SYLLABUS

Name of the course (as specified in the approved curriculum) Module 9 – Aquaculture and Its Impact on Environment			Number of ECTS credits 5
Name of the course in Polish Moduł 9 – Akwakultura i jej wpływ na środowisko			
Unit providing the course Department of Zoology			
Course co-ordinator dr inż. Mateusz Rawski			
Field of study Animal Production Management	Level II – master studies	Profile Academic-general	Semester 3

TYPE OF CLASSES AND COURSE LOAD
(Classes with teacher and student's own work)

Mode of studies: full-time		Mode of studies: part-time	
- lectures	15	- lectures	-
- classes	30	- classes	-
- field classes	10	- field classes	-
- labs	0	- labs	-
- consultations	5	- consultations	-
- student's own work	60	- student's own work	-
- others	5	- others	-
Total number of hours:	125	Total number of hours:	-

OBJECTIVE OF THE COURSE

Production and nutrition of selected freshwater fish species kept in aquaculture conditions. Technological issues in fish farming in recirculating aquaculture systems (RAS). The impact of intensive fish production on the natural environment.

TEACHING METHODS

Lectures: presentations using multimedia equipment.
Classes: supported by multimedia presentation, laboratory exercises, discussion, team-oriented tasks, and written assignments.
Preparation of the project verified by the teacher.
Field classes are conducted at the Experimental Station for Feed Production Technology and Aquaculture in Muchocin.

	Course learning outcomes	The reference to the study field learning outcomes
Knowledge	O1: the advanced methodology used in aquaculture, as well as the rules of processing and marketing of animal origin products; O2: issues related to the behaviour and welfare of aquatic animals, including animal-environment interaction and its implications on the ecosystems, biodiversity, and environmental pollution, as well as EU legal regulations on ecological aquaculture farming; O3: the advanced aspects of anatomy and physiology of selected fish species; O4: in an advanced degree, on multi-dimensional fish nutrition and its impact on the environment and animal welfare, including physiology, metabolic disorders prevention, methods of monitoring behaviour, as well as the latest technologies and nutritional techniques; O5: the impact of various management practices on fish health, productivity, and profitability of aquaculture farming;	AP2A_W02 AP2A_W09 AP2A_W11 AP2A_W13

Skills	O6: search, critically analyze, and interpret information from literature, databases and other sources related to aquaculture, present this knowledge and communicate with various stakeholders in oral, written, and graphical form; O7: fluently use scientific literature in aquaculture and discuss these topics with fish farmers using foreign congress language according to the requirements set out for the B2+ level of the Common European Framework of Reference for Languages, with particular reference to vocabulary in the field of aquaculture; O8: apply modern techniques and technologies in aquaculture, set up, use, and manage quality assurance systems in fish farming; O9: examine, using microscopy, and describe the histological fish gastrointestinal tract sections applying professional nomenclature from the field of anatomy, physiology, and histology; O10: organize the work of the fish farmers, arrange aquafeed for different species of fish, properly fed fish, lead production of aquafeeds of high quality, and their distribution according to the requirements of the Feed Law;	AP2A_U01 AP2A_U02 AP2A_U05
Social competences	O11: lifelong learning and updating the cognitive skills, as well as to inspire and organize the learning process of other people; to demonstrate a creative attitude; to think and act in an entrepreneurial way; O12: take the ethical and social responsibility for the effects of the activities in aquaculture production with particular reference to domestic fish species; O13: assess the risk of the business impact, personal threats, and the safety of colleagues and the environment; O14: take the ethical and social responsibility for the effects of the production of high-quality food, and undertake the entrepreneurial and creative actions in this respect;	AP2A_K01 AP2A_K03 AP2A_K04 AP2A_K05

Methods for verifying learning outcomes	Symbols of course learning outcomes
Lectures – written test	O1 – O14
Practical classes – individual tasks, discussions	
Phased project	

TEACHING CONTENTS

Lectures:

Inland aquaculture: development perspectives, history, and current state of production; scientific knowledge and advancements. An analysis of technologies and systems used in the rearing and breeding of selected aquatic organisms. Water pollution and eutrophication as significant issues and impacts in pond culture. Principles of conservation aquaculture, fish stocking, restocking, and the protection of wild fish populations.

Classes:

Design and maintenance of aquaculture facilities. Assessment of chemical and physical water quality, including a review of testing methods and a discussion of results. The influence of aquaculture practices on aquatic ecosystems, including mangrove forests and cage systems.

Filtration methods and water conditioning techniques in recirculating systems. Strategies for mitigating the negative environmental impacts of aquaculture.

Forms and criteria of completing the course	Percentage of a final grade
Lectures: Attendance, a multiple-choice test.	50%
Classes: Attendance, individual tasks assigned by the tutors, phased project.	50%

LITERATURE LIST

Core literature

T.V.R. Pillay, M.N. Kutty (1997). Aquaculture Principles and Practices. Blackwell Publishing.
Available online: https://www.academia.edu/38025550/AQUACULTURE_PRINCIPLES_AND_PRACTICES
Hepher B. (1988). Nutrition of Pond Fishes. Cambridge University Press.
C.D. Webster, C.E. Lim (2002). Nutrient Requirements and Feeding of Finfish for Aquaculture. CABI Publishing.

Additional sources

C. E. Nash. The history of aquaculture. Blackwell Publishing Ltd. USA, 2011. Available online:
https://bumtca.com.ua/wp-content/uploads/Colin_Nash_The_History_of_AquacultureBookFi.org-2_copy_copy-1.pdf
Williot, P., Nonnotte, G., & Chebanov, M. (Eds.). (2018). *The Siberian Sturgeon (Acipenser baerii, Brandt, 1869) Volume 1-Biology*. Springer International Publishing.
Williot, P., Nonnotte, G., & Chebanov, M. (Eds.). (2018). *The Siberian Sturgeon (Acipenser baerii, Brandt, 1869) Volume 2-Farming*. Springer International Publishing.
Review articles recommended by the teachers related to aquaculture.