# GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

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| Subject name and code | Planning of experimental research, PG_00065008 |
| Field of study | Mechanical and Medical Engineering |

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| Date of commencement of studies | February 2025 | Academic year of realisation of subject | 2024/2025 |
| Education level | second-cycle studies | Subject group | Obligatory subject group in the field of study |
| | | | Subject group related to scientific research 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 |
| Semester of study | 1 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |

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| Conducting unit | Zakład Mechaniki Stosowanej i Biomechaniki -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology |
| Name and surname of lecturer (lecturers) | Subject supervisor: dr hab. inż. Wiktoria Wojnicz |
| | Teachers: dr inż. Grzegorz Rotta |
| | dr hab. inż. Wiktoria Wojnicz |

| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 15.0 | 15.0 | 0.0 | 0.0 | 0.0 | 30 |
| | 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 | 30 | 6.0 | 14.0 | 50 |

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| Subject objectives | The aim of the subject is to present methods used to plan experimental testing and elaborate the results of the testing |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
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| | [K7_W03] has structured and well-founded knowledge covering issues in the field of medical engineering allowing to design medical devices, rehabilitation systems and to formulate research procedures | A student can formulate a research hypothesis that covers a scope of design of medical device (or rehabilitation systems), and use statistical toolbox to verify this hypothesis | [SW3] Assessment of knowledge contained in written work and projects |
| | [K7_K101] acknowledges the importance of knowledge related to the field of study in solving cognitive and practical problems, critically assessing the information obtained | A student can formulate a hypothesis on the base of acquired knowledge related to the medical engineering | [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice |
| | [K7_U02] formulates hypotheses to test research problems in the field of medical engineering | On the base of acquired knowledge related to the medical engineering a student can formulate a hypothesis, apply proper methods of testing and draw conclusions | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task |

| Subject contents | |
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| | **Lectures (15h) (DSc PhD Wiktoria Wojnicz)**Describing statistics. Random variables. Normal distribution. T-Student distribution. Chi-squared distribution.Parametric estimation.Chosen statistical tests: Normal distribution testing, Homogeneity of variances testing, T-Student testes, Nonparametric tests for independent samples Nonparametric tests for dependent samples. ANOVA, Kruskal-Wallis test and median test.Linear regression. Multilinear regression. Linearized nonlinear regression (for chosen functions). Nonlinear estimation. Time series. Methods of prediction<br><br>**Tutorials (15h) (PhD Grzegorz Rotta)**The scope covers chosen topics from Lectures.Test. Repeat test |

| Prerequisites and co-requisites | Math |
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| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
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| | pass of the tutorials | 50.0% | 50.0% |
| | pass of the lectures | 50.0% | 50.0% |

| Recommended reading | Basic literature | M.Rabiej, Statystyka z programem Statistica, Helion, 2012 |
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| | | StatSoft. Poradnik statystyczny. https://www.statsoft.pl/textbook/stathome_stat.html?https%3A%2F%2Fwww.statsoft.pl%2Ftextbook%2Fadvans1.html |
| | Supplementary literature | Literatures related to the mathematical statistics |
| | eResources addresses | Adresy na platformie eNauczanie: |

| Example issues/ example questions/ tasks being completed | Assess the minimum number of samples by considering the given threshold p |
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| Work placement | Not applicable |
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