

**Course title:** **Engineering of Renewable Energy Sources**

**Institute/Division:** **FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY**

**Number of contact hours:** **45 hours** (15 h lectures & 15 h laboratories & 15 h projects)

**Course duration:** 1 semester (???)

**ETCS credits:** **5**

**Course description:** The main purpose of this course is to introduce students with renewable energy resources availability, potential and suitability as a substitute for conventional energy resources in future energy demand and also devices using renewable energy sources.

**Education effects:**

- knowledge: Student can describe primary renewable energy resources (of heat, cold or electric power) and technologies for households, as well as the renewable energy resources influence on the environment. Student can list advantages and disadvantages of a wide usage of alternative and renewable energy resources. The student knows the basics of operation of devices using renewable energy sources and strategies for enhancing the use of renewable energy resources for future demand.
- skills: Student can explain the concept and importance of devices using renewable energy sources. Student perform simple design calculations. Student can make analysis on importance of renewable energy solutions for sustainable development. Student is able to identify solutions carry out techno-economic assessment.
- social: Student is able to work independently and in the group when solving the problems related to chemical engineering in a related aspect to renewable energy sources.

**Literature:**

- [1] Donald Klass, "Biomass for Renewable Energy, Fuels, and Chemicals", Entech International Inc., USA
- [2] JA Duffie and WA Beckman, "Solar Engineering of Thermal Processes", Third Edition (John Wiley & Sons)
- [3] S Sukhatme and J Nayak, "Solar Energy: Principles of Thermal Collection and Storage", Third Edition (Tata McGraw Hill, 2008)
- [4] TERI Energy Data Directory (TEDDY) 2016 (TERI Press, 2016)

**Assessment method:** Exam, projects, tests

**Prerequisites:** **Basic technical knowledge.**

**Primary target group:** **Students from all specialties**

**Lecturer:** **dr inż S. Pater**

**Contact person:** **dr inż S. Pater e-mail: [sebapater@chemia.pk.edu.pl](mailto:sebapater@chemia.pk.edu.pl)**

**Remarks:** **Regular course**