

ANGOL NYELVŰ

COURSE DESCRIPTION

Title:	<i>Central European pond aquaculture</i>
Neptun code:	<i>AKVKB091N</i>
Lectures/Practices:	<i>1</i>
Credit:	<i>6</i>
Program:	<i>PhD</i>
Type:	<i>Diurnal/correspondence</i>
Requirements:	<i>None</i>
Semester:	<i>Spring/fall</i>
Language:	<i>English</i>
Pre-requirements:	<i>None</i>
Institute/Department:	<i>MATE Insitute of Aquaculture and Environmental Safety</i>
Course leader:	<i>Ákos Horváth PhD, DSc</i>
Description: General introduction into aquaculture. Position of pond aquaculture in global aquaculture production. Hydrobiological principles of pond aquaculture. Annual and production cycles of pond aquaculture. Species farmed in Central European pond aquaculture – cyprinids, predator species, nuisance species. Profitability of pond aquaculture.	
Aims: The students receive a comprehensive introduction of the system, characteristics and challenges of pond fish farming in Central Europe.	
Syllabus: <ol style="list-style-type: none"> 1. Concepts of aquaculture and fisheries. 2. The global status of aquaculture. 3. Pond and intensive fish farming. 4. History of pond fish farming. 5. Hydrobiological principles of pond fish farming. 6. Pond farming production cycle: from propagation to market-sized fish. 7. Farming of non-predatory fish: common carp. 8. Farming of non-predatory fish: other species (bighead carp, silver carp, grass carp). 9. Predatory fish in pond farming: zander, pike, and catfish. 10. Secondary fish species raised in pond farms. 11. Secondary fish species occurring in pond farms and their control. 12. Profitability of pond fish production. 13. Alternative uses of pond farms: angling and ecosystem services. 	
Grading: Personal presence at classes, completion of the online exam.	
References: <ul style="list-style-type: none"> • Class notes, • Class handouts available at the elearning system 	

COURSE DESCRIPTION

Cím:	<i>Fish Genetics and Genomics</i>
Tárgykód:	SDI....
Heti óraszám:	<i>Blokkosítva 20 óra/ 20 lessons in blocks</i>
Kredit:	4
Szak(ok)/ típus:	PhD
Tagozat:	<u>nappali/levelező</u>
Követelmény:	nincs
Meghirdetés féléve:	<u>tavaszi/ősz</u>
Nyelve:	Angol/ English
Előzetes követelmény(ek):	Basic genetic
Oktató Intézet/tanszék(ek):	Department of Molecular Ecology, Institute of Aquaculture and Environmental Safety
Tárgyfelelős:	<i>Dr. Kovács Balázs</i> <i>tudományos főmunkatárs/ senior scientist</i>
<p>Tantárgyleírás:</p> <p>The genetic and genomic characteristics of fish and their various taxonomic groups. The results of conventional fish farming methods, breeding, selection, genetic manipulation and hybridization methods. The practical results of applicable molecular genetic and genomic methods and their limitations.</p> <p>1.</p>	
<p>Oktatás célja:</p> <p>The aim of the course is providing Insite knowledge in the field of fish genetics, genomics research and breeding.</p>	
<p>Tantárgy tartalma:</p> <ol style="list-style-type: none"> 1. Genomic features of fish evolution 2. Selective breeding and its results and possibilities 3. Molecular genetic methods in aquaculture 4. Practical application of genetic markers 5. Population genetic results 6. Genome manipulation 7. Fish genomic research 8. Consequences of genome duplications 9. Transgenesis in aquaculture 10. Current scientific trends 	
<p>Számonkérési és értékelési rendszere:</p> <p>Oral examination at the semester-end, which is evaluated on a 5-grade scale.</p>	
<p>Jegyzet, tankönyv, felhasználható irodalom:</p> <p>The used demonstration materials and actual scientific publications</p>	

COURSE DESCRIPTION

Title:	<i>Fish physiology</i>
Neptun code:	
Lectures/Practices:	<i>2</i>
Credit:	<i>6</i>
Program:	<i>PhD</i>
Type:	<i>full-time / part-time</i>
Requirements:	<i>none</i>
Semester:	<i>spring</i>
Language:	<i>English</i>
Pre-requirements:	<i>none</i>
Institute/Department:	<i>Institute of Physiology and Nutrition</i>
Course leader:	<i>Dr. Mézes Miklós MHAS</i>
Description: In this course, students will learn about the major physiological processes in fish, with a particular focus on those function or regulation differs from terrestrial animals. The course primarily addresses the specific features of the neuroendocrine system, and central regulation of reproductive processes. The digestive processes and their regulation are discussed in detail, with particular attention to different feeding habits.	
Aims: The aim of this course is to provide a detailed overview of the major physiological processes in fish, as these differ significantly from those of terrestrial animals—partly due to their aquatic lifestyle and partly due to evolutionary divergence	
Syllabus: <ol style="list-style-type: none"> 1. Physiological functions of skin. Pigmentation and structure of chromatophores. 2. Basic principles of muscle physiology. The skeletal and smooth muscle systems, and regulation of muscle contraction. 3. Composition of the fish bone. Mechanism and regulation of calcium and phosphorus metabolism. Composition of blood, formation of blood cells and its regulation. Blood circulation, regulation of blood pressure and distribution of blood. 4. Physiology of heart. Blood pressure and its regulation. 5. Physiology of the gas exchange mechanisms. Factors affecting gas exchange, 6. Regulation of the excretory function of kidney, bile, spleen, gill and skin. 7. Function of swim bladder and its regulation. 8. Hypothalamus – pituitary gland system. 9. Hormones of the thyroid gland, endocrine pancreas and their regulatory functions. 10. Endocrine functions of the Stannius bodies, suprarenal organ, ultimobranchial gland, caudal neurosecretory system, renin-angiotensin system and the pineal gland. 11. Hormones of the gastrointestinal system, and regulation of their release. 12. Structure and function of the sensory organs of fishes and their regulation. 13. Digestive physiology of fishes. 	
Grading: Attend the lectures, and online written exam.	
References: Lecture materials.	

COURSE DESCRIPTION

Title:	<i>Intensive aquaculture</i>
Neptun code:	
Lectures/Practices:	2
Credit:	6
Program:	<i>PhD</i>
Type:	<i>Full time / Part time</i>
Requirements:	-
Semester:	<i>Spring/fall</i>
Language:	<i>English</i>
Pre-requirements:	-
Institute/Department:	<i>Institute of Aquaculture and Environmental Safety</i>
Course leader:	<i>Balázs Kucska PhD</i>
Description: During the course, sustainability issues will be discussed, including the carbon footprint of different production systems, as well as their water, energy, and other resource requirements. Using selected fish species as examples, modern techniques for fish reproduction, larval rearing, and market-size fish production will be presented. Students will become familiar with the operating principles of modern water-saving fish production systems, including RAS (recirculating aquaculture systems), as well as combined intensive–extensive fish production methods. The course will also cover potential applications of digitalization in aquaculture.	
Aims: The aim is to provide students with a comprehensive overview of global trends in aquaculture production, sustainability issues, and the technologies applied in intensive fish production systems.	
Syllabus: <ol style="list-style-type: none"> 1. Global Aquaculture Production I (major species and production systems) 2. Global Aquaculture Production II (resource requirements and challenges) 3. Specific Characteristics of EU Aquaculture 4. Overview of Hungarian Fish Farming (opportunities for intensification) 5. Water and Carbon Footprints of Fish Production 6. Fish Production in Recirculating Aquaculture Systems I 7. Fish Production in Recirculating Aquaculture Systems II 8. Fish Production in Recirculating Aquaculture Systems III 9. Precision Techniques in Fish Reproduction 10. Fish Nutrition in Intensive Production Systems 11. Combined Intensive–Extensive Fish Production Systems 12. Opportunities for Digitalization in Aquaculture 	
Grading: attendance at the course, either in person or online, and successful completion of an oral examination.	
References: <ul style="list-style-type: none"> - Dionysis D. Bochtis, Claus Grøn Sørensen, Spyros Fountas, Vasileios Moysiadis, Panos M. Pardalos (szerk.) 2022. Information and Communication Technologies for Agriculture—Theme III: Decision. Springer Nature Switzerland AG Hardcover ISBN 978-3-030-84151-5 - Michael B. Timmons; James M. Ebeling (szerk.) 2013. Recirculating Aquaculture, Ithaca Publishing Company, LLC, ISBN 13: 9780971264656 	

COURSE DESCRIPTION

Title:	<i>Intensive fish culture in ponds</i>
Neptun code:	GOD-HU-N=PHD=EL00
Lectures/Practices:	2+0
Credit:	8
Program:	<i>PhD</i>
Type:	<i>full-time programme</i>
Requirements:	-
Semester:	<i>fall semester</i>
Language:	<i>English</i>
Pre-requirements:	-
Institute/Department:	<i>Institute of Aquaculture and Environmental Safety, Department of Aquaculture</i>
Course leader:	<i>Dr. Szabó Tamás</i>
Descriptions: During this course the following topics will be discussed: the origin, raising and domestication of common carp, Extensive, semi-intensive and intensive culture; The use of natural food developing in pond; The choice of fish species and age groups; The rational stocking rate for rearing ponds; The control of invading aquatic vegetation, restoration of pond bottoms, liming and fertilizers; Feeding of cultivated fish; Harvesting: draining the ponds, sorting out and storage of fish; Wintering.	
Aims: The primary objective of lecture will be to review the background and technology for the intensive production of fish in earthen ponds	
Syllabus: <ol style="list-style-type: none"> 1. Fish breeding in earth ponds. Pond types: production and wintering ponds. Production pond types: ponds on land areas (ponds with round dams) and ponds on hilly areas (with dams blocking valleys) 2. Pond culture: full range and segment range production. Two- and three-year-long production 3. Major species produced in earthen ponds: carp and carnivore species 4. Annual cycle of carp breeding: differences between age groups (nursing of fingerlings and second-year-olds, production of market fish) 5. Propagation techniques 1. 6. Propagation techniques 2. 7. Advanced fry rearing 8. Pond preparation: tasks and works in autumn and spring. Flooding of ponds. Nutrient supply of water- fertilization of fish ponds. 9. Stocking of fish ponds. Feeding of fish. 10. Oxygen supply. Regular fishing, checking the weight gain of fish. Summer fishing. 11. Final fishing in autumn, yield collection, transportation 12. Wintering of fish 13. Oral examination 	
Grading: Oral examination	

References:

László Horváth, Gizella Tamas, Chris Seagrave, 2002. Carp and Pond Fish Culture. Wiley-Blackwell, 188 pages

COURSE DESCRIPTION

Title:	<i>Conservation genetics</i>
Neptun code:	
Lectures/Practices:	
Credit:	6
Program:	<i>PhD</i>
Type:	
Requirements:	<i>none</i>
Semester:	<i>spring/autumn</i>
Language:	<i>Hungarian/English</i>
Pre-requirements:	<i>none</i>
Institute/Department:	<i>Institute of Aquaculture and Environmental Safety</i>
Course leader:	<i>Dr. Tamás Molnár PhD</i>
Description: In this course, students will learn about methods for preserving the genetic diversity of major groups of domestic animals and the biological principles underlying these methods, as well as the mechanisms of domestication and the effects that occur during this process. During the laboratory session, students will gain an overview of the effects of selection through several examples, illustrated using molecular genetic methods.	
Aims: Students will gain a comprehensive understanding of the methods for conserving and measuring genetic diversity, as well as for tracking its changes over time.	
Syllabus: <ol style="list-style-type: none"> 1. Domestication. 2. Measurement of genetic variability—genetic markers 3. Search for genetic markers, whole-genome analyses. 4. Natural selection. 5. Artificial selection. 6. Programs for the conservation of native domestic animal breeds. 7. Conservation genetics in non-domesticated species 	
Grading: Attendance at the course and passing the exam.	
References: <ul style="list-style-type: none"> - lesson outlines - Szalay I. (szerk.) 2017. Génbanki kutatások régi haszonállataink védelmében. Műhelytanulmányok a tudományos génmegőrzés tárgyköréből, Mezőgazda Kiadó; Haszonállat-génmegőrzési Központ, Gödöllő - Mihók S. (szerk.) 2006. Génmegőrzés. Debreceni Egyetem Agrártudományi Centrum, Debrecen - Jeffrey K. Conner, Daniel L. Hartl 2004. A Primer of Ecological Genetics 1st Ed. Sinauer Associates, Sunderland, MA, 304 pp 	