University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Marine Physics Laboratory I, PG_00206224 | | |
| Field of study | Oceanography | | |
| Date of commencement of studies | October 2027 | 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 | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 4.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Marek Kowalewski | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 50.0 | 0.0 | 0.0 | 50 |

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 | 50 | 2.0 | 48.0 | 100 |

**Subject objectives**

Introduction into realities and specifics of research work; developing the ability to plan and organize research work in marine physics; mastering the use of research equipment, software and research methods relevant to the prepared thesis (incl. programming proficiency in a selected language and digital signal analysis)

Familiarisation with bibliography tools; conducting a literature review and planning thesis research.

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANMU2-U06] is able to use specialized computer software as well as advanced mathematical and statistical methods to analyze data and describe processes and phenomena occurring in the marine and coastal environment; evaluates their reliability and usefulness and performs critical analysis | Student is able to use programming techniques, digital signal analysis and selected statistical techniqiues in data analysis and description of processes relevant to the thesis prepared. | [SU2] presentation/project/paper/ report<br>[SU6] demonstration of practical skills |
| [OCEANMU2-W03] has an in-depth understanding of research methods used in oceanography and related sciences, and interprets their mechanisms and interrelationships across different spatial and temporal scales | Knows and understands in-depth the research methods used in marine physics, including programming techniques and digital signal analysis. | [SW2] presentation/project/paper/ report |
| [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 | Is able to use source literature in Polish and English as well as archival and electronic databases on marine physics, and to critically evaluate and synthetically approach them. | [SU2] presentation/project/paper/ report |
| [OCEANMU2-K05] is ready to follow the rules<br>occupational health and safety, taking care of the entrusted person specialized and recognition equipment<br>emergency situations and take appropriate action<br>activities | Is prepared to comply with occupational health and safety regulations in computer laboratory, while performing at-sea and field measurements, to take care of the specialist equipment entrusted to him, and to recognize hazardous situations in the scope of the research being carried out, taking appropriate preventive and intervention measures. | [SK2] presentation/project/paper/ report |

## Subject contents

Computer Laboratory including project/short problems on:

1. Measurement techniques, error estimation and the use of statistics
2. Toolboxes for statistics, DSP, and linear algebra.
3. FFT, techniques for spectra estimation, filter construction and the use of general linear models.
4. Introduction to data-based modelling
5. Techniques and tools useful in thesis preparation (reference management software),

Independent work includes preparation for laboratory classes as well literature review and planning the research/ calculations needed for thesis completion.

## Prerequisites and co-requisites

Passing grade in "Programming and data analysis" OR good command of the programming language used in the course.

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| reports on practical exercises | 51.0% | 100.0% |

## Recommended reading

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|---|---|
| Basic literature | • Makać W., Urbanek-Krzysztofiak D., 2006. *Metody opisu statystycznego*, Wyd. UG, Gdańsk<br>• Thomson R.E., Emery W.J., 2024. Data analysis methods in Physical Oceanography, 4th Ed. (or a previous edition) |
| Supplementary literature | • Balicki A., Makać W., 2006. *Metody wnioskowania statystycznego*, Wyd. UG, Gdańsk<br>• Łomnicki A., 1995. *Wprowadzenie do statystyki dla przyrodników*, PWN, Warszawa |
| eResources addresses | |

## Example issues/ example questions/ tasks being completed

Fourier analysis of time series

## Work placement

Not applicable

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