



Subject card

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| Subject name and code | Vacuum technique, PG_00053365 | | | | | | |
| Field of study | Biomedical Engineering, Biomedical Engineering, Biomedical Engineering | | | | | | |
| Date of commencement of studies | October 2024 | | Academic year of realisation of subject | | 2025/2026 | | |
| Education level | second-cycle studies | | Subject group | | Optional subject group Specialty subject group 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 | 2 | | Language of instruction | | Polish | | |
| Semester of study | 3 | | ECTS credits | | 2.0 | | |
| Learning profile | general academic profile | | Assessment form | | exam | | |
| Conducting unit | Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Sebastian Bielski | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 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 | | 2.0 | | 18.0 | 50 |
| Subject objectives | Knowledge of the following concepts concerning modern vacuum technology: • properties of gases • surface processes (adsorption and desorption) • creating a vacuum • measuring a vacuum • vacuum components, construction and leak detection | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [K7_U02] can perform tasks related to the field of study as well as formulate and solve problems applying recent knowledge of physics and other areas of science | The student is able to run, test and use vacuum devices for experimental purposes. | [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment |
| | [K7_K01] is ready to create and develop models of proper behaviour in the work and life environment; undertake initiatives; critically evaluate actions of their own, teams and organisations they are part of; lead a group and take responsibility for its actions; responsibly perform professional roles taking into account changing social needs, including: - developing the achievements of the profession, - observing and developing rules of professional ethics and acting to comply to these rules | Students plan and conduct experiments and prepare reports by working in groups. | [SK2] Assessment of progress of work |
| | [K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study | The student gains knowledge about construction, operation and use of vacuum devices. | [SW1] Assessment of factual knowledge |
| Subject contents | 1) The concept of vacuum in physics and technology 2) The properties of dilute gases 3) The gas flow and surface phenomena 4) Vacuum preparation 5) Mechanical vacuum pumps 6) Jetvacuum pumps 7) Sorption pumps 8) Vacuum measurement 9) Leak Detection 10) Elements of vacuum systems | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | written test | 50.0% | 51.0% |
| | Laboratories, reports, oral presentations | 100.0% | 49.0% |
| Recommended reading | Basic literature | <ul style="list-style-type: none">S. Bielski, materials published on the moodle platform https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23587"Modern vacuum physics" Austin Chambers CRC Press 2004 | |
| | Supplementary literature | Materials and data available on the websites: <ul style="list-style-type: none">https://www3.nd.edu/~nsl/Lectures/urls/LEYBOLD_FUNDAMENTALS.pdfhttp://www.idealvac.com/files/manuals/Kinney_Piston_Vacuum_Pump_Brochure.pdfhttps://www.agilent.com/cs/library/catalogs/public/05_Diffusion_Pumps.pdfhttp://www.idealvac.com/files/literature/03_Edwards_2011_Vapour_Diffusion_Pumps.pdfhttp://www.idealvac.com/files/brochures/Pfeiffer-Adixen-Leak-Detectors-Brochure.pdf | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | <ul style="list-style-type: none">Project of a UHV system.Physical basis of vacuum measurements.Construction, operation and properties of a rotary pump. | | |
| Work placement | Not applicable | | |