

## GDAŃSK UNIVERSITY

## Subject card

| Subject name and code                          | Mathematics 2, PG_00042017  |  |   |                                     |        |  |         |     |  |
|--|---|--|---|-------------------------------------|--------|--|---------|-----|--|
| Field of study                                 | Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering   |  |   |                                     |        |  |         |     |  |
| Date of commencement of studies                | October 2020  |  | Academic year of realisation of subject   |                                     |        | 2020/2021  |         |     |  |
| 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  |                                     |        | 6.0  |         |     |  |
| Learning profile                               | general academic profile  |  | Assessment form   |                                     |        | exam   |         |     |  |
| Conducting unit                                | Mathematics Center -> Vice-Rector for Education   |  |   |                                     |        |  |         |     |  |
| Name and surname<br>of lecturer (lecturers)    | Subject supervisor  |  | dr inż. Magdalena Łapińska  |                                     |        |  |         |     |  |
|  | Teachers  |  | dr inż. Magdalena Łapińska  |                                     |        |  |         |     |  |
| Lesson types and methods                       | Lesson type   | Lecture  | Tutorial  | Laboratory                          | Projec | :t   | Seminar | SUM |  |
| of instruction                                 | Number of study hours   | 45.0   | 45.0  | 0.0                                 | 0.0    |  | 0.0     | 90  |  |
|  | E-learning hours included: 0.0  |  |   |                                     |        |  |         |     |  |
|  | Adresy na platformie eNauczanie:<br>ET - Mathematics 2 2020/2021 (M.Łapińska) - Moodle ID: 11552<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11552                        |  |   |                                     |        |  |         |     |  |
| Learning activity<br>and number of study hours | Learning activity   | Participation in didactic<br>classes included in study<br>plan |   | Participation in consultation hours |        | Self-study   |         | SUM |  |
|  | Number of study hours   | 90   |   | 15.0                                |        | 45.0   |         | 150 |  |
| Subject objectives                             | Students obtain competence in using methods of mathematical analysis and differential equations, and knowledge how to solve simple problems that are found in the field of engineering. |  |   |                                     |        |  |         |     |  |
| Learning outcomes                              | Course outcome  |  | Subject outcome   |                                     |        | Method of verification   |         |     |  |
|  | K6_U02  |  | The student uses mathematical<br>methods to analyze and design<br>energy elements.<br>Student is able to process the<br>acquired information, analyze and<br>interpret it, draw conclusions and<br>reason opinions. |                                     |        | [SU3] Assessment of ability to<br>use knowledge gained from the<br>subject |         |     |  |
|  | K6_W01  |  | Student combines knowledge of mathematics with knowledge from other fields.   |                                     |        | [SW1] Assessment of factual knowledge                                      |         |     |  |

| Subject contents                   | Improper Integrals   |   |                               |  |  |  |  |  |
|------------------------------------|--|---|-------------------------------|--|--|--|--|--|
|                                    | Ordinary differential equations  |   |                               |  |  |  |  |  |
|                                    | Sequences and Series   | Sequences and Series  |                               |  |  |  |  |  |
|                                    | definitions, monotonicity, boundedness, limits   |   |                               |  |  |  |  |  |
|                                    | convergence tests  |   |                               |  |  |  |  |  |
|                                    | Function series:   |   |                               |  |  |  |  |  |
|                                    | <ul> <li>power Taylor, McLaurin series, radius of convergence</li> <li>information about Fourier series</li> </ul>                                       |   |                               |  |  |  |  |  |
|                                    | Multivariable Calculus   |   |                               |  |  |  |  |  |
|                                    | <ul> <li>partial derivatives, directional derivatives, applications</li> <li>double and triple integrals</li> </ul>                                      |   |                               |  |  |  |  |  |
|                                    | Elements of Vector Calculus  |   |                               |  |  |  |  |  |
|                                    | <ul> <li>line integral over scalar and ver</li> <li>information about surface integral</li> </ul>  | ctor fields<br>jrals  |                               |  |  |  |  |  |
|                                    | Complex functions <ul> <li>derivatives of complex functions</li> <li>bolomorphic functions</li> </ul>  |   |                               |  |  |  |  |  |
|                                    |  |   |                               |  |  |  |  |  |
|                                    | conformal mapping  |   |                               |  |  |  |  |  |
|                                    | <ul><li>integrals of complex functions</li><li>Taylor and Laurent series</li></ul>   |   |                               |  |  |  |  |  |
| Prerequisites<br>and co-requisites | Working knowledge of the concepts of the first semester of mathematics.  |   |                               |  |  |  |  |  |
| Assessment methods                 | Subject passing criteria   | Passing threshold   | Percentage of the final grade |  |  |  |  |  |
| and criteria                       | Final Exam   | 50.0%   | 50.0%                         |  |  |  |  |  |
|                                    | Tests  | 50.0%   | 50.0%                         |  |  |  |  |  |
| Recommended reading                | Basic literature   | George B. Thomas, Jr., Ross L. Finney., Calculus and analytic<br>geometry, Addison-Wesley Publishing Company;<br>7th edition (January 1988) |                               |  |  |  |  |  |
|                                    |  | Z.Michna, Mathematics, 2nd edition, Publishing House of Wrocław University of Economics, Wrocław, 2012.                                     |                               |  |  |  |  |  |
|                                    | Supplementary literature   | M.Gewert, Z.Skoczylas, Analiza matematyczna II, wzory, Oficyna<br>Wydawnicza GiS  |                               |  |  |  |  |  |
|                                    | E.Łobos, B.Sikora, Calculus and differential equations in exercises, The<br>Publishing House of the Silesian University of Technology, Gliwice,<br>2006. |   |                               |  |  |  |  |  |
|                                    | J.Polking, A.Boggess, D.Arnold, Differential Equations, Pearson  |   |                               |  |  |  |  |  |
|                                    | eResources addresses   | ET - Mathematics 2 2020/2021 (M.Łapińska) - Moodle ID: 11552<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11552                |                               |  |  |  |  |  |

| Example issues/<br>example questions/<br>tasks being completed | 1. Solve the given differetial equation of the first order (e.g. Brenoulli equation).                 |
|--|---|
|  | 2. Solve the given differetial equation of the second order.  |
|  | 3. Find the extremum of the given function of the two variables.                                      |
|  | 4. Find the volumes of the given solids by means of double integral (or by means of triple integral). |
|  | 5. Find the line integral   |
|  | 6. Find the integral of a complex function.   |
| Work placement   | Not applicable  |