UNIWERSYTET GDAŃSKI

**Course title**
Analityczne aspekty oddziaływań międzycząsteczkowych/ Analytical aspects of intermolecular interactions

**ECTS code**
13.3.0929

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

**Studies**

| Field of study | Type | Form | |
|---|---|---|---|
| Chemistry | Bachelor | Full-time studies | |

**Teaching staff**
Prof. dr hab. inż. Tadeusz Ossowski, dr Dorota Zarzeczańska

**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

**C. Number of hours**
30 h lecture

**ECTS credits** 2

classes - 30 h
tutorial classes – 15 h
student's own work – 5 h

Total: 50 h - 2 ECTS

**The academic cycle**
Third year, summer semester

**Type of course**
elective / obligatory

**Language of instruction**
Polish

**Teaching methods**

Lecture with multimedia 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**
written exam with open questions (tasks)
written exam with multiple choice questions (tasks)

**C. The basic criteria for evaluation** or exam requirements

Positive evaluation of the written exam consisting of 5 open questions (tasks) and 10 multiple choice questions covering the issues listed in the program content of the subject; answers to the questions will require solving tasks related to the presented learning outcomes; the grading scale will be adjusted to the rating range of the assessed works

**Required courses and introductory requirements**
Analytical chemistry, physical chemistry
Basic issues in the field of analytical and physical chemistry, the ability to describe the equilibrium in solution with chemical reactions

**Aims of education**
- Acquainting with instrumental and computational techniques for analysis of equilibrium reactions in solution
- Ability to select a technique to analyze intermolecular interactions
- Ability to write, graphically present and apply chemical programs to describe and analyze intermolecular interactions

**Course contents**

Practical design of the synthesis of organic compounds. Preparation of samples for spectroscopic measurements (UV-Vis and CD). Spectroscopic and graphical analysis, IR and NMR spectra processing using appropriate software. Basics of electrochemistry in the study of intermolecular interactions. Calculation of acid dissociation constants based on spectroscopic and potentiometric measurements. Equilibrium modeling based on results obtained from potentiometry or spectroscopy. Kinds of intermolecular interactions and their description by means of quantum chemistry. Searching for available databases, using selected databases to find physicochemical properties of selected organic compounds.

**Bibliography of literature**

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


1. J. Polster, H. Lachmann, Spectrometric Titrations: Analysis of Chemical Equilibria, Weinheim; Basel (Switzerland);Cambridge, New York NY
2. A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa 2009
3. L. Piela „Idee chemii kwantowej" PWN Warszawa 2003


**B. Extracurricular readings**


4. J. Inczedy Równowagi kompleksowania w chemii analitycznej, Warszawa PWN 1979
5. J.B. Lambert, H.F. Shurvell, D.A. Lightner, R.G. Cooks, Organic Structural Spectroscopy, Prentice Hall, New Jersey, 1998


**Knowledge**

1. Defines and explains the basic concepts of spectroscopy and electrochemistry
2. Describes the forces defining intermolecular interactions.
3. Lists the types of intermolecular interactions
4. Selects the analytical technique adequate to the study of a given type of intermolecular interaction.

**Skills**

Estimates the strength of possible intermolecular interactions based on the monomer structure
Analyzes IR and NMR spectra and performs graphic processing.
Calculates the acid dissociation constants of compounds based on potentiometric and spectrophotometric measurements.
Plans and optimizes oxidation reaction conditions with catalysts
Designs selected organic compounds
Is searching in available databases of physicochemical properties for the tested compounds

**Social competence**

Shows cautious criticism in receiving information, especially available in the mass media