### Experimente in der Strömungsmechanik
(Experimental Fluid Mechanics)

<table>
<thead>
<tr>
<th>Relevance for ResEngin curriculum</th>
<th>compulsory elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>Inst. f. Hydromechanik</td>
</tr>
<tr>
<td>Contact</td>
<td><a href="mailto:cornelia.lang@kit.edu">cornelia.lang@kit.edu</a></td>
</tr>
</tbody>
</table>

### Term(s) offered
3rd term (Winter Oct-Mar)

### Duration | Cycle
1 term; every other year

### Language of instruction
German

### Prerequisites
Bachelor, German language proficiency at DSH level

### Module coordinator
LANG, Dr.-Ing. Cornelia; IfH [Modulverantwortliche]

### 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
M 7 Integrated Projects

### Lecture courses
(training mode)

<table>
<thead>
<tr>
<th>Lecture courses</th>
<th>19231 Experimente in d. Strömungsmechanik (lecture, excursion, labcourse)</th>
<th>5.0 CP</th>
<th>1+3 WCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SUM</td>
<td>5.0 CP</td>
<td>4 WCH</td>
</tr>
</tbody>
</table>

### Workload specification
(30 work hours → 1 CP acc. to ECTS)

| Lecture Phase: Contact hours                  | 10.5 h |
|                                                | 14.0 h |
|                                                | 31.5 h |
|                                                | 63.0 h |

| Exam Phase: Self instruction                  | 30.0 h |

### Module examination(s)
(mode | scope | weighting)

| “Strömungsmechanik” oral | 30 min | 5.0/5.0 CP |

### Lecturers
(in alphabetic order)
- LANG, Dr.-Ing. Cornelia; IfH

### Individual lecture courses
Descriptions + Recommended background knowledge see p. 4.
Module T1a: “Experimental Fluid Mechanics” (cont.)

Module topic

Application of experimental fluid mechanics.

Learning outcomes

Disciplinary knowledge

- **concepts, theories & definitions**
  similitude: requirements, dimensionless fluid parameters, scaling laws; modelling hydraulic problems: dimensional analysis, scale effects, design of hydraulic models, examples.

- **subject matter (factual data, examples)**
  pipe flow with orifice plate: pressure distribution, jet shape and contraction; open channel flow with vertical gate and hydraulic jump: measurement of pressure and water levels; venturi pipe flow with cavitation: pressure distribution; settling velocities of spheres: resistance in different fluids; diffusion of a turbulent air jet: transport of mass, energy and momentum.

- **methods & procedures**
  typical setup of hydraulic/aerodynamic models, measurement instrumentation.

Professional skills

- Capability of working with physical models and to interpret their results.
- Preparation of test reports. Presenting of results.

Personal competence

- Collaborative work on engineering project (physical model application).
Module T1a: “Experimental Fluid Mechanics” (cont.)

Literature/ Course material


Lecture notes
- “Experimente in der Strömungsmechanik”
**Module T1a**

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**Course**

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**Experimente in der Strömungsmechanik**

(Experimental Fluid Mechanics)

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**Experimemtal Fluid Mechanics: Physical Model Analysis**

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<table>
<thead>
<tr>
<th>KIT lecture ID</th>
<th>19231</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>
</tr>
<tr>
<td>Term(s)</td>
<td>3rd term (winter)</td>
</tr>
<tr>
<td>Language</td>
<td>German</td>
</tr>
<tr>
<td>Training mode</td>
<td>Lecture, 1 WCH * Labcourse, 3 WCH</td>
</tr>
<tr>
<td>Workload</td>
<td>5.0 CP (\Rightarrow) 150.0 h</td>
</tr>
</tbody>
</table>

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**Workload specification**

<table>
<thead>
<tr>
<th>LECTURE PHASE</th>
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<tbody>
<tr>
<td>Contact (based on 1 WCH)</td>
<td>10.5 h</td>
</tr>
<tr>
<td>Self Instruction</td>
<td>14.0 h</td>
</tr>
<tr>
<td>Lab work</td>
<td>31.5 h</td>
</tr>
<tr>
<td>Exam preparation</td>
<td>63.0 h</td>
</tr>
</tbody>
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<table>
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<th>EXAM PHASE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Self-instruction</td>
<td>30.0 h</td>
</tr>
</tbody>
</table>

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**Contact**

cornelia.lang@kit.edu

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**Lecturer(s)**

LANG, Dr.-Ing. Cornelia; IfH

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**Course topic**

Complex flow situations and the application of experimental fluid mechanics.

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**Recommended background knowledge**

Fundamentals of Hydromechanics

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**Learning outcomes**

**Disciplinary knowledge**

- **concepts, theories & definitions**
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- **methods & procedures**
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**Professional skills**

Capability of working with physical models and to interpret their results. Preparation of test reports. Presenting of results.

**Personal competence**

Collaborative work on engineering project (physical model application).

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**Assessment specification**

written ---
oral 30 min \(=\) module exam “Strömungsmechanik”
other ---

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* WCH = Weekly Contact Hours