

## Subject card

|                                             |                                                                                                                                                                                                                                   |                                                                                                                                                |                                                                                                                                                                                                                         |                                     |                                   |            |     |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------|------------|-----|
| Subject name and code                       | Systematics and basic biology of cultivated organisms - lectur, PG_00075890                                                                                                                                                       |                                                                                                                                                |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Field of study                              | Aquaculture – Business And Technology                                                                                                                                                                                             |                                                                                                                                                |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                      | Academic year of realisation of subject                                                                                                        |                                                                                                                                                                                                                         | 2025/2026                           |                                   |            |     |
| Education level                             | Bachelor’s studies                                                                                                                                                                                                                | Subject group                                                                                                                                  |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                 | Mode of delivery                                                                                                                               |                                                                                                                                                                                                                         | at the university                   |                                   |            |     |
| Year of study                               | 1                                                                                                                                                                                                                                 | Language of instruction                                                                                                                        |                                                                                                                                                                                                                         | Polish                              |                                   |            |     |
| Semester of study                           | 2                                                                                                                                                                                                                                 | ECTS credits                                                                                                                                   |                                                                                                                                                                                                                         | 3.0                                 |                                   |            |     |
| Learning profile                            | practical                                                                                                                                                                                                                         | Assessment form                                                                                                                                |                                                                                                                                                                                                                         | exam                                |                                   |            |     |
| Conducting unit                             | Laboratory of Ecophysiology and Bioenergetics -> Department of Marine Ecology -> Faculty of Oceanography and Geography -> Rector                                                                                                  |                                                                                                                                                |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                | prof. dr hab. Monika Normant-Saremba                                                                                                           |                                                                                                                                                                                                                         |                                     |                                   |            |     |
|                                             | Teachers                                                                                                                                                                                                                          | prof. dr hab. Monika Normant-Saremba<br><br>dr hab. Luiza Bielecka<br><br>dr hab. Mariusz Sapota<br><br>dr Anna Panasiuk<br><br>dr Iwona Bubak |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                       | Lecture                                                                                                                                        | Tutorial                                                                                                                                                                                                                | Laboratory                          | Project                           | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                             | 45.0                                                                                                                                           | 0.0                                                                                                                                                                                                                     | 0.0                                 | 0.0                               | 0.0        | 45  |
|                                             | 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                                                                                                                                                                                                             | 45                                                                                                                                             |                                                                                                                                                                                                                         | 15.0                                |                                   | 30.0       | 90  |
| Subject objectives                          | The aim of the course is to familiarize the student with the systematics and basic issues in the field of biology of various groups of organisms used in aquaculture.                                                             |                                                                                                                                                |                                                                                                                                                                                                                         |                                     |                                   |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                    |                                                                                                                                                | Subject outcome                                                                                                                                                                                                         |                                     | Method of verification            |            |     |
|                                             | [AKWAL3_W03] knows and understands the conceptual categories and terminology related to the biological basis of aquatic organisms breeding, as well as concepts directly relevant to the practical applications of this knowledge |                                                                                                                                                | Knows and understands the terminology relating to the systematics and biology of farmed plants and algae, invertebrates and fish, as well as concepts directly related to the practical applications of this knowledge. |                                     | [SW4] test/exam - oral or written |            |     |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Subject contents                | <p>Plants and algae: classification of cyanobacteria, algae and vascular plants of aquatic environments; structure of cyanobacterial and plant cells; characterization of the level of morphological organization of cyanobacteria, algae and vascular plants; macroalgae development cycles; adaptation of cyanobacteria and algae to the inhabited environments.</p> <p>Invertebrates: taxonomy and morphological structure of the most important species in aquaculture, with particular emphasis on mollusks, crustaceans and echinoderms; anatomy; reproduction and life cycle; sense organs, behavior and inter-individual interactions.</p> <p>Fish: historical outline of the taxonomy and specificity of the taxonomy nomenclature of this group; description of systematic features of fish: shape and color; elements of the external structure of fish; biometric and meristic features; skeleton and the structure and functioning of selected internal organs; characteristics of the main taxonomic groups; reaction to stimuli and behavior.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| Prerequisites and co-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Percentage of the final grade |
|                                 | Test/ exam: Plants and Algae                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33.33%                        |
|                                 | Test/ exam: Invertebrates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33.33%                        |
|                                 | Test/ exam: Fish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33.34%                        |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Barnes R.S.K., Calow P., Olive P.J.W., Golding D.W., Spicer J.I., 2007. The Invertebrates, A Synthesis. 3rd Edition, Blackwell Publishing.</p> <p>Bieniarz K., Epler P., 2004. Zoologia Tom V, Ryby. Leksykon popularnonaukowy. Wydawnictwo Albatros, Kraków.</p> <p>Błaszak C. (red.), 2021. Zoologia Szkarłupnie płazy Tom 3 Część 1. Wydawnictwo Naukowe PWN.</p> <p>Brusca R.C., Moore W., Shuster S.M., 2016. Invertebrates, 3rd Edition, Sinauer Associates.</p> <p>Brylińska M., 2000. Ryby słodkowodne Polski. Wydawnictwo Naukowe PWN Warszawa.</p> <p>Gerstmeier R., Romig T., 2002. Przewodnik. Słodkowodne ryby Europy. Mulico Warszawa.</p> <p>Kadłubowska J. Z., 1975. Zarys algologii, PWN, Warszawa.</p> <p>Kottelat M., Freyhof J., 2007. Handbook of European Freshwater Fishes</p> <p>Nelson J.S., 2006. Fishes of the Word. Wiley</p> <p>Pechenik J.A., 2014. Biology of the Invertebrates, 7th Edition, McGraw-Hill Education.</p> <p>Szweykowska A., Szweykowski J. 1974, 1993. Botanika Systematyka, PWN, Warszawa.</p> <p>Szweykowska A., Szweykowski J., 1974, 1993. Botanika Morfologia, PWN Warszawa.</p> |                               |

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|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                | Supplementary literature                                                                                                                      | <p>Gąsowska M., 1962. Kąglouste i ryby. Państwowe Wydawnictwo Naukowe, Warszawa.</p> <p>Grabda E., 1986. Zoologia. Bezkręgowce, PWN.</p> <p>Grodziński Z., 1981. Anatomia i embriologia ryb. Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.</p> <p>Moore J., 2009. Wprowadzenie do zoologii bezkręgowców, Wydawnictwa Uniwersytetu Warszawskiego.</p> <p>Opuszyński K., 1979. Podstawy biologii ryb. Państwowe Wydawnictwa Rolnicze i Leśne, Warszawa.</p> <p>Pliński Marcin - Glony Zatoki Gdańskiej, część I-VII - Uniwersytet Gdański, 1980.</p> <p>Pliszka F., 1964. Biologia ryb. Państwowe Wydawnictwa Rolnicze i Leśne, Warszawa.</p> <p>Suworow E., 1954. Podstawy ichtiologii. Państwowe Wydawnictwo Naukowe, Warszawa.</p> |
|                                                                | eResources addresses                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Example issues/<br>example questions/<br>tasks being completed | Taxonomy, external and internal structure, phenotypic diversity; reproduction, life cycle and growth; adaptation to environmental conditions. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Work placement                                                 | Not applicable                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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