



Subject card

| | | | | | | | |
|---|---|--|---|-------------------------------------|--|------------|-----|
| Subject name and code | Analytics in the cosmetics and pharmaceutical industry, PG_00060779 | | | | | | |
| Field of study | Chemical Technology | | | | | | |
| Date of commencement of studies | October 2023 | | Academic year of realisation of subject | | 2025/2026 | | |
| Education level | first-cycle studies | | Subject group | | Optional 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 | 3 | | Language of instruction | | Polish | | |
| Semester of study | 6 | | ECTS credits | | 2.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Analytical Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Weronika Hewelt-Belka | | | | |
| | Teachers | | | | | | |
| Lesson types | 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 | The course introduces modern analytical methods used in the cosmetic and pharmaceutical industries. It covers instrumental techniques for analyzing both conventional substances and advanced pharmaceuticals such as monoclonal antibodies, peptides, and oligonucleotides. Students learn method validation, stability testing, green chemistry principles, and assessment of substance migration from packaging into products. The course includes guest lectures from industry practitioners. | | | | | | |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
|---------------------------------|---|---|---|
| | [K6_U12] applies the principles of health and safety at work | The student applies safety and hygiene rules when performing analyses of cosmetics and pharmaceuticals, including handling reagents, operating analytical instruments, and working with biologically active materials. | [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools |
| | [K6_U02] is able to operate typical laboratory apparatus and conduct analyses related to materials testing | The student is able to operate analytical instruments used in the cosmetic and pharmaceutical industries, including HPLC, UV-Vis, and GC, and can perform qualitative and quantitative analyses of active substances, modern pharmaceuticals, and packaging-related contaminants. | [SU1] Assessment of task fulfilment [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 |
| | [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 understands the professional responsibility involved in analysing cosmetic and pharmaceutical products, including the impact of analytical quality on consumer safety, environmental protection, and regulatory compliance. The student demonstrates ethical conduct and openness to interdisciplinary collaboration. | [SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills |
| | [K6_W03] has knowledge of environmental protection in chemical technology, the classification of technological processes in terms of their environmental impact and how to eliminate the environmental impact of technological installations | The student knows the principles of green chemistry in the analysis of cosmetics and pharmaceuticals and can assess the environmental impact of analytical methods and production processes, including the migration of substances from packaging into products. | [SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects |
| | [K6_W02] has knowledge of inorganic, organic, physical and analytical chemistry useful for obtaining selected groups of compounds, determining their physical and chemical properties allowing for their quantitative and qualitative analysis, making measurements and determining the parameters of chemical reactions, phenomena and processes occurring in chemical technology | The student has knowledge of modern analytical techniques (HPLC, GC, UV-Vis, MS) used to determine both conventional ingredients and advanced pharmaceuticals such as monoclonal antibodies and oligonucleotides, as well as to assess the stability and quality of cosmetic and pharmaceutical products. | [SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge |
| Subject contents | <p>Course content – lecture</p> <p>The lectures cover key topics related to analytical methods used in the cosmetic and pharmaceutical industries. The content includes an overview of raw materials and active substances, instrumental techniques applied in quality control, fundamentals of method validation, and selected aspects of green chemistry. Additional topics may include modern biopharmaceutical products and safety assessment, such as the evaluation of substance migration from packaging. Lectures may also be supplemented with presentations delivered by industry professionals.</p> <p>Course content – laboratory</p> <p>The laboratory classes focus on the practical application of selected analytical techniques used in cosmetic and pharmaceutical analysis. Students prepare samples, perform instrumental measurements, analyze product composition and quality, and learn the basics of method validation. The laboratory work may include studies on product stability, evaluation of substance migration from packaging, and preparation of analytical reports with interpretation of results.</p> | | |
| Prerequisites and co-requisites | The student should have basic knowledge of analytical, organic, and physical chemistry, including qualitative and quantitative analysis, fundamentals of chromatography and spectroscopy, and safe laboratory practices. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Laboratory grade | 60.0% | 60.0% |
| | Final test | 60.0% | 40.0% |

| | | |
|--|---|---|
| Recommended reading | Basic literature | Norbert Andrzejewski, Analiza produktów leczniczych i wyrobów medycznych, MEDPHARM, 2025 Szczepaniak Walenty, Metody instrumentalne w analizie chemicznej, Wydawnictwo Naukowe PWN Wardencki Waldemar, Kałużna-Czaplińska, Joanna Malinowska, Irena Witkiewicz Zygfryd, Wydawnictwo Naukowe PWN |
| | Supplementary literature | D'Atri V, Barrientos RC, Losacco GL, Rudaz S, Delobel A, Regalado EL, Guillarme D. Trends in Pharmaceutical Analysis: The Evolving Role of Liquid Chromatography. Anal Chem. 2025 Mar 11;97(9):4706-4727. doi: 10.1021/acs.analchem.4c06662. Epub 2025 Feb 26. PMID: 40008977. |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | Examples of analytical techniques applied in the quality assessment of cosmetic and pharmaceutical products. Discussion of challenges related to the analysis of modern active substances, including biological and biotechnological compounds. Consideration of green chemistry principles and methods aimed at reducing the environmental impact of analytical procedures. Case studies on quality control, product safety, and migration of substances from packaging materials. Tasks involving the interpretation of analytical results and evaluation of method performance parameters. | |
| Practical activities within the subject | Not applicable | |

Document generated electronically. Does not require a seal or signature.