# COURSE DESCRIPTION CARD - SYLLABUS

**Course name**
Drug chemistry - isolation methods in pharmaceutical analysis [S1IFar2>CLmiwaf]

## Course

| | |
|---|---|
| **Field of study** | **Year/Semester** |
| Pharmaceutical Engineering | 3/5 |
| **Area of study (specialization)** | **Profile of study** |
| – | general academic |
| **Level of study** | **Course offered in** |
| first-cycle | Polish |
| **Form of study** | **Requirements** |
| full-time | elective |

## Number of hours

| | | |
|---|---|---|
| **Lecture** | **Laboratory classes** | **Other** |
| 0 | 0 | 0 |
| **Tutorials** | **Projects/seminars** | |
| 15 | 0 | |

## Number of credit points

1,00

| Coordinators | Lecturers |
|---|---|
| dr Maria Popielarz-Brzezińska | |
| dr hab. Magdalena Ogrodowczyk | |

## Prerequisites

A student starting this subject should have basic knowledge in chemistry and biology.

## Course objective

To familiarize students with the principles of classical and instrumental methods used to isolate the active substance from various forms of the drug, dietary supplements and cosmetics. In particular, the use of chromatographic methods (TLC, GC, HPLC). Isolation of the active substance from single and multi-component drugs. Substance purification methods for further qualitative and quantitative analysis.

## Course-related learning outcomes

Knowledge:
1. Student has solid knowledge in the field of separation and purification processes of raw materials and products found in the pharmaceutical, cosmetics and chemical industries. [K_W15]
2. Student knows the basic principles of occupational health and safety. [K_W27]

Skills:

1. Student uses pharmacopoeial methods, prepares documentation, selects and applies analytical methods and techniques in qualitative and quantitative analysis as well as to control processes and assess the quality of raw materials and products. [K_U11]
2. Has the ability to self-study. [K_U24]

Social competences:
1. Student is ready to critically assess their knowledge, understands the need for further education, supplementing their field knowledge and raising their professional, personal and social competences, understands the importance of knowledge in solving problems and is ready to seek expert opinions. [K_K1]
2. Student is ready to show respect and care for good towards all the people he/she will work with. [K_K4]

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Exercises in the form of active discussion. Preparation and discussion of presentations regarding the subject matter. Final test - 10 test questions (stationary or remote form depending on the epidemiological situation).

## Programme content

The student will familiarize with the theoretical foundations of modern analytical techniques used in accordance with the recommendations of the latest pharmacopoeia and the manufacturer's standards. As part of this, the following issues will be discussed:
• Selection of conditions for qualitative and quantitative analysis of active substances, excipients and solvents of medicinal preparations carried out by means of gas chromatography.
• The use of various types of liquid chromatography (ion exchange, gel, partitioning and adsorption) for the analysis of active substances in pharmaceutical preparations.
• Qualitative and quantitative analysis of pharmaceutical preparations and their active ingredients by methods:
o UV-VIS spectrophotometry, infrared spectroscopy, Raman spectrometry, nuclear magnetic resonance spectrometry,
o paramagnetic electron resonance spectrometry, mass spectrometry, atomic absorption spectrometry, spectrofluorimetry
o Electrochemical methods: potentiometry, ion selective electrodes, conductometry.
o Methods of thermal analysis (differential scanning calorimetry, thermal differential analysis, thermogravimetry)

## Course topics

## Teaching methods

seminars - multimedia presentation

## Bibliography

Basic:
1. Szczepaniak W.: „Metody instrumentalne w analizie leków" PWN, Warszawa, 2009
2. Farmakopea Polska XI, PTFarm, Warszawa, 2019

Additional:
1. Jarosz M.: „Nowoczesne techniki analityczne", Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2006
2. Cygański A.: Metody spektroskopowe w chemii analitycznej, Wydawnictwo Naukowo-Techniczne, Warszawa, 1997

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 30 | 1,00 |
| Classes requiring direct contact with the teacher | 15 | 0,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 15 | 0,50 |