



WNoŻiR



Field of study	Aquaculture and Fisheries		
Mode of study	stationary	Level	first cycle
Graduate's qualification	inżynier		
Fields of science	agricultural sciences		
Disciplines of science	animal science and fisheries (100%)		
Educational profile	general academic		
Module			
Course unit	Microbiology		
Code	WNOZIR/AQF/S1/		
Field of specialisation			
Administering faculty	Department of Applied Microbiology and Human Nutrition Physiology		
ECTS	6.0	ECTS (forms)	6.0
Form of course credit	examination	Language	english
Electives		Elective group	

Form of instruction	Cod	Semester	Hours	ECTS	Weight	Credit
laboratory course	L	5	30	3.0	0.50	credits
lecture	W	5	30	3.0	0.50	examination

Leading teacher	Bogusławska-Wąs Elżbieta (Elzbieta.Boguslawska-Was@zut.edu.pl)					
Other teachers	Dłubała Alicja (Alicja.Dlubala@zut.edu.pl), Sawicki Wojciech (Wojciech.Sawicki@zut.edu.pl)					

Prerequisites						
W-1	basic in general biology					
W-2	biochemistry					

Module/course unit objectives						
C-1	understand microbes diversity and their role in ecology					

Course content divided into various forms of instruction					Number of hours
T-L-1	Control of microbial growth				4
T-L-2	Microscopy - diversity gram (-), gram (+), endospore				6
T-L-3	Cultivation of bacteria				4
T-L-4	Microbial metabolism				4
T-L-5	Bacterial growth and time generation				4
T-L-6	Microbiological diagnostics				4
T-L-7	Quantitative and qualitative methods applied in microbiological analysis				4
T-W-1	Microbial diversity				4
T-W-2	Distribution and activity of microorganisms in water				4
T-W-3	Microbial communities				2
T-W-4	Monitoring and managing microbes in aquaculture				2
T-W-5	Growth limitation and starvation of bacteria				4
T-W-6	Effective microorganisms for aquaculture				4
T-W-7	Emerging pathogens				3
T-W-8	Microbial pathogens in aquaculture				4
T-W-9	Indicator microbes in water quality assessment				3

Student workload - forms of activity					Number of hours
A-L-1	active participation in laboratory work				30
A-L-2	self study				30
A-L-3	literature study				30
A-W-1	active participation in the laboratory work				30
A-W-2	literature study				30
A-W-3	self study				30

Teaching methods / tools

M-1	lectures/power point presentation
M-2	practical work - microbiological analyses in the laboratory

Evaluation methods (F - progressive, P - final)

S-1	F	formative
S-2	F	summarising

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_C18_W01 The student knows the structure of microorganism and their metabolisms	AQF_1A_W12	P6S_WG		C-1	T-L-1 T-W-2 T-L-2 T-W-3 T-L-3 T-W-4 T-L-4 T-W-5 T-L-5 T-W-6 T-L-6 T-W-7 T-L-7 T-W-8 T-W-1 T-W-9	M-1	S-2
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Skills

AQF_1A_C18_U01 student uses basic microbial concepts and is able to easy tasks, labor exercises	AQF_1A_U05 AQF_1A_U11	P6S_UO P6S_UU P6S_UW		C-1	T-L-1 T-L-5 T-L-2 T-L-6 T-L-3 T-L-7 T-L-4	M-2	S-1 S-2
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Social competences

AQF_1A_C18_K01 The student is able to work in a team and demonstrate the ability to the development of their creative potential	AQF_1A_K04 AQF_1A_K05	P6S_KK P6S_KR		C-1	T-L-1 T-W-2 T-L-2 T-W-3 T-L-3 T-W-4 T-L-4 T-W-5 T-L-5 T-W-6 T-L-6 T-W-7 T-L-7 T-W-8 T-W-1 T-W-9	M-1 M-2	S-2
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Outcomes	Grade	Evaluation criterion
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Knowledge

AQF_1A_C18_W01	2,0	
	3,0	Students knows the basic information about microorganisms
	3,5	
	4,0	
	4,5	
	5,0	

Skills

AQF_1A_C18_U01	2,0	
	3,0	The student with help of teacher is able to use the right techniques to identify of bacteria
	3,5	
	4,0	
	4,5	
	5,0	

Other social competences

AQF_1A_C18_K01	2,0	
	3,0	The student is aware of existing knowledge in further study of scientific disciplines related to microbiology
	3,5	
	4,0	
	4,5	
	5,0	

Required reading

1. Johnson Case, Laboratory experiments i microbiology, Pearson, 2011
2. T.E.Ford, Aquatic Microbiology, Blackwell, 2011