GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | INSTRUMENTAL TECHNIQUES FOR THE ANALYSIS OF BIOMOLECULES, PG_00063456 | | |
| Field of study | Biotechnology | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2024/2025 |
| Education level | second-cycle studies | Subject group | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Piotr Szweda | |
| | Teachers | dr hab. inż. Piotr Szweda | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 30.0 | 0.0 | 0.0 | 30 |

E-learning hours included: 0.0

**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 | 30 | 5.0 | 15.0 | 50 |

**Subject objectives**

Making students familiar with practical aspects of modern instrumental methods application in studies on biomolecules

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_U04] predicts the interaction of biomolecules and biologically active compounds on living organisms and the course of processes involving them based on knowledge in biology, biotechnology and related fields and computer methods of data analysis, modeling and simulation | The student is able to determine physicochemical and structural parameters of biomolecules based on the results of spectral analysis. | [SU2] Assessment of ability to analyse information |
| [K7_W02] explains the structure and function of biomolecules and the methods and instruments for determining their quantity and activity | The student knows the principles and possibilities of using methods of instrumental analysis of biomolecules | [SW1] Assessment of factual knowledge |
| [K7_U01] designs experiments in accordance with the state of the art and the latest scientific literature, using computer methods of data analysis, computer simulations | The student knows the theoretical basis of experimental techniques used for purification of natural compounds. The student is able to plan an experiment and interpret its results. | [SU3] Assessment of ability to use knowledge gained from the subject |

| | |
|---|---|
| Subject contents | **The students of all specializations**<br><br>1. UV spectroscopy in biomolecule studies<br><br>2. Application of FPLC for isolation and characterization of biomacromolecules<br><br>3. Application of spectrofluorimetry for investigation of protein:ligand interaction<br><br>**The students of specialization: Pharmaceutical Biotechnology and Molecular Biotechnology**<br><br>4. Study of biological membranes and transport through membranes using spectrofluorimetry<br><br>5. Determination of the structure and activity of biomolecules using NMR spectroscopy<br><br>6. Application of confocal microscopy in biomolecule studies<br><br>7. Study of the biological activity of biomolecules using flow cytometry<br><br>8. Application of RT-PCR technique for nucleic acid amplification<br><br>**The students of specialization: Technology, biotechnology and food analysis**<br><br>4. Viscometric determination of viscosity<br><br>5. Instrumental analysis of texture and mechanical strength of polysaccharide-protein systems<br><br>6. Determination of temperature of starch gelatinization by differential scanning calorimetry<br><br>7. Determination of cocoa butter polymorphism by differential scanning calorimetry<br><br>8. Potentiometric determination of enzyme activity |
| Prerequisites and co-requisites | Knowledge of Biochemistry, Methods of Structural Studies and Separation Technologies at the 1st level studies |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Practical excercises | 100.0% | 20.0% |
| Report | 50.0% | 50.0% |
| Assessment of theory knowledge | 50.0% | 30.0% |

Recommended reading

| | |
|---|---|
| Basic literature | Materials available at the WWW page<br><br>"Instrumentalne metody badania struktury i aktywności biomoleku**ł**", S. Milewski (red), Wydawnictwo PG 2013 |
| Supplementary literature | Alan Cooper, Chemia biofizyczna, PWN W-wa, 2010 |
| eResources addresses | Adresy na platformie eNauczanie:<br>Techniki Instrumentalne w Analizie Biocząsteczek - Moodle ID: 44135<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44135 |

| | |
|---|---|
| Example issues/ example questions/ tasks being completed | 1. What fluorescent dyes are used in the RT-PCR technique?<br><br>2. What absorption bands in UV region are characteristic for proteins?<br><br>3. Which features of medium-pressure liquid chromatography (FPLC) are crucial for the usefulness of this technique for biomolecules separation? |
| Work placement | Not applicable |

Document generated electronically. Does not require a seal or signature.