



<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>Hydrochemistry and water protection</b>				
<i>Code</i>		WNOZIR/AQF/S1/				
<i>Field of specialisation</i>						
<i>Administering faculty</i>		Department of Aquatic Bioengineering and Aquaculture				
<i>ECTS</i>		5.0	<i>ECTS (forms)</i>	5.0		
<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>
laboratory course	L	7	30	2.0	0.50	credits
lecture	W	7	30	3.0	0.50	examination
<i>Leading teacher</i>		Tórz Agnieszka (Agnieszka.Torz@zut.edu.pl)				
<i>Other teachers</i>						
<i>Prerequisites</i>						
<i>W-1</i>	The basic knowlege of chemistry					
<i>Module/course unit objectives</i>						
<i>C-1</i>	Students should get acquainted with the basic factors and processes conditioning the proper functioning of aquatic ecosystems as a living environment for aquatic organisms					
<i>Course content divided into various forms of instruction</i>						<i>Number of hours</i>
<i>T-L-1</i>	Determination of oxygen curves along with determining the mixing regime on the basis of sample thermal-oxygen conditions in selected lakes					2
<i>T-L-2</i>	Determination of vulnerability to lake water degradation					4
<i>T-L-3</i>	Determination of selected forms of nitrogen and phosphorus (ammonium nitrogen, nitrite nitrogen (III), nitrate nitrogen (III), reacting phosphorus) in accordance with the adopted methodology					10
<i>T-L-4</i>	Determination of organic matter in surface waters					4
<i>T-L-5</i>	Determination of anions and cations responsible for the level of surface water mineralization					10
<i>T-W-1</i>	Classification of surface waters with particular emphasis on lake ecosystems and dynamics of lake waters					6
<i>T-W-2</i>	Thermal and oxygen conditions of lake waters - lake classifications: thermal, oxygen and mycetic divisions					4
<i>T-W-3</i>	Physico-chemical properties of waters, circulation of elements including biogenic elements (nitrogen and phosphorus)					6
<i>T-W-4</i>	The problem of surface water eutrophication					4
<i>T-W-5</i>	Carbonate system for buffering properties					2
<i>T-W-6</i>	The importance of organic matter in surface waters					4
<i>T-W-7</i>	Mineralization of surface waters					4
<i>Student workload - forms of activity</i>						<i>Number of hours</i>
<i>A-L-1</i>	Participation in classes (lab)					30
<i>A-L-2</i>	Writing of class reports					15
<i>A-L-3</i>	Development of results					15
<i>A-W-1</i>	Participation during lectures					30
<i>A-W-2</i>	Individual literary studies					20
<i>A-W-3</i>	Preparation to an exam					20
<i>A-W-4</i>	Development of knowlege					20
<i>Teaching methods / tools</i>						
<i>M-1</i>	lectures					



### Teaching methods / tools

M-2	exercises (lab)
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### Evaluation methods (F - progressive, P - final)

S-1	P	An exam. 50% of total results for 3.0
S-2	F	Observation of students

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_C27_W01 The student knows the factors and processes conditioning the proper functioning of aquatic ecosystems	AQF_1A_W01 AQF_1A_W02	P6S_WG	P6S_WG	C-1	T-W-1 T-W-2 T-W-3 T-W-4	T-W-5 T-W-6 T-W-7	M-1	S-1
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### Skills

AQF_1A_C27_U01 The student knows the principles of laboratory work, knows the principles of instrumental analysis	AQF_1A_U01 AQF_1A_U02	P6S_UK P6S_UW	P6S_UW	C-1	T-L-1 T-L-2 T-L-3	T-L-4 T-L-5	M-2	S-2
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### Social competences

AQF_1A_C27_K01 Students are able to cooperate and work in a group also as a team	AQF_1A_K01 AQF_1A_K03	P6S_KK P6S_KO P6S_KR		C-1	T-L-1 T-L-2 T-L-3	T-L-4 T-L-5	M-1 M-2	S-1 S-2
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Outcomes	Grade	Evaluation criterion
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### Knowledge

AQF_1A_C27_W01	2,0	Students performing at this level demonstrate no evidence of the knowledge, skills, and practices embodied by the course assessed at their grade level. The range for the grade of 2.0 is from 0% to 50% of the total possible score (100%).
	3,0	Students performing at this level demonstrate a minimal command of the knowledge and/or skills embodied by the course assessed at their grade level. The range for the grade of 3.0 is from 51% to 60% of the total possible score (100%).
	3,5	Students performing at this level demonstrate a beginning command of the knowledge and/or skills embodied by the course assessed at their grade level. The range for the grade of 3.5 is from 61% to 70% of the total possible score (100%).
	4,0	Students performing at this level demonstrate a developing command of the knowledge, skills, and practices embodied by the course at their grade level. The range for the grade of 4.0 is from 71% to 80% of the total possible score (100%).
	4,5	Students performing at this level demonstrate a moderate command of the knowledge, skills, and practices embodied by the course. Students at this level are approaching the standards at their grade level. The range for the grade of 4.5 is from 81% to 90% of the total possible score (100%).
	5,0	Students performing at this level demonstrate a distinguished and strong command of the knowledge, skills, and practices embodied by the course. Students at this level are meeting or extending the standards at their grade level. The range for the grade of 5.0 is from 91% to 100% of the total possible score (100%). Students performing at this level demonstrate a distinguished and strong command of the knowledge, skills, and practices embodied by the course. Students at this level are meeting or extending the standards at their grade level. The range for the grade of 5.0 is from 91% to 100% of the total possible score (100%).

### Skills

AQF_1A_C27_U01	2,0	Students performing at this level demonstrate no evidence of the knowledge, skills, and practices embodied by the course assessed at their grade level. The range for the grade of 2.0 is from 0% to 50% of the total possible score (100%).
	3,0	Students performing at this level demonstrate a minimal command of the knowledge and/or skills embodied by the course assessed at their grade level. The range for the grade of 3.0 is from 51% to 60% of the total possible score (100%).
	3,5	Students performing at this level demonstrate a beginning command of the knowledge and/or skills embodied by the course assessed at their grade level. The range for the grade of 3.5 is from 61% to 70% of the total possible score (100%).
	4,0	Students performing at this level demonstrate a developing command of the knowledge, skills, and practices embodied by the course at their grade level. The range for the grade of 4.0 is from 71% to 80% of the total possible score (100%).
	4,5	Students performing at this level demonstrate a moderate command of the knowledge, skills, and practices embodied by the course. Students at this level are approaching the standards at their grade level. The range for the grade of 4.5 is from 81% to 90% of the total possible score (100%).
	5,0	Students performing at this level demonstrate a distinguished and strong command of the knowledge, skills, and practices embodied by the course. Students at this level are meeting or extending the standards at their grade level. The range for the grade of 5.0 is from 91% to 100% of the total possible score (100%).

### Other social competences

AQF_1A_C27_K01	2,0	Students performing at this level demonstrate no evidence of increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.
	3,0	Acceptable student's achievements in increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.
	3,5	Below average student's achievements in increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.
	4,0	Average student's achievements in increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.
	4,5	Above average student's achievements in increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.
	5,0	Outstanding student's achievements in increased social and emotional skills, improved attitude toward self and others, improved positive social behaviors, decreased conduct problems and emotional distress.

### Required reading

1. Standards methods for examination of water and wastewater, Am. Publ. Health Ass., Washington, 1995



*Required reading*

2. Kalff J., Limnology, New Jersey, USA, 2001

*Supplementary reading*

1. Carlson R.F., A trophic state index for lakes, Limnol. Oceanogr., 22 (2), 361-369, 1977