

SUSTAINABLE ENERGY SYSTEMS Interdisciplinary programme from departments of MECHANICAL ENGINEERING and NATURAL SCIENCES BACHELOR LEVEL (required language level B2)	Description	Lecturer	CP / ECTS	Term (Semester)
LECTURE: Introduction to modelling and simulation	Types of numerical models, scientific computing, programming of simple models in Matlab.	Mr Herráez	5	fall
LECTURE: Simulation of energy systems Prerequisites: basic knowledge of programming. Only open to limited no. of students	Modelling, simulation and analysis of local energy systems with producers, consumers and prosumers	Ms Pechmann	5	fall
LECTURE: Energy storage, only open to limited no. of students	Storage of thermal, chemical, electrical and kinetic energy, as well as potential energy. Fuel cell and hydrogen storage.	Mr Illing	5	fall
LECTURE: Wind turbines	Design of wind turbines and wind farms, aerodynamics, structural dynamics, wind resource and site assessment. Knowledge of fluid dynamics needed.	Mr. Herráez	5	spring
PROJECT: Wind challenge	Design and production of a small wind turbine in cooperation with a group of students from different backgrounds for participating in an international wind energy contest.	Mr. Herráez	2	fall and spring
LECTURE: Solar Thermal Energy	Solar resource, design of solar thermal systems, performance analysis. Knowledge of thermodynamics needed.	Mr Herráez	2,5	spring
LECTURE: Photovoltaics	Physical principles of the use of photovoltaic energy, components of photovoltaic installations, design of photovoltaics systems. Basic knowledge of electrotechnics needed.	Mr. Herráez	2,5	spring
LECTURE: Sustainable Production Prerequisites: Basic knowledge of programming. Only open for limited no. of students	Globalization and climate change, production systems and production management systems, requirements for sustainable production	Mrs Pechmann	5	spring
LECTURE: Thermal Power Plants	Types of Thermal Power Plants, heat sources, power machines, efficiency, emissions, power density	Mr. Jakiel	5	spring
LECTURE: Energy Process Technology	Optimization of energy-relevant process, analysis of thermodynamics, chemical and biological aspects	Mr Paul	5	spring
LECTURE: Process modelling and energy optimization	Modeling of chemical and environmental processes, commercial process simulators, development and optimization of energy processes	Mr Steinigeweg	4	spring
LECTURE: Sustainable energy generation	Energy supply chains and their technical, environmental and economic dimensions	Mr. Paul	2	spring
LECTURE: Laboratory Course Solar Energy	The theory of the lectures Solar Thermal Energy and Photovoltaics will be applied to perform and evaluate different experiments in the field of solar energy.	Mr Herráez	2	spring