University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Introduction to Remote Sensing of The Environment - lecture, PG_00201432 | | |
| Field of study | Water Management and Protection of Water Resources | | |
| Date of commencement of studies | October 2027 | Academic year of realisation of subject | 2028/2029 |
| Education level | Bachelor's studies | Subject group | Obligatory subject group in the field of study<br>Subject group related to practical vocational preparation |
| 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 | practical | 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 Katarzyna Bradtke | |
| | 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**

This course aims to equip students with the principles and techniques of satellite remote sensing, focusing on data processing, interpretation for environmental monitoring, and hydrological modeling.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [GWOZWL3-W04] research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including basic statistical and IT tools enabling the description, modelling and interpretation of data concerning phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships within socio-ecological systems. | The student knows and understands satellite techniques and satellite data processing tools currently used in water management and water resources protection. | [SW4] test/exam - oral or written |
| [GWOZWL3-W02] the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a system of interrelated and interacting components. | The student understands the importance of knowledge in the field of exact sciences allowing understanding the processes and phenomena occurring in the hydrosphere as a system of interconnected and interacting components. | [SW4] test/exam - oral or written |

<table>
<tr><td>Subject contents</td><td>1. Electromagnetic radiation as a carrier of information about the environment<br>2. Remote sensing devices and techniques. Satellite systems used in environmental research.<br>3. Physical basis of passive remote sensing in the range of VIS-SWIR radiation and radar imaging<br>4. Visualization and interpretation of remotely recorded images, basic analysis of optical data<br>5. Geometric and radiometric distortions of remote sensing images and their correction<br>6. Image fusion and transformation, spectral indexes, image content classification methods<br>7. Sources of satellite data and examples of their applications in monitoring of surface water</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>knowledge of the basics of water management, cartography and digital data models used in GIS and basic skills in using the ArcGISPro program (in the scope of the subject "Geographic Information Systems - laboratory exercises I")</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>test</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Hejmanowska B., Wężyk P. (ed.), Dane satelitarne dla administracji publicznej, Polska Agencja Kosmiczna 2020; https://polsa.gov.pl/wp-content/themes/polsa/files/Podrecznik.pdf</td></tr>
<tr><td>Supplementary literature</td><td>• Szturc J., Teledetekcja satelitarna i radarowa w meteorologii i hydrologii, Wydawnictwo ATH, Bielsko-Biała 2004<br>• Kurczyński Z., Lotnicze i satelitarne obrazowanie Ziemi. Oficyna Wyd. Polit. Warsz., Warszawa 2006.<br>• Xiaojun Yang (red.), Remote Sensing and Geospatial Technologies for Coastal Ecosystem Assessment and Management, Springer 2009<br>• Lillesand T.M., Kiefer R.W., Remote sensing and image interpretation, Wiley 2000</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>The criteria for passing the lecture are based on a final test. The following aspects will be considered in the evaluation:<br><br>• Understanding of basic concepts in the field of remote sensing,<br>• Familiarity with basic satellite remote sensing systems,<br>• Understanding of the physical foundations of remote sensing and knowledge of the properties of objects that can be studied remotely using devices that record electromagnetic radiation,<br>• Knowledge of properties and basic methods of raster data analysis.<br><br>The final grade will be awarded based on the number of points obtained from the test, in accordance with the grading scale specified in the UG Study Regulations.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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