Course title:	Biochemical and Real-Time PCR analyses: practical aspects
Course title in Polish:	Praktyka wykonywania analiz biochemicznych oraz analiz Real-Time PCR
Course for discipline:	animal science and fisheries, biological sciences

Semester:	7	**Status of course:**	faculty	**Language:**	english
Academic year:		**Catalog number:**			

Coordinator of course:	Magdalena Fajkowska, Ph.D.
Lecturer od course:	Magdalena Fajkowska, Ph.D.; Hubert Szudrowicz, Ph.D.
Executing unit:	Faculty of Animal Breeding, Bioengineering and Conservation, Department of Ichthyology and Biotechnology in Aqu
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	The aim of the course is to practically familiarize PhD students with the method of relative gene expression Real-Time PCR and quantitative and kinetic spectrophotometric methods used in the analysis of biological material. The topics of the exercises include discussion of individual stages of Real-Time PCR and UV-Vis spectrophotometric techniques, laboratory work and analysis of the results obtained after the experiment. In addition, the exercises will include a discussion of key moments of analyses, common errors and various possibilities of presenting results depending on the experiment performed.
Didactic form, number of hours:	Laboratory classes, number of hours: 10
Teaching methods:	Lecture, instructions for performing analyses, team work, discussion of the results, solving problems in calculations, consultations
Limit of people in the group:	12

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:	Assessment in the form of a test
Form of documentation of achieved learning outcomes:	Test results
Elements and weights of the final grade:	100% - test results
Place of the course:	Laboratories of the Department of Ichthyology and Biotechnology in Aquaculture

Basic and supplementary literature

1. Pfaffl, M. W. (2012). Quantification strategies in real-time polymerase chain reaction. Quantitative real-time PCR Appl Microbiol, 53-62.
2. Huggett, J. F., Foy, C. A., Benes, V., Emslie, K., Garson, J. A., Haynes, R., ... & Bustin, S. A. (2013). The Digital MIQE Guidelines: M inimum I nformation for Publication of Q uantitative Digital PCR E xperiments. Clinical chemistry, 59(6), 892-902.
3. Palińska-Żarska, K., Król, J., Woźny, M., Kamaszewski, M., Szudrowicz, H., Wiechetek, W., Brzuzan, P., Fopp-Bayat, D. and Żarski, D., 2021. Domestication affected stress and immune response markers in Perca fluviatilis in the early larval stage. Fish & Shellfish Immunology, 114, pp.184-198.
4. Palińska-Żarska, K., Woźny, M., Kamaszewski, M., Szudrowicz, H., Brzuzan, P. and Żarski, D., 2020. Domestication process modifies digestion ability in larvae of Eurasian perch (Perca fluviatilis), a freshwater Teleostei. Scientific reports, 10(1), pp.1-12.

Comments:	

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

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