

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|------------|-----|
| Subject name and code                       | Mathematical Analysis, PG_00167656                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Field of study                              | Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                          | Academic year of realisation of subject                                                                                                         |                                     | 2025/2026                                      |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          | Subject group                                                                                                                                   |                                     | Obligatory subject group in the field of study |            |     |
| Mode of study                               | part-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Mode of delivery                                                                                                                                |                                     | at the university                              |            |     |
| Year of study                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Language of instruction                                                                                                                         |                                     | Polish                                         |            |     |
| Semester of study                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | ECTS credits                                                                                                                                    |                                     | 6.0                                            |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          | Assessment form                                                                                                                                 |                                     |                                                |            |     |
| Conducting unit                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          | dr inż. Magda Dettlaff                                                                                                                          |                                     |                                                |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                | Lecture                                                  | Tutorial                                                                                                                                        | Laboratory                          | Project                                        | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20.0                                                     | 20.0                                                                                                                                            | 0.0                                 | 0.0                                            | 0.0        | 40  |
|                                             | 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                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40                                                       |                                                                                                                                                 | 0.0                                 |                                                | 110.0      | 150 |
| Subject objectives                          | Equipping the student with mathematical knowledge supporting IT subjects                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | Subject outcome                                                                                                                                 |                                     | Method of verification                         |            |     |
|                                             | [INFL3_W01] has knowledge in mathematics including issues of mathematical analysis and linear algebra with geometry and numerical methods                                                                                                                                                                                                                                                                                                                  |                                                          | The student knows the basic concepts of mathematical analysis discussed during the lecture.                                                     |                                     | [SW4] test/exam - oral or written              |            |     |
|                                             | [INFL3_U01] can apply mathematical knowledge to formulate, analyze and solve problems related to computer science                                                                                                                                                                                                                                                                                                                                          |                                                          | The student understands that mathematical analysis is useful when creating new algorithms or optimizing and working with large amounts of data. |                                     | [SU4] test/exam - oral or written              |            |     |
|                                             | [INFL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning                                                                                                                                                                                                                                                                                                                         |                                                          | The student appreciates the importance of independently expanding knowledge. Performs independently exercises to consolidate knowledge.         |                                     | [SU5] implementation of a problem task         |            |     |
| Subject contents                            | Numerical sequences. Convergent (divergent) sequence. Functions of one variable. Limit of functions, continuous functions. Differential calculus of functions of one variable. Derivative of a function. Monotonic, convex (concave) function, function extrema, function asymptotes. d'Hospital's rule. Geometric and physical application of derivatives. Indefinite and definite integrals.To familiarize the student with the nomenclature in English. |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Prerequisites and co-requisites             |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                          |                                                                                                                                                 |                                     |                                                |            |     |
| Assessment methods and criteria             | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          | Passing threshold                                                                                                                               |                                     | Percentage of the final grade                  |            |     |
|                                             | test 2                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | 51.0%                                                                                                                                           |                                     | 30.0%                                          |            |     |
|                                             | test 1                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | 51.0%                                                                                                                                           |                                     | 30.0%                                          |            |     |
|                                             | homeworks                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                          | 51.0%                                                                                                                                           |                                     | 5.0%                                           |            |     |
|                                             | exam                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          | 51.0%                                                                                                                                           |                                     | 35.0%                                          |            |     |

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| Recommended reading                                            | Basic literature                                                                                                                      | J. Topp, Matematyka, Funkcje jednej zmiennej. Wydawnictwo Uniwersytetu Gdańskiego, 2016<br><br>M.Gewert, Z.Skoczylas, Analiza matematyczna 1. Definicje, twierdzenia, wzory. Wrocław Oficyna Wydawnicza GiS 2001<br><br>M.Gewert, Z.Skoczylas, Analiza matematyczna 1. Przykłady i zadania. Wrocław Oficyna Wydawnicza GiS 2001 |
|                                                                | Supplementary literature                                                                                                              | B. Wiekł, Matematyka. Podstawy z elementami matematyki wyższej, Wydawnictwo Politechniki Gdańskiej, 2015                                                                                                                                                                                                                        |
|                                                                | eResources addresses                                                                                                                  |                                                                                                                                                                                                                                                                                                                                 |
| Example issues/<br>example questions/<br>tasks being completed | <p>Calculate the limit of the sequence.</p> <p>Test the monotonicity of a given function.</p> <p>Formulate Weierstrass's theorem.</p> |                                                                                                                                                                                                                                                                                                                                 |
| Work placement                                                 | Not applicable                                                                                                                        |                                                                                                                                                                                                                                                                                                                                 |

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