

Subject card

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| Subject name and code | Satellite Oceanography - lecture, PG_00204984 | | | | | | |
| 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 Optional subject group 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 | 3 | ECTS credits | | | 1.0 | | |
| Learning profile | academic | Assessment form | | | exam | | |
| 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 Aleksandra Cupiał | | | | |
| | 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 | | 1.0 | | 9.0 | 25 |
| Subject objectives | Introducing students to aspects of oceanography that can be investigated from a satellite perspective, including remote sensing techniques, with particular emphasis on microwave techniques, satellite databases, and methods for their processing and analysis | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [OCEANMU2-W04] has an in-depth understanding of the latest research trends in oceanography, as well as the possibilities for practical application of related achievements; evaluates their usefulness and limitations in solving scientific research problems, and critically analyzes and assesses their applicability | | The student knows and understands in-depth the latest trends in oceanographic research using satellite remote sensing devices and systems | | [SW4] test/exam - oral or written | | |
| | [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 | | The student knows and understands in-depth research methods used in the work of an oceanographer to describe and interpret phenomena and processes occurring in the aquatic environment using satellite data | | [SW4] test/exam - oral or written | | |
| | [OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language) | | The student knows and understands in-depth specialized terminology related to satellite remote sensing methods used in oceanography, in particular microwave techniques. | | [SW4] test/exam - oral or written | | |

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| Subject contents | <p>1. Satellite techniques used in Earth Observation. Basic concepts of satellite remote sensing.</p> <p>2. Spatial and temporal scales of marine phenomena. Applications and limitations of satellite remote sensing in monitoring, e.g.:</p> <ul style="list-style-type: none"> - large-scale Phenomena (e.g., ice cover in polar regions, El Niño) - mesoscale and submesoscale Phenomena (e.g., eddies, fronts, coastal upwelling, internal waves) - aquatic productivity (types 1 and 2 waters) - coastal zones (bathymetry, river plume extent, shoreline changes) - potential hazards (oil spills, iceberg trajectories, anthropogenic atmospheric pollution). <p>3. Satellite data in temporal trend analysis and ecohydrodynamic modeling</p> <p>4. Operational earth observation programs. Overview of sensors and available data for Marine Areas and coastal zones (parameters, temporal and spatial resolution).</p> <p>5. Synergy of data from different satellite systems. Methods for assessing satellite data quality. Filtering, transforming, segmentation and classification methods for image data analysis.</p> | | |
| Prerequisites and co-requisites | Knowledge of the basics of satellite remote sensing and GIS | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | test | 51.0% | 100.0% |
| Recommended reading | Basic literature | <ul style="list-style-type: none"> • Robinson I., 2010. Discovering the Oceans from Space: The unique applications of satellite oceanography, Springer-Verlag, Berlin and Heidelberg • Emery W., Camps A., 2017, Introduction to Satellite Remote Sensing. Atmosphere, Ocean, Land and Cryosphere Applications, Elsevier | |
| | Supplementary literature | <ul style="list-style-type: none"> • Berizzi F., Martorella M., Giusti E., 2016, Radar Imaging for Maritime Observation, CRC Prss, Taylor & Francis Group 348 s. • Martin S., 2004, An introduction to Ocean Remote Sensing, Cambridge University Press, 426 s. • Chapman R., Gasparovic R., 2022, Remote sensing physics: an introduction to observing earth from space, Wiley, Hoboken USA, 468 ss. • Chang N.-B., Bai K., 2018, Multisensor data fusion and machine learning for environmental remote sensing, CRC Press, Boca Raton, 508 ss. | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | <p>Assessment criteria: Knowledge of</p> <ul style="list-style-type: none"> • physical processes occurring in the sea that can be studied using satellite methods • satellite techniques used to study specific processes in the sea sea • surface properties that enable remote detection of the phenomena discussed in the lecture • satellite data processing stages necessary to obtain specific environmental information from satellite data • spatial data analysis methods used in the analysis of satellite data in oceanography | | |
| Work placement | Not applicable | | |

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