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| **Course title**  Biotechnology and Biochemistry Laboratory – ERASMUS  Laboratorium biochemii i biotechnologii – ERASMUS | | | **ECTS code** |
| **Name of unit administrating study**  Faculty of Chemistry | | | |
| **Studies**   |  |  |  |  | | --- | --- | --- | --- | | **Field of study** | **Type** | **Form** |  | | Chemistry | Bachelor | Full-time studies |  | | Chemistry | Master | Full-time studies |  | | Environmental sciences | Bachelor | Full-time studies |  | | | | |
| **Teaching staff**  Leading teacher: dr Daria Krefft;  Other teachers: dr inż. Joanna Jeżewska-Frąckowiak; dr Joanna Żebrowska; dr hab. Agnieszka Żylicz-Stachula | | | |
| **Forms of classes, the realization and number of hours** | | **ECTS credits 6**  classes 45 h  tutorial classes 40 h  student’s own work 65 h  TOTAL: 150 h - 6 ECTS | |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**   laboratory classes | |
| 1. **The realization of activities**   In-class | |
| 1. **Number of hours**   45 h - laboratory | |
| **The academic cycle**  summer | | | |
| **Type of course**  facultative | **Language of instruction**  English | | |
| **Teaching methods**  Laboratory experiments | **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**  Laboratory exercise: conducting experiments, report preparation; final test | | |
| **C. The basic criteria for evaluation** or exam requirements  Evaluation criteria in accordance with the UG Studies Regulations; | | |
| **Required courses and introductory requirements**  no requirements | | | |
| **Aims of education**  • To gain knowledge and skills in the field of biological macromolecules such as nucleic acids, proteins and sugars  • To gain knowledge and skills in the field of analysis of selected biologically active compounds such as vitamins or plant dyes  • To gain knowledge and skills in the field of enzyme kinetics  • To gain knowledge and skills in the field of microorganisms in biotechnology and the food industry applications  **Convergent to:** biochemistry, biotechnology | | | |
| **Course contents**  The use of microorganisms in biotechnology and industry. Conducting the cultivation of microorganisms (yeast or bacteria). Methods of isolation and analysis of nucleic acids. Methods of carbohydrate analysis, their characteristic reactions. Methods of protein separation and analysis. Agarose and polyacrylamide electrophoresis (SDS-PAGE). Adsorption chromatography: TLC and column chromatography. Photosynthesis, characteristics, chlorophyl and accompanying dyes. Analysis of plant dyes. Enzyme kinetics - optimal enzyme operating conditions, parameters affecting enzyme activity, reaction inhibitors. | | | |
| **Bibliography of literature**  1. Stryer L., Berg J., Tymoczko J., Gatto G.: Biochemistry, Macmillan Learning, 2019  2. Green M.R., Sambrook J.: Molecular Cloning: A Laboratory Manual, 4th edition, Cold Spring Harbor Laboratory Press, 2012  3. Kłyszejko-Stefanowicz L.: Ćwiczenia z biochemii, Wydawnictwo Naukowe PWN, Warszawa 2005  4. Drożdż B.: Analiza jakościowa związków organicznych, Collegium Medicum UJ, Kraków 2013 | | | |
| **Knowledge**  1. Student names and describes differences in the structure of basic macromolecules such as proteins, nucleic acids and carbohydrates.  2. Student knows the basics of separation and analytical techniques of selected macromolecules, incl. adsorption chromatography or agarose/polyacrylamide gel electrophoresis.  3. Student is able to indicate and describe reaction parameters that influence the kinetics of enzymes.  4. Student has the knowledge about the applications of microorganisms in biotechnology and the food industry.  5. Student describes the impact of maintaining sterile conditions when working with microorganisms. | | | |
| **Skills**  1. Student is able to prepare own laboratory environment in order to work aseptically.  2. Student follows given experimental procedures and rules of work with chemical compounds as well as microorganisms.  3. Student performs chemical calculations needed to perform experiments.  4. Student is able to analyze basic features of macromolecules such as nucleic acids, proteins and sugars.  5. Student individually plans the course of experiments to perform.  6. Student is able to interpret and comment the obtained experimental results and presents them in a written form (a report).  7. Student is able to involve knowledge from different fields while concluding after an experiment. | | | |
| **Social competence**  1. Student understands the need for further education in the field of biochemistry and biotechnology.  2. Student shows creativity as well in individual and team work.  3. Student is careful when handling chemicals or biological materials. | | | |