Module label: Ocean Energy Systems Technologies
Module code: pre333
Credit points: 7.5 KP
Workload: 225 h
Used in course of study: Master's Programme European Master in Renewable Energy (EUREC) > Mastermodule
Contact person:
Entry requirements:
Skills to be acquired in this module:
- be familiar with the state of the art of electro-mechanical power take-off equipment used in wave energy converters and marine current turbines;
- be familiar with mooring and anchoring systems;
- be familiar with the design and configuration of farms;
- be capable to distinguish the different components and designs of offshore electrical grids;
- acquire basic knowledge on the requirements to deploy, operate and maintain the wave and current energy system;
- be aware of maritime safety issues.

Module contents:
- Principle of operation and components of air turbines, water turbines, high-pressure hydraulic systems, linear and rotating electrical generators, and energy storage in ocean energy.
- Classification of offshore structures; loads, cost and materials of mooring and anchoring systems; description of anchoring and foundations systems; taut and slack-mooring systems; and mooring configurations in arrays.
- Principles of interference of WEC arrays and layout optimization methods.
- Analysis of tidal turbines arrays.
- Offshore electrical grid structure and components, cable technologies, electrical designs (HVDC vs AC), interaction with the local electricity network, integration into the National grid, examples/case studies.
- Routine and non-routine offshore operations; management systems; maintenance procedures, risk assessment and inspection plans; and case studies.
- Introduction to offshore operations; vessels, equipment and personnel; method planning and permitting; principles, legislation and standards of safety management.
- Fluid Mechanics Laboratory of the Mechanical Engineering Department of IST: Testing of an air turbine for use in OWC systems. (Duration 3 h).
- Electrical Machinery Laboratory of the Electrical and Computer Engineering Department of IST: laboratory practice on electrical generators. (Duration 3 h).

Reader's advisory:
Carbon Trust: Guidelines on design and operation of wave energy converters, 2005.
R. E. Harris et al: Mooring systems for wave energy converters: A review of design issues and choices.

Links:
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency:jährlich
Module capacity: unlimited
Modulart: MM (Mastermodul / Master module)
Lern-/Lehrform / Type of program: Lectures, Tutorial, Laboratory, Self-study
Vorkenntnisse / Previous knowledge:
Examination:
Final exam of module:
Course type: Seminar

Time of examination: Exam week (mid-June)
Type of examination: Written exam (3 hours)

SWS:
Frequency:
Workload attendance: 0 h