

## GDAŃSK UNIVERSITY

## Subject card

| Subject name and code                          | Mathematics II, PG_00055648  |  |   |            |            |  |         |     |  |
|--|--|--|---|------------|------------|--|---------|-----|--|
| Field of study                                 | Architecture   |  |   |            |            |  |         |     |  |
| Date of commencement of studies                | October 2021   |  | Academic year of realisation of subject   |            |            | 2021/2022  |         |     |  |
| Education level                                | first-cycle 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                                  | 1  |  | Language of instruction   |            |            | English  |         |     |  |
| Semester of study                              | 2  |  | ECTS credits  |            |            | 3.0  |         |     |  |
| Learning profile                               | general academic profile   |  | Assessment form   |            |            | exam   |         |     |  |
| Conducting unit                                | Faculty of Electronics, Telecommunications and Informatics   |  |   |            |            |  |         |     |  |
| Name and surname<br>of lecturer (lecturers)    | Subject supervisor   |  | dr inż. Magdalena Łapińska  |            |            |  |         |     |  |
|  | Teachers   |  | dr inż. Magda   |            |            |  |         |     |  |
| Lesson types and methods of instruction        | Lesson type  | Lecture                                    | Tutorial  | Laboratory | Projec     | t  | Seminar | SUM |  |
|  | Number of study<br>hours   | 15.0                                       | 30.0  | 0.0        | 0.0        |  | 0.0     | 45  |  |
|  | E-learning hours included: 0.0   |  |   |            |            |  |         |     |  |
|  | Adresy na platformie eNauczanie:   |  |   |            |            |  |         |     |  |
| Learning activity<br>and number of study hours | Learning activity  | Participation in<br>classes includ<br>plan | didactic Participation in<br>ed in study consultation hours   |            | Self-study |  | SUM     |     |  |
|  | Number of study hours  | 45   |   | 6.0        |            | 24.0   |         | 75  |  |
| Subject objectives                             | Students obtain competence in using methods of mathematical analysis (single variable calculus) and knowledge how to solve simple problems that are found in the field of engineering, in particular connected to data engineering.  |  |   |            |            |  |         |     |  |
| Learning outcomes                              | Course outcome   |  | Subject outcome   |            |            | Method of verification                               |         |     |  |
|  | [K6_W01] knows and understands<br>construction problems, building<br>and engineering issues related to<br>building design; principles,<br>solutions, constructions and<br>building materials used in simple<br>engineering tasks in the field of<br>architectural and urban design |  | Student defines basic concepts of<br>differential and integral calculus<br>on single-variable function.<br>Student gives the graphical<br>interpretation of definite integral.<br>Student lists geometrical<br>applications of definite integrals |            |            | [SW1] Assessment of factual knowledge                |         |     |  |
|  | [K6_U04] is able to use analytical<br>methods to formulate and solve<br>project tasks  |  | Student applies the concepts of<br>limit, continuity, and derivatives of<br>functions to solve curve sketching<br>problems. Student uses definite<br>integral to solve geometrical<br>problems  |            |            | [SU4] Assessment of ability to use methods and tools |         |     |  |

| Subject contents   | Partial derivatives  |  |                               |  |  |  |  |  |
|--|--|--|-------------------------------|--|--|--|--|--|
|  | Double integral over a rectangular region. Change of variables in double integral. Applications  |  |                               |  |  |  |  |  |
|  | Continuity   |  |                               |  |  |  |  |  |
|  | Continuity.  |  |                               |  |  |  |  |  |
|  | <ul> <li>Derivative of a function of one variable. Geometrical and physical interpretation. Basic differentiation formulas.</li> <li>Product, quotient, and chain rules.</li> <li>Applications of differentiation. Optimization. Concavity.</li> </ul>   |  |                               |  |  |  |  |  |
|  |  |  |                               |  |  |  |  |  |
|  |  |  |                               |  |  |  |  |  |
|  | <ul> <li>Indefinite integral. Basic formulas. Integration by parts, by substitution</li> <li>Definite integral. Geometrical interpretation. Fundamental Theorem of Calculus.</li> <li>Geometrical applications of definite integrals: areas, volumes, lengths.</li> <li>Partial derivatives</li> </ul>   |  |                               |  |  |  |  |  |
|  |  |  |                               |  |  |  |  |  |
|  |  |  |                               |  |  |  |  |  |
|  |  |  |                               |  |  |  |  |  |
|  | Double integral over rectangular and normal regions. Change of variables in double integral.     Applications  |  |                               |  |  |  |  |  |
| Prerequisites<br>and co-requisites                             |  |  |                               |  |  |  |  |  |
| Assessment methods   | Subject passing criteria   | Passing threshold  | Percentage of the final grade |  |  |  |  |  |
| and criteria   | Final Exam   | 50.0%  | 80.0%                         |  |  |  |  |  |
|  | Homework assignments   | 0.0%   | 20.0%                         |  |  |  |  |  |
| Recommended reading  | <ul> <li>Basic literature</li> <li>H. Anton, <i>Calculus with analytic geometry</i>, John Wiley &amp; Sons, 1989.</li> <li><i>Matematyka. Podstawy z elementami matematyki wyższej</i>, edited by B. Wikieł, PG publishing house</li> <li>J.Dymkowska, D.Beger, <i>Rachunek różniczkowy w zadaniach</i>, PG publishing hous</li> <li>J.Dymkowska, D.Beger, <i>Rachunek całkowy w zadaniach</i>, PG publishing house</li> </ul> |  |                               |  |  |  |  |  |
|  | Supplementary literature   | <ul> <li>B.Sikora, E.Łobos, A first course in calculus, Publishing house of<br/>Silesian University of Technology, 2010.</li> <li>H. Anton, Calculus : a new horizon, John Wiley &amp; Sons, 6th ed</li> <li>K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, PG<br/>publishing house, 2010</li> <li>W. Żakowski, Algebra i analiza matematyczna dla licealistów i<br/>kandydatów na wyższe uczelnie, WNT, Warszawa 1999</li> <li>M. Gewert, Z.Skoczylas, Analiza Matematyczna 1, GiS</li> <li>M.Gewert, Z. Skoczylas, Analiza Matematyczna 2, GIS 2007;</li> </ul> |                               |  |  |  |  |  |
|  | eResources addresses   |  |                               |  |  |  |  |  |
| Example issues/<br>example questions/<br>tasks being completed | <ol> <li>Find the local extrema and intervals of monotonicity of the function f(x)=</li> <li>2.</li> </ol>   |  |                               |  |  |  |  |  |
|  | Find the area between the x-axis and the curves  |  |                               |  |  |  |  |  |
|  | <ul> <li>Find the volume of the solid obtained by rotating about the x-axis, the region bounded by y=</li> </ul>   |  |                               |  |  |  |  |  |
|  | Evaluate partial derivatives of the given function   |  |                               |  |  |  |  |  |
|  | Evaluate the double integral over the given region   |  |                               |  |  |  |  |  |
| Work placement   | Not applicable   |  |                               |  |  |  |  |  |