UNIWERSYTET GDAŃSKI

**Course title**
Wykład monograficzny - Analiza lipidów/Monographic lecture – Lipid analysis

**ECTS code**
13.3.1031

**Name of unit administrating study**
Faculty of Chemistry

**Studies**

| Field of study | Type | Form | |
|---|---|---|---|
| Chemical business | Master | Full-time studies | |

**Teaching staff**
Dr Łukasz Haliński

**Forms of classes, the realization and number of hours**

A. **Forms of classes, in accordance with the UG Rector's regulations**
lecture

B. **The realization of activities**
In-class learning

**Number of hours**
lecture 30 h

**ECTS credits**
classes 30 h
Tutorial classes 10 h
Student's own work 35 h
TOTAL: 75 h - 3 ECTS

**The academic cycle**
2020/2021 summer semester

**Type of course**
obligatory

**Language of instruction**
Polish

**Teaching methods**
Lecture including multimodal presentation

**Form and method of assessment and basic criteria for evaluation or examination requirements**

**A. Final evaluation, in accordance with the UG study regulations**
Course completion (with a grade)

**B. Assessment methods**
Lecture – two tests with open and closed questions

**C. The basic criteria for evaluation** or exam requirements
Lecture:
• pass tests with open and closed questions; the final score from the results of both tests gives the following grade:
91-100%: 5.0
81-90%: 4.5
71-80%: 4.0
61-70%: 3.5
51-60%: 3.0
Less than 51% 2.0

**Required courses and introductory requirements**

**Formal requirements** Organic chemistry; Analytical chemistry

**A. Prerequisites**

Organic chemistry; Analytical chemistry.
Basic skills in organic chemistry and analytical chemistry, including instrumental analysis.

**Aims of education**
• To provide students a clear understanding of basic issues in lipid chemistry and analysis
• To familiarize students with lipid chemistry, nomenclature and properties
• To familiarize students with the theory and practice of lipid extraction, purification, fractionation and chemical analysis
• To introduce students to principles of designing the analytical process basing on the structure and

properties of certain lipid classes
• To learn students how to independently design simple analytical process

**Course contents**

The course includes principles of the modern qualitative and quantitative analysis of lipids, with the special attention paid to determination of fatty acids, triacylglycerols and phospholipids. Specified topics of lectures are given below.

Introduction to lipid chemistry (definitions, chemical structure and nomenclature of non-polar and polar lipids). Sample preparation and lipid extraction. Fractionation of lipids using chromatographic techniques (TLC, LC, HPLC, SPE). Fractionation and analysis of lipids using HPLC. Detectors used in HPLC analysis of lipids (spectrophotometric/UV, IR, refractive index detector, light scattering detector, CAD). Gas chromatography: columns, stationary phases, injectors and detectors (FID, IR, MS) used in lipid analysis. Mass spectrometry of lipids (GC-MS, LC-MS, MALDI-TOF/MS techniques). Interpretation of mass spectra of selected lipids. Usefulness of coupled analytical techniques. Applications of instrumental techniques for the analysis of selected lipid classes. Extraction of lipids from certain organisms: special cases. Lipids as markers of selected human disorders.

**Bibliography of literature**

**A. Literature required to pass the course**

A.1. Literature used during classes:

• Christie W.W. *Gas chromatography and lipids*. The Oily Press, Wielka Brytania, dostępne on-line: http://lipidlibrary.aocs.org/ , przeglądane 2012-01-20
• Hamilton R.J., Hamilton S. *Lipid Analysis*. A Practical Approach. IRL Press, Wielka Brytania.
• Gunstone F.D., Harwood J.L., Padley F.B. *The Lipid Handbook*. Chapman & Hall, Wielka Brytania.

A.2. Literature for individual studies:
• Stepnowski P., Synak E., Szafranek B., Kaczyński Z. *Techniki separacyjne*. Wydawnictwo UG, 2010.
• Kocjan R. (red.). *Chemia analityczna. Podręcznik dla studentów*. Wydawnictwo Lekarskie PZWL, Warszawa, 2000, Tom 2.
• Szczepaniak W. *Metody instrumentalne w analizie chemicznej*. Wydawnictwo Naukowe PWN, Warszawa, 1996.

**B. Extracurricular readings**

• scientific articles concerning course contents