



<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>		Aquaculture				
<i>Code</i>		WNOZIR/AQF/S1/				
<i>Field of specialisation</i>						
<i>Administering faculty</i>		Department of Aquatic Bioengineering and Aquaculture				
<i>ECTS</i>		6.0	<i>ECTS (forms)</i>	6.0		
<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	4	30	3.0	0.50	credits
lecture	W	4	30	3.0	0.50	examination
<i>Leading teacher</i>		Sadowski Jacek (Jacek.Sadowski@zut.edu.pl)				
<i>Other teachers</i>		Biernaczyk Marcin (Marcin.Biernaczyk@zut.edu.pl), Sadowski Jacek (Jacek.Sadowski@zut.edu.pl)				
<i>Prerequisites</i>						
<i>W-1</i>	students taking classes in the basics of aquaculture should have basic knowledge in the field of environmental biology including ichthyology, hydrochemistry, biochemistry, body physiology, mathematics and biophysics					
<i>Module/course unit objectives</i>						
<i>C-1</i>	To familiarize students with the concept of aquaculture, with methods and techniques of aquaculture used in Poland with particular emphasis on fish farming in carp and trout ponds					
<i>C-2</i>	Practical familiarization of students with selected aquaculture techniques, with basic calculations used in aquaculture					
<i>C-3</i>	practical presentation of the operation of aquaculture enterprises on the example of selected Polish enterprises - site visits					
<i>Course content divided into various forms of instruction</i>						<i>Number of hours</i>
<i>T-P-1</i>	Oxygen balance of carp ponds					2
<i>T-P-2</i>	Division of the surface of summer ponds for rearing different carp class					6
<i>T-P-3</i>	Carp production technology in full circulation - traditional Dubisch method - site inspection along with analysis of the production system.					2
<i>T-P-4</i>	Oxygen balance on a trout farm					4
<i>T-P-5</i>	Technological assumptions for the design of the open-circuit trout production facility					4
<i>T-P-6</i>	Full trout rainbow trout production technology - site inspection along with production system analysis.					2
<i>T-P-7</i>	Technological assumptions for the cage farm project					4
<i>T-P-8</i>	Fish production technology in the cage facility - site visit with analysis of the production system					2
<i>T-P-9</i>	Technological assumptions for their recirculation aquaculture systems for fish fattening.					2
<i>T-P-10</i>	Selected issues from the calculation of rearing efficiency in various production technologies					2
<i>T-W-1</i>	History and current state of aquaculture in the world and in Poland.					2
<i>T-W-2</i>	Fish farming in carp ponds: Carp as a rearing object Biology of carp joints Biology of carp joints II Carp production technology in joints Polyculture in carp ponds					12
<i>T-W-3</i>	Rainbow trout as a farming object					2
<i>T-W-4</i>	Rearing other species of salmonid fish in trout ponds.					2
<i>T-W-5</i>	Biological basics of fish farming in closed circuits.					2
<i>T-W-6</i>	Basics of fish farming in cages					4
<i>T-W-7</i>	Rainbow trout farming technology - reproduction, incubation of eggs and rearing of stocking material					2
<i>T-W-8</i>	Technologia chowu pstrąga tęczowego - produkcja ryby towarowej					2



Course content divided into various forms of instruction		Number of hours
T-W-9	Recirculation aquaculture systems - fattening technology	2

Student workload - forms of activity		Number of hours
A-P-1	participation in classes	30
A-P-2	preparation for passing the course	60
A-W-1	preparation for passing the course	30
A-W-2	participation in classes	60

Teaching methods / tools	
M-1	lecture
M-2	didactic discussion related to the lecture
M-3	movie
M-4	a show combined with an experience
M-5	subject exercises using a computer

Evaluation methods (F - progressive, P - final)		
S-1	F	the assessment is carried out on the basis of tests - the so-called entrance materials from previous classes - the average grade is 30% of the final grade
S-2	P	at the end of the course, a test is carried out covering all the issues discussed in the class - it accounts for 70% of the final grade for the subject
S-3	F	the assessment is carried out on the basis of a correctly presented design
S-4	P	assessment of social competences is not quantified in a normal society - the teacher's task is not to de facto evaluate someone's worldview - it can only be considered (or not) that the student has become familiar with a specific approach - in this case I do not assess

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
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Knowledge								
AQF_1A_C12_W01 Has knowledge of the basic farming techniques used in aquaculture	AQF_1A_W04	P6S_WG	P6S_WG	C-1 C-3	T-W-1 T-W-2 T-W-3	T-W-4 T-W-5 T-W-6	M-1 M-2 M-3 M-4 M-5	S-1 S-2
AQF_1A_C12_W02 Knows the methods of breeding selected species of aquatic animals, with particular emphasis on the area of Europe	AQF_1A_W08	P6S_WG		C-1 C-3	T-W-1 T-W-2 T-W-3	T-W-4 T-W-5 T-W-6	M-1 M-2 M-3 M-4	S-1 S-2
AQF_1A_C12_W03 knows the calculation methods used in aquaculture	AQF_1A_W03	P6S_WG	P6S_WG	C-2	T-P-1 T-P-2 T-P-4 T-P-5 T-P-6	T-P-7 T-P-8 T-P-9 T-P-10 T-W-9	M-5	S-3

Skills								
AQF_1A_C12_U01 can make basic calculations regarding selected aquaculture techniques	AQF_1A_U15	P6S_UW	P6S_UW	C-2	T-P-1 T-P-2 T-P-4	T-P-7 T-P-8 T-P-9	M-1 M-2 M-3 M-4 M-5	S-3
AQF_1A_C12_U02 is able to recognize selected species of aquatic animals in aquaculture and select an appropriate breeding technique for them	AQF_1A_U21	P6S_UW	P6S_UW	C-1	T-W-1 T-W-2 T-W-3	T-W-4 T-W-5 T-W-6	M-1 M-2 M-3 M-4	S-1
AQF_1A_C12_U03 knows the basics of using computer programs used in aquaculture	AQF_1A_U07	P6S_UW		C-2	T-P-3 T-P-6	T-P-8 T-P-10	M-5	S-3

Social competences								
AQF_1A_C12_K01 understands the importance of ethical and social aspects related to the breeding of aquatic organisms	AQF_1A_K02	P6S_KO P6S_KR		C-1	T-W-1 T-W-4	T-W-5 T-W-6	M-1 M-2 M-3	S-4
AQF_1A_C12_K02 is aware of the impact of human activities in the field of aquatic animal breeding on the shaping and condition of the aquatic environment	AQF_1A_K04	P6S_KK		C-1 C-3	T-W-1 T-W-2	T-W-5 T-W-6	M-1 M-2 M-4	S-4



Outcomes	Grade	Evaluation criterion
Knowledge		
AQF_1A_C12_W01	2,0	
	3,0	has knowledge of some of the basic farming techniques used in aquaculture
	3,5	
	4,0	
	4,5	
	5,0	
AQF_1A_C12_W02	2,0	
	3,0	knows some methods of breeding selected species of aquatic animals
	3,5	
	4,0	
	4,5	
	5,0	
AQF_1A_C12_W03	2,0	
	3,0	knows some calculation methods used in aquaculture
	3,5	
	4,0	
	4,5	
	5,0	
Skills		
AQF_1A_C12_U01	2,0	
	3,0	can make some basic calculations for selected aquaculture techniques
	3,5	
	4,0	
	4,5	
	5,0	
AQF_1A_C12_U02	2,0	
	3,0	the student recognizes only a few species and is able to assign them breeding techniques
	3,5	
	4,0	
	4,5	
	5,0	
AQF_1A_C12_U03	2,0	
	3,0	the student knows some of the elements of operating computer programs
	3,5	
	4,0	
	4,5	
	5,0	
Other social competences		
AQF_1A_C12_K01	2,0	
	3,0	grades are not formulated as degrees
	3,5	
	4,0	
	4,5	
	5,0	
AQF_1A_C12_K02	2,0	
	3,0	grades are not formulated as degrees
	3,5	
	4,0	
	4,5	
	5,0	
Required reading		
1. Timmons M.B., Guerdat T., Vinci B.J., Recirculating Aquaculture, NRAC, USA, 2018		
2. Varadi L., Tamas G., Seagrave C., Carp and pond fish culture, Wiley-Blackwell, 2002		
3. Stead S.M., Laird L., The Handbook of Salmon Farming, Springer-Praxis, 2002		
4. Lekang O.I., Aquaculture Engineering, Wiley-Blackwell, 2019		
Supplementary reading		



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Supplementary reading

1. różni, aquaculture websites and aquaculture magazines, 2020