University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Geoinformatics - laboratory classes , PG_00200501 | | |
| Field of study | Marine Hydrography | | |
| Date of commencement of studies | October 2026 | 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 | 3 | Language of instruction | Polish |
| Semester of study | 5 | ECTS credits | 2.0 |
| Learning profile | practical | Assessment form | credit |
| Conducting unit | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Krzysztof Naus | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 25.0 | 0.0 | 0.0 | 25 |

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 | 25 | 2.0 | 18.0 | 45 |

**Subject objectives**

1. Presentation of the functionality of programming environments for acquiring, processing, and presenting spatial data.
2. Discussion on the principles of designing and creating spatial databases.
3. Introduction to the principles of spatial data conversion, transforming planar coordinates to ellipsoidal coordinates.
4. Discussion on the functioning of data transmission from hydrographic devices and satellite navigation devices.
5. Introduction to operations on binary files and text strings from sensors.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [HML3-U14] is able to use the applicable terminology in presenting and discussing problems related to the field of study | is able to use the relevant terminology when presenting and discussing issues related to their field of study | [SU2] presentation/project/paper/ report |
| [HML3-U04] is able to use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks | is able to use analytical, simulation, and experimental methods to identify, formulate, and solve engineering problems | [SU2] presentation/project/paper/ report |
| [HML3-W05] knows and understands, at an advanced level, map construction and its symbolism | knows the structure of a map and its symbols | [SW2] presentation/project/paper/ report |

**Subject contents**

Programmatic methods for acquiring spatial data. Spatial data conversion. Programmatic methods for spatial data analysis. Designing and creating spatial databases. Registration of analog map raster, converting planar coordinates to ellipsoidal coordinates. Digital data transmission from hydrographic and navigation devices. Introduction to the Embarcadero Tokyo 10.2 environment. Input and output operations on files containing data from sensors in text and binary formats. Developing software for controlling and acquiring spatial data from navigation sensors. Building software for generating point, line, and area geometric objects. Creating monolithic database architectures. Creating client-server database architectures, exchanging XML documents oriented towards data.

<table>
<tr><td>Prerequisites and co-requisites</td><td></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>Project</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>1. Bielecka, E.: "Geographic Information Systems. Theory and Applications." PJWSTK, Warsaw, 2006.<br>2. Myrda, G.: "Geographic Information Systems. Spatial Data Management in GIS, SIP, SIT, LIS." Helion Publishing, Gliwice, 2005.<br>3. Werner, P.: "Introduction to Geographic Information Systems." Jark Publishing, Warsaw, 2004.</td></tr>
<tr><td>Supplementary literature</td><td>1. Gręboszj, J.: "Symfonia C++ Standard. Object-Oriented Programming in C++. Volumes I and II." Edition Publishing, 2015.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Example of implementing a grid generation on a given area.<br>2. How to implement reading a binary file with data from a hydrographic sensor?<br>3. Example of implementing real-time GPS data reception in Python.<br>4. Example of implementing a script to fetch data from a WMS service.<br>5. What libraries and tools are available in Python for acquiring spatial data?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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