope of lectures: History of radiobiology. Fundamentals of radiobiology. Biological dosimetry. Basic radiobiology techniques. Cellular response to DNA damage, DNA repair systems. Types of radiation and biological effects associated with radiation. Ionizing radiation and human health, hormesis hypothesis, nuclear accidents and disasters. Anticancer therapies using ionizing radiation in Poland and around the world. Model organisms in radiobiology. NASA space research.</p> <p>Exercises: Basic radiobiology tests - clonogenic and comet assay.</p>
Didactic form, number of hours:	Lectures - 6 hours; practical classes - 9 hours
Teaching methods:	Multimedia presentations, demonstrations, simulations, case studies, analysis ai interpretation of sample experiments.
Limit of people in the group:	40 - lectures, 20 - practical classes

Learning outcomes

KNOWLEDGE - the graduate knows and understands:	SKILLS - the graduate is able to:	COMPETENCES - the graduate is ready to:
To the extent enabling to revise the existing pradisgms in the field/discipline - the world achievements, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievements in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research
The method of verification of learning outcomes:	Credit for the course on the basis of the project.	
Form of documentation of achieved learning outcomes:	The project in the form of a report including data analysis.	
Elements and weights of the final grade:	Final evaluation-report of the completed project 100%.	
Place of the course:	Lectures - teaching room KFB 0/23 bldg. 34; Exercises - computer room P/7 bldg. 37	

Basic and supplementary literature

<ol style="list-style-type: none"> INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Biology: A Handbook for Teachers and Students, Training Course Series No. 42, IAEA, Vienna, 2010 Brzozowska B, Gałeczki M, Tartas A, Ginter J, Kaźmierczak U, Lundholm L. Freeware tool for analysing numbers and sizes of cell colonies. Radiat Environ Biophys, 2019 Suchorska W, Radiobiology: basic mathematical models describing cell survival. Scientific Letters WCO, Letters in Oncology Science 2018;15(1):59-65. <p>Literatura uzupełniająca:</p> <ol style="list-style-type: none"> Maliszewska-Olejniczak et al., Immunofluorescence Imaging of DNA Damage and Repair Foci in Human Colon Cancer Cells. J Vis Exp. 2020 Maliszewska-Olejniczak et al., Molecular Mechanisms of Specific Cellular DNA Damage Response and Repair Induced by the Mixed Radiation Field During Boron Neutron Capture Therapy. Front Oncol. 2021
Comments:

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	25 h
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Learning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:

Symbol:	Learning outcomes:	8 level NQF
SD1_KW01	To the extent enabling to revise the existing pradisgms in the field/discipline - the world achievements, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievements in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR