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

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

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
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.

Stand: 25.03.18
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6. ECTS credits</strong></td>
<td>- 5 ECTS credits</td>
</tr>
<tr>
<td><strong>7. Frequency of offer</strong></td>
<td>- Annually in the autumn semester</td>
</tr>
</tbody>
</table>
| **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 |