Master study course Renewable Energy Systems (M. Eng.)

Module – No.		861		Compulsory module
Module name		**Ocean energy and Hydropower**		
Module coordinator		Prof. Dr.-Ing. Joachim Fischer		
Title		Ocean energy and Hydropower		
Title of examination		Ocean energy and Hydropower		
Semester		2		
Course type	Language	Lecture	English	
SWS/ ECTS/ Workload		4 V	5	150
Requirements for attendance		Successfully completed technical study course (e.g. Bachelor of Engineering)		

1. Content and objectives

Objective

This lecture discusses the theory, technology and engineering associated with hydropower, tidal and ocean energy.

Module content:

Ocean energy

- Ocean as an energy resource
- Wave energy, fundamentals and application
- Tidal energy, tidal theory and prediction; barrage generation; turbines
- Ocean thermal energy conversion
- Ocean currents as an energy resource – fundamentals and technologies
- Economic assessment of ocean energies

Hydropower

- Hydro power potentials
- Types of hydro power stations
- Hydro turbines: turbine types, application ranges, fundamentals
- Stream turbines: fundamentals, turbine types, application range
- Hydro power without dams and weirs

On-line Lecture notes and training material will be available.

Recommended Literature:

Deborah Greaves, Gregorio Iglesias; Wave and Tidal Energy, Wiley , 2018

Victor Lyatkher: Tidal Power: -Harnessing Energy from Water Currents, Wiley-Scrivener,2014

Edwin Parks; Hydropower Engineering, Larsen and Keller Education, 2017

Learning goals:

After successfully completing the module, students understand the established and new technologies of hydropower and ocean energy generation. They are able to evaluate the properties of those technologies. They can analyse potentials of ocean energy and hydropower based on meteorological, geomorphic and topographical conditions. They are capable to assess the basic economic feasibility of hydro power and ocean energy plants

2. Method(s) of instruction

Lecture with integrated exercises

3. Requirements for attendance

No course specific requirements

4. Usability of this module

The module is offered as compulsory course in the master study course „Renewable Energy Systems“ (M.Eng.)

5. Requirements for assessment

- Assessment is performed either as written examination (90 minutes) or oral examination
- Students need to pass the module examination, which encompasses all contents of the lecture.

6. ECTS credits
- 5 ECTS credits
7. Frequency of offer
- Annually in the autumn semester
8. Work load
150 h of total work load, therefrom - 80 h of presence at lectures - 40 h of self-study - 30 h preparation for examination
9. Duration of module
1 semester