Course title:	Electrophysiology
Course title in Polish:	Elektrofizjologia
Course for discipline:	biology, veterinary medicine, agriculture and horticulture, zootechnics and fisheries, health

Semester:	5	**Status of course:**	faculty	**Language:**	english
Academic year:		**Catalog number:**			

Coordinator of course:	Prof. Dr hab. Piotr Bednarczyk
Lecturer od course:	Prof. Dr hab. Piotr Bednarczyk
Executing unit:	Department of Physics and Biophysics, Institute of Biology, Warsaw University of Life Sciences
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	Goal: To familiarize students with the basic laws and modern biophysical methods that allow them to understand the mechanisms of phenomena observed in living organisms, necessary for further education in specialized natural science subjects. Providing the ability to use electrophysiological techniques to study the transport of ions across biological membranes in animal and plant models. Developing skills in using software for analyzing electrophysiological data and preparing graphic interpretations of data. Scope of lectures: History of electrophysiology. Theoretical basis for the transport of small and large molecules across biological membranes. Experimental models (tissues, cell cultures). Techniques for measuring ion transport. Construction of experimental sets used in electrophysiology. Micropipette forge. Analysis of electrophysiological data and their interpretation.
Didactic form, number of hours:	Lecture 4 hours, Exercises 6 hours: Sum 10 h
Teaching methods:	Multimedia presentations, shows, simulations, case studies, analysis and interpretation of exemplary experiences
Limit of people in the group:	16

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 pradigms in the field/discipline - the world achievments, 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 achievments 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:	Project in the form of a report containing data analysis.
Form of documentation of achieved learning outcomes:	Final project
Elements and weights of the final grade:	Final project - 100%
Place of the course:	Department of Physics and Biophysics, Institute of Biology, SGGW 0/23 (building 34) and P7 (building 37)

Basic and supplementary literature

Basis literature:
1. Jay Nadeau, Introduction to Experimental Biophysics, CRC Press, 2012
2. Franklin Bretschneider, Jan R. de Weille, Introduction to Electrophysiological Methods and Instrumentation, Academic Press, 2006
3. Edited by B. Sakman and E. Neher, Single-Channel Recordings, Plenum Press, 1996
4. Bertil Hille, Ion Channels of Excitable Membranes, Sinauer Associates INC., 1984
5. K. Dołowy, A. Szewczyk, S. Pikuła, Błony biologiczne, Śląsk, 2001

Supplementary literature:
1. JoVE Science Education Database. Neuroscience. Patch Clamp Electrophysiology. JoVE, Cambridge, MA, (2019).
2. Fizyka wokół nas. Paul G. Hewitt. Wydawnictwo Naukowe PWN, Warszawa, 2001
3. https://www.moleculardevices.com/applications/patch-clamp-electrophysiology#gref

Comments:	

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	20

Leraning 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 pradigms in the field/discipline - the world achievments, 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 achievments 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