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| **Course title**Renewable energy – ERASMUS Energia odnawialna – ERASMUS  | **ECTS code**13.3.1281 |
| **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**prof. dr hab. Ewa Siedlecka, dr Aleksandra Bielicka-Giełdoń |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 4**classes 20 hlab exercises 10htutorial classes 20 hstudent’s own work 50 hTOTAL: 100 h - 4 ECTS |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**

Lecture, laboratory exercises |
| 1. **The realization of activities**

In-class or on-line, work in the lab |
| 1. **Number of hours**

20 h – lecture; 10 h lab exercises |
| **The academic cycle**winter |
| **Type of course**facultative | **Language of instruction**English |
| **Teaching methods**Lecture with a multimedia presentationWork in the lab | **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**Writing 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**Familiarizing students with all issues listed in the seminar program content**Convergent to**: general chemistry, physical chemistry, environmental sciences |
| **Course contents**Characteristics of renewable energy sources. Determinants of energy policy in the 21st century - forecasts for the future. Overview of the methods of obtaining solar, wind, geothermal and tidal energy. Heat pumps. Solar cells. Windmills. Energy resources of biomass. Energy plants – the raw material for the production of energy, liquid and gas biofuels. Characteristics and technologies of gaseous and liquid biofuel production. Utilization and management of waste generated during the production of biofuels. Hydrogen as the fuel of the future. Algae a source of biofuels. Fuel and microbial cells. Green vehicles: powered vehicles electric, solar energy, hybrid diesel-electric. Energy storage. Technical preparation for use of environmentally friendly vehicles. |
| **Bibliography of literature** Material is given during the lecture. |
| **Knowledge**1. discusses the energy situation of the country and the world2. lists and defines the basic types of renewable energy and vehicle ecological3. lists and characterizes the basic methods of obtaining energy renewable4. classifies raw materials and appropriate technologies for the production of liquid biofuels and gas and the methods of their storage5. uses the basic technological and chemical concepts describing the process of obtaining renewable energy6. discusses the advantages and disadvantages of producing and using energy from renewable sources. |
| **Skills**1. is clear, both orally and in writing, that it is correct technological reasoning, |
| **Social competence**1. understands the need to save energy and obtain it from renewable sources,2. understands the need for further education |