



Subject card

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|---|--|---|-------------------------------------|------------|--|---------|-----|
| Subject name and code | Basics of chemical technology, PG_00060860 | | | | | | |
| Field of study | Chemical Technology | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | 2025/2026 | | |
| Education level | first-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 | 2 | Language of instruction | | | Polish | | |
| Semester of study | 4 | ECTS credits | | | 5.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Jacek Gębicki | | | | | |
| | Teachers | dr hab. inż. Jacek Gębicki dr hab. inż. Justyna Łuczak dr inż. Robert Aranowski dr inż. Piotr Rybarczyk dr inż. Edyta Słupek dr inż. Aleksandra Małachowska dr inż. Anna Grzegórska | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 15.0 | 30.0 | 0.0 | 0.0 | 75 |
| | E-learning hours included: 0.0 | | | | | | |
| | eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=4948 Moodle ID: 4948 Podstawy technologii chemicznej https://enauczanie.pg.edu.pl/2025/course/view.php?id=4948 | | | | | | |
| 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 | 75 | 8.0 | | 42.0 | 125 | |
| Subject objectives | The aim of the course is to provide students with information on: technological principles, heat and material balances, chemical and technological concepts of the process, process scaling, conceptual and technological diagrams, basic definitions related to the technological process, energy transformation and the challenges of modern technology. | | | | | | |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
|-------------------|---|---|--|
| | [K6_W05] has knowledge of chemical technology based on mineral or energy resources and modern energy sources, understands the concept of sustainable development, knows the principles of green chemistry and environmentally friendly process engineering, has knowledge of occupational safety in the chemical industry | The student understands the technological principles and aspects of energy transition, and the concepts of the circular economy. They are familiar with the concept of Industry 4.0. | [SW3] Assessment of knowledge contained in written work and projects |
| | [K6_U05] recognises and identifies the relationship between technological issues, implemented in industrial practice, and their impact on various elements of the environment, in the context of mechanisms and conditions of sustainable development, recognizes their systemic and non-technical aspects | The student identifies the relationships between the main technological principles and understands the principles of green engineering and the circular economy. | [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools |
| | [K6_K02] understands the non-technical aspects and implications of the activities of a chemical engineer, including the impact on the environment, is aware of professional behaviour, observance of professional ethics and respect for diversity of views and cultures | The student locates and classifies aspects related to environmental protection, health and safety and correctly identifies the role of a chemical engineer in modern industry. | [SK1] Assessment of group work skills [SK3] Assessment of ability to organize work |
| | [K6_W12] knows the chemical nomenclature in Polish and specialized terms related to chemical technology | The student can define processes and unit operations. Correctly use specialized terms related to chemical technology. They can prepare a basic process diagram. | [SW3] Assessment of knowledge contained in written work and projects |
| | [K6_U12] applies the principles of health and safety at work | The student correctly identifies hazards and safety principles related to processes and unit operations. They are able to apply occupational health and safety principles in the chemical industry. | [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject |

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| Subject contents | <p>Course content – lecture</p> <ol style="list-style-type: none"> 1. Basics of chemical processes, equilibrium constant, reaction rate, 2. Mathematical theory of experimental design, optimization 3. Elements of process design. Unit operations. Schematic and technological diagram 4. Material and heat balance 5. Technological principles 6. Basic unit operations 7. Problems of technological process kinetics 8. Basics of reactor theory 9. Scaling up a technological process 10. Energy transformation - green energy |
| | <p>Course content – exercises</p> <ol style="list-style-type: none"> 1. Introduction to Process Balancing 2. Material Balance for a Unit Operation 3. Material Balance for a Unit Process 4. Energy Balance for a Process Unit |
| | <p>Course content – laboratory</p> <ol style="list-style-type: none"> 1. Unit activities based on the process of obtaining fatty acid methyl esters (3 lab sessions) 2. Removal of volatile organic compounds from air by biofiltration (1 lab session) 3. Planning a factorial experiment (2 lab sessions) 4. Process kinetics in chemical technology (2 lab sessions) |
| Prerequisites and co-requisites | <p>The student will have knowledge of:</p> <ol style="list-style-type: none"> 1. Chemical equipment 2. Chemical and process engineering 3. Unit processes in the chemical industry 4. Thermodynamics and chemical kinetics 5. Fundamentals of environmental protection |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
|--|---|---|-------------------------------|
| | exercises - 2 tests | 60.0% | 25.0% |
| | lecture - knowledge test, 3 tests | 60.0% | 50.0% |
| | laboratory - entrance test + report on the implementation of laboratory classes | 60.0% | 25.0% |
| Recommended reading | Basic literature | <ul style="list-style-type: none"> • J. Piotrowski, J. Szarawara „Podstawy technologii chemicznej”, WNT 2010 • M. Wisniewski, K. Alejski, „Podstawy technologii chemicznej i reaktorów chemicznych" część 1 i 2, Wydawnictwo Politechniki Poznańskiej, 2017 • A. Selecki, L. Gradoń, „Podstawowe procesy przemysłu chemicznego”, Wydawnictwa Naukowo-Technicznej, 1985 • K. Schmidt-Szałowski i in., Technologia Chemiczna, PWN, Warszawa, 2013 | |
| | Supplementary literature | resources of the Gdańsk University of Technology library in the field of chemical technology and related technologies of the chemical industry | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1. Describe the relationship between the equilibrium conversion rate and temperature. 2. Describe the relationship between the reaction rate and the conversion rate. 3. Schematically represent a model of a plug-flow tubular reactor. 4. List the types of absorbers. 5. Describe the mass transfer process in co-current and counter-current systems. | | |
| Practical activities within the subject | Not applicable | | |

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