

Subject card

Subject name and code	Biotechnology of reproduction and rearing of cultivated invertebrates - laboratory exercises, PG_00117454						
Field of study	Aquaculture – Business And Technology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor’s studies		Subject group				
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		3.0		
Learning profile	practical		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Katarzyna Smolarz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		5.0		30.0	65
Subject objectives	The aim of the course is to familiarize the students with the latest methods used in biotechnology of reproduction and breeding of invertebrate organisms in aquaculture.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[AKWAL3-K03] is ready to follow the ethical principles in biological research and adhere to the principles of intellectual honesty		Students are aware of the role of ethics in biological research and the meaning of intellectual honesty. Students know and value the practical application of knowledge		[SK1] oral statement/conversation/discussion		
	[AKWAL3-U12] can interact and work in a group, and assume different roles		the student is able to cooperate and work in a group, taking on various roles (program content: 1-2)		[SU8] observation of student's independent or team work		
	[AKWAL3_W04] knows and understands the principles of optimization of breeding methods for aquatic invertebrates, and has acquired theoretical and practical knowledge of the diagnostic methods used		Students know the principles of optimization of methods for breeding aquatic invertebrates and they have acquired theoretical and practical knowledge related to the diagnostic methods.		[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion		
	[AKWAL3-U03] can competently obtain selected aquatic invertebrates for ongoing breeding and perform simple practical tasks related to their breeding under the guidance of the scientific supervisor		Students can independently acquire selected aquatic invertebrates for the ongoing breeding and perform simple practical tasks related to the breeding under the supervision of an academic advisor		[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written		

Subject contents	1. Developmental stages of cultivated invertebrates - identification of larval and juvenile stages.		
	2. Cytogenetic techniques in genomic manipulations: methods of polyploid creation in selected marine mussels.		
	3. Determination of the effect of food on the growth rate and indicators of bioenergetic efficiency in selected species of crustaceans.		
Prerequisites and co-requisites	Systematics of cultivated invertebrates and basics of their biology, ecology, biochemistry, physiology and genetics.		
	Systematics and basic biology of cultivated organisms, Basic physiology of cultivated invertebrates, Basic biochemistry and genetics of cultivated organisms, Diseases of cultivated invertebrates		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	work and activity during classe	50.0%	15.0%
	final assessment work (report)	50.0%	15.0%
	final grade based on partial marks obtained during classes	0.0%	0.0%
	knowledge of the material covered during laboratories (final written test)	50.0%	70.0%

Recommended reading	Basic literature	Allan G., Burnell G., 2013. Advances in Aquaculture Hatchery Technology. Woodhead Publishing. Conn, D. B., 2000. Atlas of invertebrate reproduction and development, J. Wiley & Sons, New York. Dunham R. A., 2011, Aquaculture and fisheries biotechnology: genetic approaches, Second edition, CABI Publishing, Cambridge. Fingerman M., Nagabhushanam R., 2000. Recent Advances in Marine Biotechnology, Vol. 4: Aquaculture: Part A: Seaweeds and Invertebrates. CRC Press. Grabda E., 1986. Zoologia. Bezkręgowce. PWN Jura Cz., 1997. Bezkręgowce. PWN Lucas J.S., Southgate P. C., 2012. Aquaculture: farming aquatic animals and plants. Second edition, Blackwell Publishing Ltd., Oxford . Phillips B.F., 2013. Lobsters: Biology, Management, Aquaculture and Fisheries. 2nd Edition, John Wiley & Sons, Ltd. Sumich, J. L., J. F. Morrissey, 2004. Introduction to the biology of marine life, Jones and Bartlett Publisher, Boston Young C. M., 2002. Atlas of marine invertebrate larvae, Academic Press, USA Literature based keys to determining the development stages of aquatic organisms from various sea and ocean regions - specialized literature Grabda E., 1986. Zoologia. Bezkręgowce. PWN Jura Cz., 1997. Bezkręgowce. PWN Żmudziński L., 1990. Świat zwierzęcy Bałtyku. Atlas makrofauny. Wydawnictwo Szkolne i Pedagogiczne, Warszawa
	Supplementary literature	Hassan M.M., Qina J.G., Li X., 2015. Sperm cryopreservation in oysters: A review of its current status and potentials for .future application in aquaculture. Aquaculture 438, 24-42. Robertson L., Lawrence A.L., Castille F.L., 2008. Effect of feeding frequency and feeding time on growth of <i>Penaeus vannamei</i> (Boone). Aquaculture Research 24, 1-6. Inne publikacje naukowe z czasopism: Aquaculture, Aquaculture Research, Aquaculture International, Marine Biotechnology, Journal of Shellfish Research, Science of The Total Environment.
	eResources addresses	
Example issues/ example questions/ tasks being completed	none	
Work placement	Not applicable	