### Energiewasserbau (Hydropower Engineering)  RESE M T1b

**Relevance for ResEngin curriculum**
- compulsory elective

**Administration**
- Inst. f. Wasser & Gew.entw.
- Wasserwirtschaft & Kulturtech.

**Contact**
- peter.oberle@kit.edu

**Term(s) offered**
- 2nd (Summer Apr–Sept)

**Duration | Cycle**
- 1 term; every year

**Language of instruction**
- German

**Prerequisites**
- Bachelor, German language proficiency at DSH level

**Module coordinator**
- OBERLE, Dr.-Ing. Peter; IWG-WK

**Learning outcomes**
- Description see p. 2.

**Literature / Course materials**
- Reference list see p. 3.

**Basis for module(s)**
- not applicable

**Intersection with module(s)**
- M 1 Hydraulic & Environmental Engineering

**Lecture courses**
- (training mode)
- 19208 Energiewasserbau (lecture)
  - 5.0 CP 4 WCH
  - SUM 5.0 CP 4 WCH

**Workload specification**
- (30 work hours → 1 CP acc. to ECTS) 5 x 30 h 150 h

**Lecture Phase:**
- Contact hours 42.0 h
- Self instruction 63.0 h

**Exam Phase:**
- Self instruction 45.0 h

**Module examination(s)**
- (mode | scope | weighting)
- “Energiewasserbau” written | 75 min | 5.0/5.0 CP

**Lecturers**
- OBERLE, Dr.-Ing. Peter; IWG-WK

**Individual lecture courses**
- Descriptions + Recommended background knowledge see p. 4.
Module T1b: “Hydropower Engineering” (cont.)

Module topic

The current political and legal framework as major context factor for practice-oriented planning, operation and maintenance of hydropower plants considering environmental issues.

Learning outcomes

Disciplinary knowledge

- **concepts, theories & definitions**
  turbines (e.g. Euler’s turbine equation); flow conditions in turbines; mass oscillation and water hammer phenomena; analysis of water power capacity; essentials for creating a plan of water-economic capability; electro-technical basics of power generation.

- **subject matter (factual data, examples)**
  constructional characteristics of river and high-pressure power plants; operating modes and selection criteria of different types of turbines as well as electro-technical aspects of the plants’ operation; consideration of ecological aspects and energy policy; presentation of current projects and excursions.

- **methods & procedures**
  technical background for planning and designing hydropower plants.

Professional skills

- Gain expertise in planning hydropower plants considering turbine pre-selection, structural dimensions (e.g. powerhouse, draft tube), and economic aspects.

Personal competence

- n.a.
Module T1b: “Hydropower Engineering” (cont.)

Literature/ Course material


Lecture notes

- “Energiewasserbau”
## Course: Energiewasserbau (Hydropower Engineering)

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<thead>
<tr>
<th>KIT lecture ID</th>
<th>19208</th>
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<tbody>
<tr>
<td>Relevance</td>
<td>compulsory elective</td>
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<td>Prerequisites</td>
<td>Bachelor, German proficiency (DSH level)</td>
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<td>Term(s)</td>
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<td>Language</td>
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<td>Training mode</td>
<td>Lecture, 4 WCH *</td>
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<td>Workload</td>
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### Workload specification

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<th>LECTURE PHASE</th>
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<tr>
<td>Contact (based on 4 WCH)</td>
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<tr>
<td>Self Instruction</td>
<td>63.0 h</td>
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<th>EXAM PHASE</th>
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<tr>
<td>Self-instruction</td>
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### Lecturer(s)

OBERLE, Dr.-Ing. Peter; IWG-WK

### Course topic

Current political and legal framework as major context factor for practice-oriented planning, operation and maintenance of hydropower plants considering environmental issues.

### Recommended background knowledge

- Fundamentals in engineering physics and mathematics; statics and hydrodynamics; energy, environmental and social issues.

### Learning outcomes

#### Disciplinary knowledge

- **concepts, theories & definitions**
  - Turbines (e.g., Euler's turbine equation); flow conditions in turbines; mass oscillation and water hammer phenomena; analysis of water power capacity; essentials for creating a plan of water-economic capability; electro-technical basics of power generation.

- **subject matter (factual data, examples)**
  - Constructional characteristics of river and high-pressure power plants; operating modes and selection criteria of different types of turbines as well as electro-technical aspects of the plants' operation; consideration of ecological aspects and energy policy; presentation of current projects and excursions.

- **methods & procedures**
  - Technical background for planning and designing hydropower plants

#### Professional skills

- Gain expertise in planning hydropower plants considering turbine pre-selection, structural dimensions (e.g., powerhouse, draft tube), and economic aspects.

### Personal competence

- n.a.

### Assessment specification

- **written** 75 min = module exam “Energiewasserbau”
- **oral** ---
- **other** ---

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* WCH = Weekly Contact Hours