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| **Course title**Kinetics and chemical thermodynamics – ERASMUSKinetyka i termodynamika chemiczna – ERASMUS  | **ECTS code**13.3.1273 |
| **Name of unit administrating study** Faculty Chemistry |
| **Studies**

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| **Field of study** | **Type** | **Form** |  |
| Chemistry | Bachelor  | Full-time studies  |  |
| Chemistry | Master  | Full-time studies  |  |
| Environmental sciences | Bachelor | Full-time studies |  |

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| **Teaching staff**dr hab. Dagmara Jacewicz, prof. UG; dr Joanna Dżeżdżon |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 4**classes 30 htutorial classes 20 hstudent’s own work 50 hTOTAL: 100 h - 4 ECTS |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**

laboratory |
| 1. **The realization of activities**

In-class |
| 1. **Number of hours**

30 h - laboratory |
| **The academic cycle**winter |
| **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**Lab reports  |
| **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*** a continuation and extension of the course of inorganic, physical and coordination chemistry,
* the aim of the course is to acquaint students with the fundamental procedures of the examination of the chemical compounds that are generally used in various chemical industries, in a scientific research and in a quality control laboratories,
* this laboratory is intended to familiarize students with a designing of an experiment, an interpretation of the data and the methods of a visualization and a presentation of the results,
* a presentation the most important contemporary issues related to the study of the kinetics and thermodynamics of chemical complexes,
* a development of the ability for planning and carrying out a single-handed experiments as well as for interpreting obtained data
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| **Course contents**The kinetic and thermodynamic properties of coordination compounds. Stable and unstable complexes, inert and labile complexes. Factors affecting stability of complexes. The thermodynamic parameters of chemical reactions. The spectroscopic properties of complexes. Kinetics and reaction mechanisms in coordination compounds, conformational changes between reactant and product complexes. The thermal properties of transition metal complexes. Thermogravimetric analysis. Differential thermal analysis. Calorimetry. |
| **Bibliography of literature** J. Keeler, “Kinetics of Chemical Reactions”, University of Cambridge |
| **Knowledge**Understanding the mechanisms of intermolecular interactions in various states clusters of matter. Assessment of bond stability and reactivity of inorganic compounds. To acquaint students with the research methods of coordination compounds in solutions and in the solid. Designing experiments to determine the speed of a reaction chemicals involving coordination compounds of transition metals. Determination of the value of rate constants of chemical reactions by techniques spectroscopic, studying the mechanisms of isomerization of complex compounds catalyzed with selected metal ions. Presentation of the use of basic spectroscopic techniques (IR, FIR, Ra-man, UV-Vis) for the analysis of the structure of complex compounds. The use of modern methods of thermal analysis combined with analysis volatile decomposition products (TG-IR, TG) for testing the thermal stability of samples, analysis of the composition and purity of complexes, tracking the formation of new ones complex compounds in the solid phase and the identification of gaseous products decomposition reaction. |
| **Skills**Determining the basic properties and reactivity of compounds inorganic and organic in terms of kinetic and thermodynamics (activation parameters). Acquisition of the skills of planning and conducting experiments by students,selection of appropriate measurement techniques for physicochemical analysis complex compounds. The ability to interpret the received data and present the received data results. Predicting observations and formulating conclusions resulting from conducted chemical experiments. Justifying the presented opinion. |
| **Social competence**The use of chemical knowledge in correlation with other natural sciences to explaining the course of phenomena encountered in everyday life. The ability to use the acquired knowledge for risk assessment and planning ways of counteracting threats to human health and the environment natural. Correct identification and resolution of dilemmas related to performing chemical experiments with inorganic compounds and coordination. Understanding the social aspects of the practical application of the acquired knowledge and skills and associated responsibility. |