



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Pharmaceutical chemistry and analysis [S1IFar2>CiAF]

### Course

Field of study

Pharmaceutical Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

35

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

prof. dr hab. Beata Stanis

### Lecturers

### Prerequisites

Knowledge in the field of biochemistry, analytical chemistry and physical chemistry

### Course objective

Acquaintance with chemical structure of pharmaceutical compounds, their chemical properties and determination methods. Development of skills needed to perform both qualitative and quantitative chemical analysis. Acquaintance with analysis used in the quality assessment of raw materials used in pharmaceutical and cosmetic industry.

### Course-related learning outcomes

Knowledge:

1. Student has general knowledge in the field of pharmacy, cosmetology, technology and chemical engineering as disciplines directly related to pharmaceutical engineering. [K\_W1]
2. Student knows the basics of kinetics, thermodynamics and catalysis of chemical processes. [K\_W11]
3. Student has detailed knowledge about pharmaceutical and cosmetic compounds, dietary supplements, plant raw materials and their fabrication. [K\_W25]
4. Student has a knowledge of basic techniques, methods for characterizing and identifying pharmaceutical products and research tools used in pharmaceutical engineering, knows classical and

instrumental methods used in assessing the quality of substances for pharmaceutical purposes and in quantitative analysis in medicinal products, knows the physicochemical properties of substances for pharmaceutical use which influence the biological activity of drugs, knows the classification of analytical techniques along with the criteria for method selection and method validation. [K\_W1]

#### Skills:

1. Student can select and apply analytical methods and techniques for qualitative and quantitative analysis, process control, as well as for the quality control of raw materials and products. [K\_U11]
2. Student has the ability to conduct chemical, pharmaceutical and toxicological tests of pharmaceutically active substances and medicinal products. [K\_U10]

#### Social competences:

1. Student is able to critically assess her/his knowledge; understands the necessity of continuous education, gaining new knowledge and professional, personal and social qualifications; understands the significance of knowledge in problem solving and is able to ask for experts' opinion. [K\_K1]
2. Student is ready to show respect and concern for the well-being of all people among whom they will work. [K\_K4]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on a written exam (in person) or with the use of the TEAMS application (depending on the epidemiological situation of the country).

The knowledge acquired during the exercises is verified: during the discussion of each exercise and / or test of specific exercise, for which the student has to be prepared, and the practical exam (exercise 7).

### Programme content

#### Lectures

Overview of: questions concerning basic mechanisms of action of drugs on the molecular level; the chemical structure and reactivity of selected groups of drugs, the relationship between the chemical structure and action; pharmacopeial and non-pharmacopeial methods of quality assessment; the contamination analysis in the assessment of the quality and security of use of a product; validation parameters for different analytical methods; the problem of durability of the raw material and the final product; the use of spectroscopic methods in the identification of a compound; choice criteria for methods used in quantitative analysis.

#### Classes

Classes comprise analytical topics related to the quality assessment of pharmaceutical and cosmetic compounds and products, in the view of current pharmacopeial and non-pharmacopeial norms, ICH guidelines concerning the quality and the durability of drugs, as well as the issue of counterfeit medications.

Practical classes are preceded by the introduction to current edition of the Polish Pharmacopeia, particularly with methods used for the identification of drugs, as well as their quality and purity assessment.

The student will get to know the classical and instrumental methods used for the identification, quantitative analysis and the purity control of the raw material and the pharmaceutical or cosmetic product in the view of physicochemical properties of the compounds, such as: solubility, melting point of the substance and its derivatives, optical rotation, refractive index, chemical reactions specific for the group of compounds and specific substances. The student will perform individual analyses from the scope of topics of laboratory classes. A practical exam will be held at the end of the laboratory course.

### Course topics

none

### Teaching methods

Interactive lectures with multimedia presentations, individual laboratory classes, presentation of study results and preparation of a report of performed studies.

### Bibliography

Basic:

1. Zając M, Pawełczyk E, Jelińska A. Chemia Leków. Wydawnictwo Naukowe Akademii Medycznej im. Karola Marcinkowskiego w Poznaniu, 2006.
2. Farmakopea Europejska (wydanie ostatnie).
3. Ocena jakości substancji i produktów leczniczych - podręcznik dla studentów farmacji pod red. M. Zając i A. Jelińskiej, Wydawnictwo Naukowe Uniwersytetu Medycznego im. Karola Marcinkowskiego w Poznaniu, 2010.

Additional:

1. Steinhilber D., Schubert-Zsilavec M., Roth H.J. Chemia medyczna, redakcja wydania polskiego Jelińska A., Pałka J. Zając M., MedPharm Polska, Wrocław, 2012.
2. Marzec A.: Chemia kosmetyków, Surowce, półprodukty, preparatyka wyrobów. Dom Organizatora TNOiK, 2009.
3. Stanisław B., Muszalska I.: Metody badania jakości surowców i produktów kosmetycznych. Uniwersytet Medyczny im. Karola Marcinkowskiego, Poznań 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00