



## Subject card

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|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | , PG_00066711                                                                                                                                                                                                                                                           |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| Field of study                              | Transport                                                                                                                                                                                                                                                               |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| Date of commencement of studies             | October 2024                                                                                                                                                                                                                                                            |                                                          | Academic year of realisation of subject                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     | 2024/2025                                                                                                                                                                                                                         |            |     |
| Education level                             | first-cycle studies                                                                                                                                                                                                                                                     |                                                          | Subject group                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                                                                                                                                                                                                                   |            |     |
| Mode of study                               | Full-time studies                                                                                                                                                                                                                                                       |                                                          | Mode of delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                     | e-learning                                                                                                                                                                                                                        |            |     |
| Year of study                               | 1                                                                                                                                                                                                                                                                       |                                                          | Language of instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     | Polish                                                                                                                                                                                                                            |            |     |
| Semester of study                           | 2                                                                                                                                                                                                                                                                       |                                                          | ECTS credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     | 3.0                                                                                                                                                                                                                               |            |     |
| Learning profile                            | general academic profile                                                                                                                                                                                                                                                |                                                          | Assessment form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     | assessment                                                                                                                                                                                                                        |            |     |
| Conducting unit                             | Department Of Mechanics Of Materials And Structures -> Faculty Of Civil And Environmental Engineering -> Wydziały Politechniki Gdańskiej                                                                                                                                |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                      |                                                          | dr inż. Marek Jasina                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                   |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| Lesson types and methods of instruction     | Lesson type                                                                                                                                                                                                                                                             | Lecture                                                  | Tutorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Laboratory                          | Project                                                                                                                                                                                                                           | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                   | 0.0                                                      | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30.0                                | 0.0                                                                                                                                                                                                                               | 0.0        | 30  |
|                                             | E-learning hours included: 30.0                                                                                                                                                                                                                                         |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| 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                                                                                                                                                                                                                                                   | 30                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.0                                 |                                                                                                                                                                                                                                   | 0.0        | 30  |
| Subject objectives                          | <ul style="list-style-type: none"><li>• learning the basics of engineering programming in MATLAB</li><li>• learning to use MATLAB to solve basic data analysis problems</li><li>• presentation of the basic capabilities of Ms Excel sheets for data analysis</li></ul> |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                                                                                                                                                                                                                   |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                          |                                                          | Subject outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     | Method of verification                                                                                                                                                                                                            |            |     |
|                                             | [K6_W03] has knowledge of informatics, electronics, telecommunications, automation and control, information technologies, computer graphics, geodesy and satellite navigation which is useful for understanding how it can be applied in transport                      |                                                          | The student is able to define and initialize variables and is able to distinguish between their types. The student is able to use mathematical operators and perform matrix operations in MATLAB. The student knows the basics of logic in programming and is able to write conditional "if" statements. The student can use the "while" and "for" loops. The student is able to use the built-in functions of the environment and is able to write his own functions. The student is able to use external files and calculate basic statistical quantities. The student knows the basics of drawing graphs and two basic numerical methods: trapezoid integration and linear approximation. |                                     | [SW3] Assessment of knowledge contained in written work and projects                                                                                                                                                              |            |     |
|                                             | [K6_U05] able to use IT graphic techniques suitable for tasks typical of designing, construction, operation, and diagnosing means and transportation systems.                                                                                                           |                                                          | The student is able to solve engineering problems related to the basic principles of physics and the processing of experimental data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     | [SU5] Assessment of ability to present the results of task<br>[SU4] Assessment of ability to use methods and tools<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU1] Assessment of task fulfilment |            |     |

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| Subject contents                | <p>1. Installation and configuration of the environment. Basic information on its operation.</p> <p>2. Presentation of the basic types of variables and mathematical operators. Vectors and matrix operations.</p> <p>3. Logic in MATLAB. Presentation of logical operators and conditional if statement. Using while and for loops.</p> <p>4. Functions in MATLAB.</p> <p>5. Basics of data analysis - presentation of basic statistical values. Loading data from external files and drawing charts. Two basic numerical methods: trapezoid integration and linear approximation.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| Prerequisites and co-requisites | Mathematics, Physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                        | Percentage of the final grade |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 50.0%                         |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 50.0%                         |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <a href="https://www.mathworks.com/help/matlab/">https://www.mathworks.com/help/matlab/</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/format.html">https://www.mathworks.com/help/matlab/ref/format.html</a><br><br><a href="https://www.anaconda.com/products/distribution">https://www.anaconda.com/products/distribution</a><br><br><a href="https://support.microsoft.com/pl-pl/excel">https://support.microsoft.com/pl-pl/excel</a> |                               |

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|  | Supplementary literature | <a href="https://www.mathworks.com/help/matlab/ref/double.html">https://www.mathworks.com/help/matlab/ref/double.html</a><br><br><a href="https://www.mathworks.com/help/matlab/matlab_prog/operator-precedence.html">https://www.mathworks.com/help/matlab/matlab_prog/operator-precedence.html</a><br><br><a href="https://www.mathworks.com/help/matlab/characters-and-strings.html">https://www.mathworks.com/help/matlab/characters-and-strings.html</a><br><br><a href="https://www.mathworks.com/help/matlab/learn_matlab/matrices-and-arrays.html">https://www.mathworks.com/help/matlab/learn_matlab/matrices-and-arrays.html</a><br><br><a href="https://www.mathworks.com/help/matlab/dictionary.html">https://www.mathworks.com/help/matlab/dictionary.html</a><br><br><a href="https://www.mathworks.com/help/matlab/trigonometry.html">https://www.mathworks.com/help/matlab/trigonometry.html</a><br><br><a href="https://www.mathworks.com/help/matlab/random-number-generation.html">https://www.mathworks.com/help/matlab/random-number-generation.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/if.html">https://www.mathworks.com/help/matlab/ref/if.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/while.html">https://www.mathworks.com/help/matlab/ref/while.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/for.html">https://www.mathworks.com/help/matlab/ref/for.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/function.html">https://www.mathworks.com/help/matlab/ref/function.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/load.html">https://www.mathworks.com/help/matlab/ref/load.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/readmatrix.html">https://www.mathworks.com/help/matlab/ref/readmatrix.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/readtable.html">https://www.mathworks.com/help/matlab/ref/readtable.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/plot.html">https://www.mathworks.com/help/matlab/ref/plot.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/fill.html">https://www.mathworks.com/help/matlab/ref/fill.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/matlab.graphics.chart.primitive.histogram.html">https://www.mathworks.com/help/matlab/ref/matlab.graphics.chart.primitive.histogram.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/scatter.html">https://www.mathworks.com/help/matlab/ref/scatter.html</a><br><br><a href="https://www.mathworks.com/help/matlab/ref/trapz.html">https://www.mathworks.com/help/matlab/ref/trapz.html</a><br><br><a href="https://www.mathworks.com/help/curvefit/fit.html">https://www.mathworks.com/help/curvefit/fit.html</a> |
|  | eResources addresses     | Adresy na platformie eNauczanie:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Example issues/<br>example questions/<br>tasks being completed | <ul style="list-style-type: none"> <li>• Write a function that calculates the trajectory of a bungee jumper.</li> <li>• Make a linear approximation of a given set of points.</li> <li>• Calculate basic statistics for a given dataset.</li> </ul> |
| Work placement                                                 | Not applicable                                                                                                                                                                                                                                      |

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