University of Gdańsk

# Subject card

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| Subject name and code | Geoinformatics - lecture, PG_00200502 | | |
| 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 |
| 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 | 1.0 |
| 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 | 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**

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-U07] is able to effectively use information and communication techniques, including utility programs to solve professional problems | is able to conduct a preliminary economic assessment of proposed solutions and engineering measures | [SU4] test/exam - oral or written |
| [HML3-W05] knows and understands, at an advanced level, map construction and its symbolism | knows the structure of a map and its symbols | [SW4] test/exam - oral or written |
| [HML3-W04] knows and understands, at an advanced level, the issue of measurements related to the exploration of sea basins and inland waters and tools allowing to describe, interpret and present the results of measurements | knows the issues related to measurements in the study of marine and inland waters, as well as the tools used to describe, interpret, and present measurement results | [SW4] test/exam - oral or written |
| [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 | [SU4] test/exam - oral or written |

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| 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 both text and binary formats. Developing software for controlling and acquiring spatial data from navigation sensors. Building software that allows for the generation of point, line, and area geometric objects. Creating monolithic database architectures. Creating client-server database architectures and exchanging XML documents oriented towards data. |
| Prerequisites and co-requisites | |
| Assessment methods and criteria | |

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Colloquium | 51.0% | 100.0% |

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| Recommended reading | Basic literature | 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. |
| | Supplementary literature | 1. Grębosz, J.: "Symphony C++ Standard. Object-Oriented Programming in C++. Volumes I and II." Edition Publishing, 2015. |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | 1. What are the basic steps for converting data from Shapefile to GeoJSON?<br>2. How to convert planar coordinates (UTM) to ellipsoidal coordinates (latitude and longitude)?<br>3. What are the steps for creating a PostGIS database from scratch?<br>4. What are the differences between monolithic and client-server databases in the context of spatial data?<br>5. How to create the first project in Embarcadero Tokyo 10.2?<br>6. How to create an application that generates geometric objects in Python using the Shapely library? | |
| Work placement | Not applicable | |

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