

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          |                                                                                                                                     |                                     |                                                                                                             |            |     |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Geoinformatics - laboratory exercises, PG_00131508                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          |                                                                                                                                     |                                     |                                                                                                             |            |     |
| Field of study                              | Marine Hydrography                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          |                                                                                                                                     |                                     |                                                                                                             |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                          | Academic year of realisation of subject                                                                                             |                                     | 2027/2028                                                                                                   |            |     |
| 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                                                                                                                        |                                     | 0.0                                                                                                         |            |     |
| 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                                                      | 5.0                                                                                                                                 | 0.0                                 | 0.0                                                                                                         | 0.0        | 5   |
|                                             | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5                                                        |                                                                                                                                     | 1.0                                 |                                                                                                             | 2.0        | 8   |
| Subject objectives                          | <div>1. Presentation of the functionality of programming environments for acquiring, processing, and presenting spatial data.</div> <div>2. Discussion on the principles of designing and creating spatial databases.</div> <div>3. Introduction to the principles of spatial data conversion, transforming planar coordinates to ellipsoidal coordinates.</div> <div>4. Discussion on the functioning of data transmission from hydrographic devices and satellite navigation devices.</div> <div>5. Introduction to operations on binary files and text strings from sensors</div>                                                                                                                                                                                                                    |                                                          |                                                                                                                                     |                                     |                                                                                                             |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Subject outcome                                                                                                                     |                                     | Method of verification                                                                                      |            |     |
|                                             | [HML3-U14] use the applicable terminology in presenting and discussing problems related to the field of study                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          | Is capable of:<br>- Using the current terminology to present and discuss problems related to the field of study.                    |                                     | [SU2] presentation/project/paper/report                                                                     |            |     |
|                                             | [HML3-W05] map construction and its symbolism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          | Knows:<br>- The structure of maps and their symbolism.                                                                              |                                     | [SW2] presentation/project/paper/report                                                                     |            |     |
|                                             | [HML3-U04] use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          | Is capable of:<br>- Utilizing analytical, simulation, and experimental methods to identify, formulate, and solve engineering tasks. |                                     | [SU2] 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. |                                                          |                                                                                                                                     |                                     |                                                                                                             |            |     |

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|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Prerequisites and co-requisites                                |                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                          |                               |
| Assessment methods and criteria                                | Subject passing criteria                                                                                                                                                   | Passing threshold                                                                                                                                                                                                                                                                                                                        | Percentage of the final grade |
|                                                                | Report                                                                                                                                                                     | 51.0%                                                                                                                                                                                                                                                                                                                                    | 100.0%                        |
| 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.: "Symfonia C++ Standard. Object-Oriented Programming in C++. Volumes I and II." Edition Publishing, 2015.                                                                                                                                                                                                                 |                               |
|                                                                | eResources addresses                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                          |                               |
| Example issues/<br>example questions/<br>tasks being completed | 1. Example of Reading a Text File with GPS Data and Saving Analysis Results to a CSV File.<br>2. Example of Creating a Monolithic SQLite Database for a Small GIS Project. |                                                                                                                                                                                                                                                                                                                                          |                               |
| Work placement                                                 | Not applicable                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                          |                               |

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