

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

| Subject name and code                          | Mathematics ans Statistics, PG_00060636   |  |  |                                     |        |  |         |     |  |
|--|---|--|--|-------------------------------------|--------|--|---------|-----|--|
| Field of study                                 | Transport and Logistics   |  |  |                                     |        |  |         |     |  |
| Date of commencement of studies                | October 2023  |  | Academic year of realisation of subject  |                                     |        | 2023/2024  |         |     |  |
| 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  |                                     |        | Polish   | Polish  |     |  |
| Semester of study                              | 2   |  | ECTS credits   |                                     |        | 8.0  |         |     |  |
| Learning profile                               | general academic profile  |  | Assessment form  |                                     |        | exam   |         |     |  |
| Conducting unit                                | Mathematics Center -> Vice-Rector for Education   |  |  |                                     |        |  |         |     |  |
| Name and surname                               | Subject supervisor  |  | dr Lech Kujawski   |                                     |        |  |         |     |  |
| of lecturer (lecturers)                        | Teachers  |  | dr inż. Magdalena Kunicka  |                                     |        |  |         |     |  |
|  |   |  | dr Lech Kujav  |                                     |        |  |         |     |  |
| Lesson types and methods of instruction        | Lesson type   | Lecture  | Tutorial   | Laboratory                          | Projec | t  | Seminar | SUM |  |
|  | Number of study hours   | 30.0   | 45.0   | 0.0                                 | 15.0   |  | 0.0     | 90  |  |
|  | E-learning hours included: 0.0  |  |  |                                     |        |  |         |     |  |
| 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   |  | 8.0                                 |        | 102.0  |         | 200 |  |
| Subject objectives                             | The aim of the subject is to enable the student to acquire competence in using basic mathematical analysis, descriptive and mathematical statistics, and applying the acquired knowledge to solve simple theoretical and practical problems encountered in engineering fields |  |  |                                     |        |  |         |     |  |
| Learning outcomes                              | Course out  | come   | Subj   | ect outcome                         |        | Method of verification                               |         |     |  |
|  | [K6_U02] can work individually<br>and in a team, communicate using<br>various techniques in a<br>professional environment, as well<br>as document, analyze and present<br>the results of his work; can<br>estimate the time needed to<br>complete a given task                |  | The student has knowledge in the<br>field of mathematical analysis and<br>differential equations. They can<br>utilize the acquired concepts to<br>solve problems related to<br>modeling and interpreting<br>mechanical systems, as well as<br>manufacturing processes of<br>devices. |                                     |        | [SU4] Assessment of ability to use methods and tools |         |     |  |
|  | [K6_W01] has well structured<br>knowledge of mathematics,<br>including algebra, elements of<br>logic, geometry, mathematical<br>analysis and probabilistics<br>necessary to describe and<br>analyze the operation of means<br>and transport systems                           |  | The student understands the need<br>for lifelong learning, can inspire,<br>and organize the learning process<br>for others   |                                     |        | [SW1] Assessment of factual knowledge                |         |     |  |

| Subject contents   | Mathematics: Elements of Linear Algebra: matrices, determinants, matrix rank, systems of linear equations,<br>Kronecker-Capelli theorem, Cramer's theorem, Gauss-Jordan elimination method. Integral calculus of<br>functions of one variable: indefinite and definite integrals with applications, integration by parts and by<br>substitution, integration of rational, trigonometric, and irrational functions. Limits and continuity of<br>multivariable functions. Multivariable calculus: partial derivatives, total differential, extrema of functions of<br>two variables. Double integral: over a rectangle, over a normal set, change of variables, polar coordinates,<br>applications of double integral. Triple integral with applications.<br>Statistics: Population and sample. Empirical distribution. Measures of central tendency and dispersion.<br>Distribution of sample statistics. Central limit theorem. Graphical presentation of statistical data. Estimation<br>(point and interval). Hypothesis testing: about mean, variance, proportion. Comparison of populations. Tests<br>for two means, variances, and proportions. Correlation, sample correlation coefficient. Testing the<br>significance of linear correlation coefficient. Test for two correlation coefficients. Spearman's rank correlation<br>coefficient. Kendall's rank correlation coefficient. Regression, testing the significance of regression<br>coefficient. Analysis of variance in regression, interval estimation in regression analysis, confidence curves.<br>Analysis of variance. Experimental factor, experimental unit, experimental design. Completely randomized<br>design. One-way classification model. Multiple comparison tests (Student's t-test (Fisher's method), Tukey's<br>test. Scheffé's test). Nonparametric tests for independence, conformity, randomness of the sample |  |                               |  |  |  |
|--|--|--|-------------------------------|--|--|--|
|  | test, Schette's test). Nonparametric tests for independence, conformity, randomness of the sample.   |  |                               |  |  |  |
| Prerequisites<br>and co-requisites                             | Knowledge of the material from the Mathematics I course conducted in the first semester  |  |                               |  |  |  |
| Assessment methods   | Subject passing criteria   | Passing threshold  | Percentage of the final grade |  |  |  |
| and criteria   |  | 50.0%  | 100.0%                        |  |  |  |
| Recommended reading  | Basic literature Brak  |  |                               |  |  |  |
| , i i i i i i i i i i i i i i i i i i i                        | Supplementary literature   | Brak   |                               |  |  |  |
|  | eResources addresses   | Podstawowe   |                               |  |  |  |
|  |  | https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36905 - |                               |  |  |  |
|  |  | Uzupełniające  |                               |  |  |  |
|  |  | Adresy na plattormie eNauczanie:                               |                               |  |  |  |
| Example issues/<br>example questions/<br>tasks being completed |  |  |                               |  |  |  |
| Work placement   | Not applicable   |  |                               |  |  |  |

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