GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Biomeasurements, PG_00053509 | | |
| Field of study | Biomedical Engineering, Biomedical Engineering, Biomedical Engineering | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | 2024/2025 |
| Education level | first-cycle studies | Subject group | Optional subject group<br>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 | 3 | Language of instruction | Polish |
| Semester of study | 6 | ECTS credits | 3.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | prof. dr hab. inż. Jerzy Wtorek | |
| | Teachers | prof. dr hab. inż. Jerzy Wtorek | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 15.0 | 0.0 | 0.0 | 45 |

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 | 45 | 2.0 | 28.0 | 75 |

**Subject objectives**

The main aim of the course is to familiarize students with measurement techniques utilized in medical diagnostics

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U10] can individually plan their own lifelong education, also by means of advanced information and communication technologies (ICT), and communicate with people from their environment, firmly justify their point of view, participate in debates, present, assess and discuss different opinions and points of view, as well as use specialist terminology related to the field of study in communication | Student is able to assess the impact of available technology on the quality of the proposed solution. It tracks the development of useful technology. | [SU4] Assessment of ability to use methods and tools<br>[SU3] Assessment of ability to use knowledge gained from the subject |
| [K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study | The student knows the basic measurement methods used in medical, diagnostic techniques known physiological systems and principles of imaging techniques The student knows the basic concepts related to biomeasurements | [SW3] Assessment of knowledge contained in written work and projects<br>[SW1] Assessment of factual knowledge |

**Subject contents**

1 measurements in the diagnosis and therapy, 2. accuracy, repeatability, non-invasiveness, safety, 3. measurements in vitro, in situ, in vivo, 4 Introduction to qualitative and quantitative analysis, 5 types of measurements in medicine, 6. Electrical Measurements , potential, current, 7 Mathematical models of bioelectric phenomena, 8. volume conductor model, 9. Spatial Sensitivity, 10. measurements bioelektroimpedancyjne, 11. Dispersion Guide volumetric 12. Spatial sensitivity 13. ICG classic, 14. varieties ICG, 15 . elektroimpedancyjna spectroscopy (EIS), 16 Selected applications EIS, 17 Measurement of magnetic sensors 18 types of sensors (classic, SQUID), 19 3D models of current flow, 20. Spatial sensitivity, 21. magnetic measurements in medicine, MCG, 22. measurements of cardiac output, 23. Dilution Methods, 24 . measurements of respiratory processes, 25 blood gasometry, 26. measurements in psychology, 28. psychophysiology measurements, 28 measurements of EDA, 29 measurements of the BCI / BMI, 30 Photodynamic Methods

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|---|---|---|---|
| Prerequisites and co-requisites | Basics of mathematics, physics, metrology and electronic circuits | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Laboratory | 60.0% | 60.0% |
| | | 60.0% | 40.0% |
| Recommended reading | Basic literature | J. Wtorek, Materiały pomocnicze do wykładu „Biopomiary”<br>Brodzino [red.] The biomedical engineering handbook, IEEE Press<br>M. Nałęcz [red.] Biocybernetyka i Inzynieria Biomedyczna, t. 2 Biopomiary, Exit, 2001 | |
| | Supplementary literature | Enderle [red}, Introduction to biomedical engineering, Elsevier, 2005<br>IEEE Transactions on Biomedical Engineering<br>IEEE Transactions on Instrumentation and Measurements | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | Present and evaluate pH measurement methods. | | |
| Work placement | Not applicable | | |

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