

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                         |                                     |                        |            |     |
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| Subject name and code                       | Marine Vertebrate Ecology, PG_00154377                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                         |                                     |                        |            |     |
| Field of study                              | Natural Resources Conservation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          |                                         |                                     |                        |            |     |
| Date of commencement of studies             | October 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | Academic year of realisation of subject |                                     | 2026/2027              |            |     |
| Education level                             | undergraduate studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          | Subject group                           |                                     | Optional subject group |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | Mode of delivery                        |                                     | at the university      |            |     |
| Year of study                               | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | Language of instruction                 |                                     | English<br>English     |            |     |
| Semester of study                           | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | ECTS credits                            |                                     | 2.0                    |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          | Assessment form                         |                                     |                        |            |     |
| Conducting unit                             | Pracownia Ewolucji Molekularnej i Bioinformatyki -> Katedra Genetyki Ewolucyjnej i Biosystematyki -> Faculty of Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                          |                                         |                                     |                        |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          | dr hab. Andre Viola De Moura            |                                     |                        |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                                         |                                     |                        |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lecture                                                  | Tutorial                                | Laboratory                          | Project                | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 15.0                                                     | 0.0                                     | 0.0                                 | 0.0                    | 0.0        | 15  |
|                                             | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 15                                                       |                                         | 3.0                                 |                        | 32.0       | 50  |
| Subject objectives                          | <ul style="list-style-type: none"><li>Understand the basic physical/chemical patterns and processes of the marine environment</li><li>Identify key marine vertebrate groups, and understand their unique and common characteristics</li><li>Understand unique characteristics of marine vertebrate ecology</li><li>Understand how analytical techniques and tools to understand key patterns and processes in marine biology and ecology</li><li>Identify key conservation threats to the marine environment, and understand key techniques and challenges of implementing mitigation measures</li></ul> |                                                          |                                         |                                     |                        |            |     |

|                                 |                                                                                                                                                                                                                       |                                                                                                                                                                        |                                   |
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| Learning outcomes               | Course outcome                                                                                                                                                                                                        | Subject outcome                                                                                                                                                        | Method of verification            |
|                                 | [OZPL3_W14] The graduate understands the relationship between the achievements of natural sciences and their potential applications in socio-economic contexts, while considering the sustainable use of biodiversity | - understands the relationship between fundamental ecological processes and the principles of sustainable use of marine environment resources                          | [SW4] test/exam - oral or written |
|                                 | [OZPL3_U07] The graduate is able to draw correct conclusions on the basis of analysis and synthesis of data from various sources                                                                                      | - draws correct conclusions based on the analysis and synthesis of data from various sources on structure, function, key patterns, and processes in marine environment | [SU4] test/exam - oral or written |
|                                 | [OZPL3_K01] The graduate is ready to recognise the limitations in his/her own knowledge and understands the need for continuous learning and development                                                              | - recognizes the limitations of own knowledge of marine environment ecology and understands the need for continuous learning and development                           | [SK4] test/exam - oral or written |
|                                 | [OZPL3_K08] The graduate is ready to systematically update his/her natural knowledge and to apply it in practice                                                                                                      | - systematically updates the knowledge of marine environment ecology and knows its practical applications                                                              | [SK4] test/exam - oral or written |
|                                 | [OZPL3_U13] The graduate is able to speak a foreign language at B2 level, using specialised vocabulary                                                                                                                | - speaks English at Level B2, using specialist vocabulary in population ecology in scientific discussion                                                               | [SU4] test/exam - oral or written |
|                                 | [OZPL3_W13] The graduate has an advanced understanding of the fundamental rules, methods, and techniques of environmental research and their potential applications in nature conservation                            | - knows basic analytical techniques and methods enabling studies and protection of vertebrates in marine environment                                                   | [SW4] test/exam - oral or written |
| Subject contents                | [OZPL3_U10] The graduate is able to use a specialised Polish and foreign language in a way that is understandable and accessible to both specialists and non-specialists                                              | - speaks English at Level B2, using specialist vocabulary in marine ecology in scientific discussion                                                                   | [SU4] test/exam - oral or written |
|                                 | 1. Basic oceanography and marine geography                                                                                                                                                                            |                                                                                                                                                                        |                                   |
|                                 | 2. Biology and ecology of fish inhabiting marine environment                                                                                                                                                          |                                                                                                                                                                        |                                   |
|                                 | 3. Biology and ecology of reptile, bird and mammalian species inhabiting marine environment                                                                                                                           |                                                                                                                                                                        |                                   |
|                                 | 4. Evolution of vertebrates in the marine environment                                                                                                                                                                 |                                                                                                                                                                        |                                   |
|                                 | 5. Dispersal in the marine environment, and how to integrate ecology and oceanography                                                                                                                                 |                                                                                                                                                                        |                                   |
|                                 | 6. Ecological niche modelling in the marine environment                                                                                                                                                               |                                                                                                                                                                        |                                   |
| Prerequisites and co-requisites | 7. Marine conservation challenges, including pollution, climate change and overfishing                                                                                                                                |                                                                                                                                                                        |                                   |
|                                 | 8. Case studies based on current research                                                                                                                                                                             |                                                                                                                                                                        |                                   |
| Assessment methods and criteria | English at level B2                                                                                                                                                                                                   |                                                                                                                                                                        |                                   |
|                                 | Subject passing criteria                                                                                                                                                                                              | Passing threshold                                                                                                                                                      | Percentage of the final grade     |
|                                 | Written exam; in the case of resit exam – it is oral test                                                                                                                                                             | 51.0%                                                                                                                                                                  | 100.0%                            |

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| Recommended reading                                            | Basic literature         | <p>Kaiser MJ, Attrill MJ, Jennings S, Thomas DN, Barnes DKA, Brierley AS, Hiddink JG, Kaartokallio H, Polunin NVC, Raffaelli DG (2011). Marine Ecology: Processes, Systems, and Impacts. OUP Oxford. ISBN 0199227020</p> <p>Thomas D, Bowers DJ (2012). Introducing Oceanography. Dunedin Academic Press. ISBN 1780460015</p> <p>Helfman G, Collette BB, Facey DE, Bowen BW (2009). The Diversity of Fishes: Biology, Evolution, and Ecology. Wiley-Blackwell. ISBN 1405124946</p> <p>King M (2007). Fisheries Biology, Assessment and Management. Wiley-Blackwell. ISBN 140515831X</p> <p>Hoelzel AR (2002). Marine Mammal Biology: an Evolutionary Approach. Wiley-Blackwell. ISBN 0-632-05232-5</p> <p>Ray GC, McCormick-Ray J, Smith Jr RL (2013). Marine Conservation: Science, Policy, and Management. Wiley-Blackwell. ISBN 1405193476</p> |
|                                                                | Supplementary literature | <p>Natoli A, Moura AE, Sillero N (2022) Citizen science data of cetaceans in the Arabian/Persian Gulf: Occurrence and habitat preferences of the three most reported species. Mar Mammal Sci 38:235255. doi: 10.1111/MMS.12865</p> <p>Moura AE, Shreves K, Pilot M, Andrews KR, Moore DM, Kishida T, Möller L, Natoli A, Gaspari S, McGowen M, Chen I, Gray H, Gore M, Culloch RM, Kiani MS, Sarrouf Willson M, Bulushi A, Collins T, Baldwin R, Willson A, Minton G, Ponnampalam L, Rus Hoelzel A (2020) Phylogenomics of the genus Tursiops and closely related Delphininae reveals extensive reticulation among lineages and provides inference about eco-evolutionary drivers. Mol Phylogenet Evol 146:106756. doi: 10.1016/j.ympev.2020.106756</p>                                                                                           |
|                                                                | eResources addresses     | Adresy na platformie eNauczanie:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Example issues/<br>example questions/<br>tasks being completed |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Work placement                                                 | Not applicable           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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