Course: Technologies, Plants and Integration — credits: 5

Course code	SUVM23TPI
Name	Technologies, Plants and Integration
Study year	2025-2026
ECTS credits	5
Language	English
Coordinator	J. Bekkering
Modes of delivery	Teaching method 1
Assessments	Technologies, Plants and Integration - Assignment

Learning outcomes

Objective of the module:

At the completion of this module the student is able to:

1. Evaluate the technical feasibility of a renewable energy facility (e.g., hydro storage) and its contribution to the energy system.
2. Analyze grid balancing with technologies and plant designs at different scales.
3. Understand the basics of energy (forms), thermodynamics and electricity
4. Understand the technical feasibility of renewable energy technologies
5. Understand current energy systems including production and consumption of energy
6. Understand the structure and characteristics of electricity and gas grids, both for transport and distribution
7. Understand the characteristics of storage and the role of storage in balancing supply and demand flexible energy systems with integrated renewable energy technologies while balancin supply and demand

Content

Content of the module:

In this module the student will firstly acquire knowledge of physical aspects in relation to energy. Discussion of the fundamentals of fossil fuel and renewable energy technologies and energy carriers will follow. The student will also develop basic knowledge of the technical and economic issues relating to the planning and operation of power systems that use renewable energy sources. The influence of technology, cost and scale upon all items are discussed (e.g., after completing this module, the student must be able to judge the technical feasibility of wind energy and its contribution to the energy system and to make a rough cost/benefit analysis to evaluate the viability of such an idea). Gas and electricity grids are predominantly given separate consideration within this module.

The module content is divided in five main parts:

1. Energy Basics
2. Sustainable Technologies and Economics
3. Current Energy Systems (gas, electricity) and Economics
4. Transport & Distribution Technologies and Economics
5. Balancing and Energy Storage

Lab work provides 0.5 EC of the module.

Included in programme(s)

European Master in Sustainable Energy System Management

School(s)

Institute of Engineering

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