



## Subject card

|   |  |  |          |                                     |  |            |     |
|---|--|--|----------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Discrete Mathematics, PG_00047823  |  |          |                                     |  |            |     |
| Field of study                              | Informatics  |  |          |                                     |  |            |     |
| Date of commencement of studies             | October 2020   | Academic year of realisation of subject                  |          |                                     | 2021/2022  |            |     |
| Education level                             | first-cycle studies  | Subject group  |          |                                     | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | Part-time studies  | Mode of delivery   |          |                                     | at the university  |            |     |
| Year of study                               | 2  | Language of instruction                                  |          |                                     | Polish   |            |     |
| Semester of study                           | 3  | ECTS credits   |          |                                     | 4.0  |            |     |
| Learning profile                            | general academic profile   | Assessment form  |          |                                     | assessment   |            |     |
| Conducting unit                             | Department of Algorithms and Systems Modelling -> Faculty of Electronics, Telecommunications and Informatics   |  |          |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   | dr Paweł Obszarski                                       |          |                                     |  |            |     |
|   | Teachers   | dr Paweł Obszarski                                       |          |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture  | Tutorial | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours  | 15.0   | 15.0     | 0.0                                 | 0.0  | 0.0        | 30  |
|   | E-learning hours included: 0.0   |  |          |                                     |  |            |     |
|   | Adresy na platformie eNauczanie:<br>Matematyka Dyskretna (Discrete Mathematics) 2021 - Moodle ID: 13200<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13200">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13200</a> |  |          |                                     |  |            |     |
| 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  | 30   |          | 4.0                                 |  | 66.0       | 100 |
| Subject objectives                          | Getting familiar with the mathematical notation and techniques useful in discrete optimization.  |  |          |                                     |  |            |     |

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| Learning outcomes   | Course outcome   | Subject outcome   | Method of verification   |
|   | [K6_W41] Knows and understands, to an advanced extent, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining   | Knows elements of combinatorics and graph theory crucial in big data analysis.          | [SW1] Assessment of factual knowledge  |
|   | [K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study  | Learns about numerous algorithmic aspects of set theory, combinatorics and graph theory | [SW1] Assessment of factual knowledge  |
|   | [K6_K02] is ready to critically assess possessed knowledge and acknowledge the importance of knowledge in solving cognitive and practical problems   | Learns about numerous mathematical models and their practical applications.             | [SK2] Assessment of progress of work<br>[SK5] Assessment of ability to solve problems that arise in practice |
| [K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n-selection and application of appropriate methods and toolsn | Knows how to use in practice knowledge from graph theory, set theory and other   | [SU4] Assessment of ability to use methods and tools                                    |  |
| Subject contents  | <p>Algebra of sets</p> <p>Logic: tautologies, predicates</p> <p>Mathematical induction</p> <p>Binary relations: equivalence relation, equivalence classes</p> <p>Binary relations: partial order, Hasse diagrams</p> <p>Binary relations: transitive closure, equivalence closure</p> <p>Counting: functions, configurations, partitions,</p> <p>Graph Theory: notation, basic terms</p> <p>Graph Theory: Eulerian graphs, Chinese Postman Problem</p> <p>Graph Theory: Hamiltonian graphs, Traveling Salesman Problem</p> <p>Graph Theory: properties of trees</p> <p>Graph Theory: planarity</p> <p>Graph coloring</p> |   |  |
| Prerequisites and co-requisites   |  |   |  |
| Assessment methods and criteria   | Subject passing criteria   | Passing threshold   | Percentage of the final grade  |
|   | Written exam   | 51.0%   | 100.0%   |

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| Recommended reading  | Basic literature         | [1] K. A. Ross, C. R. B. Wright, Matematyka dyskretna, PWN, Warszawa 1996. [2] R. L. Graham, D. E. Knuth, O. Patashnik, Matematyka konkretna, PWN, Warszawa 1996. [3] W. Lipski, W. Marek, Analiza kombinatoryczna, PWN, Warszawa 1986. [4] H. Rasiowa, Wstęp do matematyki współczesnej, PWN, Warszawa 1984. [5] Robin J. Wilson, Wprowadzenie do teorii grafów, PWN, Warszawa 2000. |
|  | Supplementary literature | No requirements   |
|  | eResources addresses     | Matematyka Dyskretna (Discrete Mathematics) 2021 - Moodle ID: 13200<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13200">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13200</a>  |
| Example issues/<br>example questions/<br>tasks being completed |                          |   |
| Work placement   | Not applicable           |   |