



Subject card

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| Subject name and code | Discrete Mathematics, PG_00047646 | | | | | | |
| Field of study | Informatics | | | | | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | | | 2026/2027 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 1 | Language of instruction | | | Polish | | |
| Semester of study | 2 | 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 -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Paweł Obszarski | | | | | |
| | Teachers | mgr inż. Andrzej Jastrzębski dr inż. Robert Ostrowski dr Paweł Obszarski | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 30.0 | 0.0 | 0.0 | 0.0 | 60 |
| | 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 | 60 | 3.0 | | 37.0 | 100 | |
| Subject objectives | Obtaining skills in formulating thesis using formal mathematical language. Ability of expressing relations, dependencies and configurations in a strict abstract form. Understanding clue of reasoning and proofs construction. | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [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 others. | [SU4] Assessment of ability to use methods and tools |
| | [K6_K02] is ready to critically assess possessed knowledge and acknowledge the importance of knowledge in solving cognitive and practical problems | Learns about various mathematical models and how to use them in practice. | [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice |
| | [K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study | Knows numerous algorithmic issues from set theory, combinatorics and graph theory. | [SW1] Assessment of factual knowledge |
| [K6_W44] knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human-computer interaction, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining as well as standards and methods of IT systems administration, monitoring of processes and robustness to undesirable phenomena and activities | Knows and understands selected mathematical models and algorithms and is able to apply them to computer problems. | [SW1] Assessment of factual knowledge | |
| Subject contents | <p>Course content – lecture</p> <p>Definition and properties of sets, set algebra. Theoretical foundations of propositional and predicate logic. Basic variants of the theorem of mathematical induction and technics of proof. Definition and properties of binary relations. Definition of equivalence relations, order relations, and closures. Definition and methods of recognizing combinatorial objects (functions, distributions, partitions - Stirling numbers).</p> <p>Graph theory - notation, basic concepts, Eulerian graphs, the Chinese postman problem, Hamiltonian graphs, the traveling salesman problem, properties of trees, planarity. Graph coloring.</p> <p>Course content – exercises</p> <p>Set operations, solving problems using set properties. Problems in propositional logic and predicate logic. Inductive proof. Investigating binary relations. Counting combinatorial objects. Graph theory - solving problems involving graph models, Eulerian graphs, the Chinese postman problem, Hamiltonian graphs, the traveling salesman problem, properties of trees, planarity. Graph coloring.</p> | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Test 1. | 50.0% | 45.0% |
| | Classes activity | 0.0% | 10.0% |
| | Test 2 | 50.0% | 45.0% |
| Recommended reading | Basic literature | <p>[1] K. A. Ross, C. R. B. Wright, <i>Matematyka dyskretna</i>, PWN, Warszawa 1996. [2] R. L. Graham, D. E. Knuth, O. Patashnik, <i>Matematyka konkretna</i>, PWN, Warszawa 1996.</p> | |
| | Supplementary literature | <p>[3] W. Lipski, W. Marek, <i>Analiza kombinatoryczna</i>, PWN, Warszawa 1986. [4] H. Rasiowa, <i>Wstęp do matematyki współczesnej</i>, PWN, Warszawa 1984. [5] Robin J. Wilson, <i>Wprowadzenie do teorii grafów</i>, PWN, Warszawa 2000.</p> | |

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| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | Data are n balls, each of which weighs 10 g, except for one that weighs 9 g or 11 g using k weighing (weight balance) must decide which ball has a different weight, and whether it is lighter or heavier from the other. Determine the maximum value which n can assume at a given angle as a function f (k). Introduce weighting algorithm for any k and $n = f(k)$. | |
| Practical activities within the subject | Not applicable | |

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