



<i>Field of study</i>		Aquaculture and Fisheries				
<i>Mode of study</i>		stationary	<i>Level</i>	first cycle		
<i>Graduate's qualification</i>		inżynier				
<i>Fields of science</i>		agricultural sciences				
<i>Disciplines of science</i>		animal science and fisheries (100%)				
<i>Educational profile</i>		general academic				
<i>Module</i>						
<i>Course unit</i>		<b>Fish biology and introduction to fish ecology</b>				
<i>Code</i>		WNOZIR/AQF/S1/				
<i>Field of specialisation</i>						
<i>Administering faculty</i>		Department of Commodity Science, Quality Assessment, Process Engineering and Human Nutrition				
<i>ECTS</i>		4.0	<i>ECTS (forms)</i>	4.0		
<i>Form of course credit</i>		examination	<i>Language</i>	english		
<i>Electives</i>			<i>Elective group</i>			
<i>Form of instruction</i>	<i>Cod</i>	<i>Semester</i>	<i>Hours</i>	<i>ECTS</i>	<i>Weight</i>	<i>Credit</i>
project course	P	1	30	2.0	0.50	credits
lecture	W	1	30	2.0	0.50	examination
<i>Leading teacher</i>		Czerniejewski Przemysław (Przemyslaw.Czerniejewski@zut.edu.pl)				
<i>Other teachers</i>						
<i>Prerequisites</i>						
<i>W-1</i>	Student should have a basic knowledge of hydrobiology, fish anatomy, hydrochemistry					
<i>Module/course unit objectives</i>						
<i>C-1</i>	Fish biology and introduction to fish ecology is an introductory course designed to provide an overview on the diversity of fishes, namely on their ecology and evolutionary relationships. We'll discuss and conduct hands-on examinations of the anatomy, systematics, behavior, and trends in diversity of extinct and extant fishes — from jawless fishes like hagfish and lampreys, to jawed animals like cartilaginous sharks and rays, and on to the most diverse group of fishes: the bony fishes and teleosts. This survey will impart students with the basic rules governing where we find certain fishes, from the freshwaters of Amazonia onto mangrove swamps and coral reefs in the Indo-Pacific, and focusing especially on the fishes of the Salish Sea in lab. Students will leave with an understanding of the history of fishes, the basics of their identification and relationships, and a global perspective on modern fish diversity and biogeography.					
<i>Course content divided into various forms of instruction</i>						<i>Number of hours</i>
<i>T-P-1</i>	Fish age on scales, otholiths and other hard structures					5
<i>T-P-2</i>	Growth rate of fish					5
<i>T-P-3</i>	Condition of fish					5
<i>T-P-4</i>	Fish diet					5
<i>T-P-5</i>	Reproduction of fish					5
<i>T-P-6</i>	Indexes of biodiversity of fish					5
<i>T-W-1</i>	Diversity of Fishes					2
<i>T-W-2</i>	Fishes and their Habitats					4
<i>T-W-3</i>	Food and Feeding					4
<i>T-W-4</i>	Reproduction and Life Histories					4
<i>T-W-5</i>	Behaviour					3
<i>T-W-6</i>	Envirenmental biology of fishes					4
<i>T-W-7</i>	Fish migration					4
<i>T-W-8</i>	Fish condition					3
<i>T-W-9</i>	Ecology of fishes					2
<i>Student workload - forms of activity</i>						<i>Number of hours</i>
<i>A-P-1</i>	workshops					30
<i>A-P-2</i>	Own work					6
<i>A-P-3</i>	tests					4
<i>A-P-4</i>	Work at laboratory					20



Student workload - forms of activity		Number of hours
A-W-1	Lectures	30
A-W-2	Field observations	30

Teaching methods / tools	
M-1	Lecture, workshops, work in laboratory

Evaluation methods (F - progressive, P - final)		
S-1	F	Tests
S-2	P	Project evaluation

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to Learning Outcomes for qualifications at PQF 6, 7 or 8	Reference to learning outcomes for qualifications at level 6 or 7 that enable acquiring engineering competences	Course objectives	Course content	Teaching methods	Evaluation methods
<b>Knowledge</b>							
AQF_1A_C02_W01 Students have a knowledge about fish diets, condition, growth rate, fish population parameters	AQF_1A_W02 AQF_1A_W08	P6S_WG	P6S_WG	C-1	T-P-1 T-W-3 T-P-2 T-W-4 T-P-3 T-W-5 T-P-4 T-W-8 T-P-5	M-1	S-1 S-2
AQF_1A_C02_W02 Student have a knowledge about biodiversity, behaviour, fish migration, habitats of fish	AQF_1A_W02 AQF_1A_W05	P6S_WG	P6S_WG	C-1	T-P-6 T-W-6 T-W-1 T-W-7 T-W-2 T-W-9 T-W-5	M-1	S-1 S-2
<b>Skills</b>							
AQF_1A_C02_U01 The ability to make artificial fish spawning, estimation of the condition, fertility, age and growth of fish	AQF_1A_U09 AQF_1A_U14 AQF_1A_U21	P6S_UW	P6S_UW	C-1	T-P-1 T-W-3 T-P-2 T-W-4 T-P-3 T-W-6 T-P-4 T-W-8 T-P-5 T-W-9	M-1	S-1 S-2
<b>Social competences</b>							
AQF_1A_C02_K01 the student is competent and able to work as a biologist and fish ecologist	AQF_1A_K01 AQF_1A_K02 AQF_1A_K03 AQF_1A_K04 AQF_1A_K05 AQF_1A_K06	P6S_KK P6S_KO P6S_KR		C-1	T-P-1 T-W-3 T-P-2 T-W-4 T-P-3 T-W-5 T-P-4 T-W-6 T-P-5 T-W-7 T-P-6 T-W-8 T-W-1 T-W-8 T-W-2 T-W-9	M-1	S-1 S-2
AQF_1A_C02_K02 the student has the ability to apply knowledge in practice	AQF_1A_K01 AQF_1A_K03	P6S_KK P6S_KO P6S_KR		C-1	T-P-1 T-W-3 T-P-2 T-W-4 T-P-3 T-W-5 T-P-4 T-W-6 T-P-5 T-W-7 T-P-6 T-W-8 T-W-1 T-W-8 T-W-2 T-W-9	M-1	S-1 S-2

Outcomes	Grade	Evaluation criterion
<b>Knowledge</b>		
AQF_1A_C02_W01	2,0	the student hasnot knowledge at a basic level in the field of fish biology and ecology
	3,0	the student has knowledge at a basic level in the field of fish biology and ecology
	3,5	the student has knowledge at a upper basic level in the field of fish biology and ecology
	4,0	the student has knowledge at a good level in the field of fish biology and ecology
	4,5	the student has knowledge at a upper good level in the field of fish biology and ecology
	5,0	the student has knowledge at a very good level in the field of fish biology and ecology
AQF_1A_C02_W02	2,0	Students have not a knowledge of biology and ecology of fish (at the primary level)
	3,0	Students have a knowledge of biology and ecology of fish (at the primary level)
	3,5	Students have a knowledge of biology and ecology of fish (at the upper than primary level)
	4,0	Students have a knowledge of biology and ecology of fish (at good level)
	4,5	Students have a knowledge of biology and ecology of fish (upper than good level)
	5,0	Students have a knowledge of biology and ecology of fish (at very good level)
<b>Skills</b>		
AQF_1A_C02_U01	2,0	the student has not knowledge at a basic level in the field of fish biology and ecology
	3,0	the student has knowledge and is able to use it at a basic level in the field of fish biology and ecology
	3,5	the student has knowledge and is able to use it at a upper basic level in the field of fish biology and ecology
	4,0	the student has knowledge and is able to use it at a good level in the field of fish biology and ecology
	4,5	the student has knowledge and is able to use it at a upper good level in the field of fish biology and ecology
	5,0	the student has knowledge and is able to use it at a very good level in the field of fish biology and ecology



*Other social competences*

AQF_1A_C02_K01	2,0	the student is incompetent and able to work as a biologist and fish ecologist
	3,0	the student is competent and able to work as a biologist and fish ecologist at basic level
	3,5	the student is competent and able to work as a biologist and fish ecologist at upper than basic level
	4,0	the student is competent and able to work as a biologist and fish ecologist at good level
	4,5	the student is competent and able to work as a biologist and fish ecologist at upper than good level
	5,0	the student is competent and able to work as a biologist and fish ecologist at very good level
AQF_1A_C02_K02	2,0	The student has not ability to apply knowledge in practice in basic level
	3,0	The student has ability to apply knowledge in practice in basic level
	3,5	The student has ability to apply knowledge in practice in upper than basic level
	4,0	The student has ability to apply knowledge in practice in good level
	4,5	The student has ability to apply knowledge in practice in upper than good level
	5,0	The student has ability to apply knowledge in practice in very good level

*Required reading*

1. Hard J. B., Reynolds J. D., Handbook of fish biology and fisheries, Blackwell, 2002
2. Bone Q., Moore R. H., Biology of Fishes, Taylor and Francis, 2008
3. Piska R. Sh., Fish Biology and Ecology Theory, 2011
4. Jakobsen T., Fogarty M., Megrey B., Moksness R., Fish reproduction biology, Wiley-Blackwell, 2009

*Supplementary reading*

1. Begenal, Methods for Assessment of Fish Production in Freshwaters, Blackwell Scientific Publications, Oxford, 1978