GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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| Subject name and code | Chemistry and nanotechnology of cosmetics, PG_00069409 | | |
| Field of study | Nanotechnology | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | 2025/2026 |
| Education level | first-cycle studies | Subject group | |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 3 | Language of instruction | Polish |
| Semester of study | 5 | ECTS credits | 3.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Biotechnology and Microbiology -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Patrycja Szumała | |
| | Teachers | dr hab. inż. Patrycja Szumała | |

**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

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=953

Moodle ID: 953 Chemia i nanotechnologia kosmetyków 2025/2026
https://enauczanie.pg.edu.pl/2025/course/view.php?id=953

**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 | 5.0 | 25.0 | 75 |

**Subject objectives**

Knowing the technology of preparation, composition and use of selected cosmetic products.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K6_W07 | Has knowledge of the physical and chemical basis of nanotechnology in the field of cosmetics (methods of obtaining nanostructures, types of nanostructures, their properties, basic research methods) | [SW1] Assessment of factual knowledge |
| K6_U06 | Able to identify various problems and technological and scientific principles related to the production and application of nanostructures in cosmetics | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU1] Assessment of task fulfilment |
| K6_K05 | Is able to produce various forms of cosmetic formulations, present information about cosmetic formulations in a generally comprehensible manner, evaluate cosmetics available on the market and described in the literature | [SK1] Assessment of group work skills<br>[SK5] Assessment of ability to solve problems that arise in practice |

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| Subject contents | Lectures:<br><br>Structure and function of human skin. Compounds affecting the increase in skin barrier.<br><br>Types of cosmetic products and their performance.<br><br>Raw materials in cosmetics and criteria for their selection, with particular focus on biologically active materials.<br><br>Nanomaterials and nanocarriers in cosmetic.<br><br>Emulsions, nanoemulsions, microemulsions and their construction and method of stabilization. The technology of manufacturing various types of cosmetic emulsions.<br><br>Surfactants in cosmetics.<br><br>Haircare products: shampoos, conditioners, conditioning preparations.<br><br>Make-up preparations. Powders, shadows, ink, lipstick, nail polish, etc.<br><br>Technology of perfume products.<br><br>Technology of deodorants and antiperspirants.<br><br>Legal regulations on raw materials and cosmetic products.<br><br>Laboratory:<br><br>1. Preparation and analysis of body cleansers<br><br>2. Cosmetic emulsions<br><br>3. Creation of masks and scrubs for the face and body.<br><br>4. Preparation of facial cleansing products (toners, lotions, makeup removers).<br><br>5. Preparation of color cosmetics (powders, foundations, lip glosses, lipsticks). |
| Prerequisites and co-requisites | Basic knowledge of organic and inorganic chemistry. |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| tests and reports | 100.0% | 40.0% |
| written exam | 50.0% | 60.0% |

Recommended reading

Basic literature

1. J. Marcinkiewicz - Salmonowiczowa, Zarys chemii i technologii kosmetyków, Wyd. Politechniki Gdańskiej, Gdańsk, 1995.

2. W.S. Brud, R. Glinka, Technologia Kosmetyków, Oficyna Wydawnicza, Łódź, 2001.

3. M.M.Rieger, Surfactants in Cosmetics, M. Dekker, Inc. New York, 1985.

4. L. Ho Tan Tai, Formulating Detergents and Personal Care Products, AOCS Press, Champaing, 2000.

5. Analysis of Cosmetic Products, ed. A. Salvador, A.Chisvert, Elsevier, Amsterdam, 2007.

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| | Supplementary literature | 6. J. Przondo, Związki powierzchniowo czynne i ich zastosowanie w produktach chemii gospodarczej ,<br>Wydawnictwo Politechniki Radomskiej, 2007.<br><br>7. K. Gawrońska, K. Kacprzak, Chemia kosmetyczna: ćwiczenia laboratoryjne; UAM, Warszawa 2008.<br><br>8. R. Glinka, M. Glinka; Receptura kosmetyczna z elementami kosmetologii: tom 1; Oficyna Wydawnicza MA, Łódź, 2008 |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | 1. State the differences in the properties, preparation and composition of emulsions, nanoemulsions and microemulsions.<br><br>2. Describe the barrier functions of the skin | |
| Work placement | Not applicable | |

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