University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Global Changes in the Marine Environment - conversatory, PG_00204943 | | |
| Field of study | Oceanography | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | 2027/2028 |
| Education level | Master's studies | Subject group | Obligatory subject group in the field of study<br>Optional subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 4 | ECTS credits | 2.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Department of Marine Ecosystems Functioning -> Faculty of Oceanography and Geography -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Filip Pniewski | |
| | Teachers | | |

| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 30.0 | 0.0 | 0.0 | 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 | 2.0 | 18.0 | 50 |

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| Subject objectives | To familiarise students with the causes, determinants and directions in global changes observed in marine ecosystems. |

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANMU2-W06] knows and identifies potential threats to the marine environment on a local and global scale resulting from strong anthropopressure, predicts their effects on various time and space scales | Student knows and identifies potential threats to the marine environment on a global scale resulting from strong anthropopression, and predicts their consequences in relation to the functioning of marine ecosystems and the use of marine resources. | [SW2] presentation/project/paper/ report<br>[SW5] implementation of a problem task |
| [OCEANMU2-U09] can take part in a discussion/debate using substantive arguments, has the ability to formulate opinions based on scientific knowledge and experience and creating synthetic summaries | Students are able to take the floor in a discussion on changes in the marine environment on a global scale using substantive arguments, will be able to formulate opinions on the basis of their knowledge and experience, and will be able to create synthetic summaries of threats to the marine environment. | [SU1] oral statement/conversation/ discussion |
| [OCEANMU2-U05] is able to use source information in Polish and a chosen foreign language, including archival and electronic databases, within the field of oceanography; critically analyzes and synthesizes information, and is capable of performing critical interpretation and synthesis of data | Students are able to make appropriate use of information and verify sources, in Polish and English, on global changes in marine ecosystems, carrying out a critical analysis thereof. | [SU1] oral statement/conversation/ discussion |
| [OCEANMU2-W02] knows and understands complex processes and phenomena occurring in the marine environment, with particular emphasis on the coastal zone, as well as complex relationships between living and non-living elements of the aquatic environment | Student has in-depth knowledge and understanding of the relationships between living organisms and inanimate elements of the environment, and the changes they may undergo as a result of human activity. | [SW2] presentation/project/paper/ report<br>[SW5] implementation of a problem task |
| [OCEANMU2-K04] is ready to critically evaluate his/her knowledge and<br>received content in the field of natural sciences in<br>in particular in the field of the studied specialty, a<br>in problematic situations, supports oneself with knowledge experts | Student is ready to critically evaluate knowledge and content in the field of marine sciences, particularly in relation to global changes of the marine environment. | [SK1] oral statement/conversation/ discussion |

## Subject contents

1 Climate warming and its consequences.
2 Eutrophication - causes and consequences.
3. Ocean pollution. Marine disasters. Litter in the oceans.
4 Changes in the range of marine organisms. Alien species.
5 Progress and prospects for exploitation of animate and inanimate resources of the oceans.
6. Mariculture development, importance and impact on marine ecosystems.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| participation in a disucssion | 51.0% | 50.0% |
| report | 51.0% | 50.0% |

## Recommended reading

Basic literature

1. Kozer J., Mass K., Kothuis B. 2003. Demonstration of environmentally sound and cost-effective shipping. Journal of Cleaner Production. 11: 767-
777.
2. Nienhuis P.H. 1992. Eutrophication, water management, and the functioning of Dutch estuaries and coastal lagoons. Estuaries. 15(4): 538-548.
3. Occhipinti-Amborgi A. 2007. Global change and marine communities: Alien species and climate change. Marine Pollution Bulletin. 55: 342-352.
4. Sabine C.L., Feely R.A., Gruber N., Key R.M, Lee K., Bullister J.L., Wanninkhof R., Wong C.S., Wallace D.W.R., Til-brook B., Millero F.J., Peng T.-
H., Kozyr A., Ono T., Rios A.F. 2004. The Oceanic Sink for Anthropogenic CO2. Science. 305: 367-371.
5. Seibel B.A., Fabry V.J. 2003. Marine biotic response to elevated carbon dioxide. Advances in Applied Biodiversity Science. 4: 59-67.
6. Stachowicz J.J., Terwin J.R., Whitlatch R.B., Osman R.W. 2002. Linking climate change and biological invasions: Ocean warming facilitates
nonindigenous species invasions. PNAS. 99(24): 15497-15500.

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| | Supplementary literature | 1. Kozer J., Mass K., Kothuis B. 2003. Demonstration of environmentally sound and cost-effective shipping. Journal of Cleaner Production. 11: 767-<br>777.<br>2. Nienhuis P.H. 1992. Eutrophication, water management, and the functioning of Dutch estuaries and coastal lagoons. Estuaries. 15(4): 538-548.<br>3. Occhipinti-Amborgi A. 2007. Global change and marine communities: Alien species and climate change. Marine Pollution Bulletin. 55: 342-352.<br>4. Sabine C.L., Feely R.A., Gruber N., Key R.M, Lee K., Bullister J.L., Wanninkhof R., Wong C.S., Wallace D.W.R., Til-brook B., Millero F.J., Peng T.-<br>H., Kozyr A., Ono T., Rios A.F. 2004. The Oceanic Sink for Anthropogenic CO2. Science. 305: 367-371.<br>5. Seibel B.A., Fabry V.J. 2003. Marine biotic response to elevated carbon dioxide. Advances in Applied Biodiversity Science. 4: 59-67.<br>6. Stachowicz J.J., Terwin J.R., Whitlatch R.B., Osman R.W. 2002. Linking climate change and biological invasions: Ocean warming facilitates<br>nonindigenous species invasions. PNAS. 99(24): 15497-15500. |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | | |
| Work placement | Not applicable | |

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