### Human-Centered Robotics

**AR-317**

<table>
<thead>
<tr>
<th>Rota</th>
<th>Duration</th>
<th>Semester</th>
<th>SWS</th>
<th>Credit Points</th>
<th>Workload</th>
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<tbody>
<tr>
<td>annually WS</td>
<td>1 Semester</td>
<td>3rd (Semester)</td>
<td>3 SWS</td>
<td>5</td>
<td>150 h</td>
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#### Modul Structure

<table>
<thead>
<tr>
<th>Course (Abbreviation)</th>
<th>Type / SWS</th>
<th>Presence</th>
<th>Self Study</th>
<th>Credit Points</th>
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<tbody>
<tr>
<td>Human-Centered Robotics</td>
<td>Lecture / 2 SWS</td>
<td>25 h</td>
<td>65 h</td>
<td>3</td>
</tr>
<tr>
<td>Human-Centered Robotics</td>
<td>Tutorial / 1 SWS</td>
<td>10 h</td>
<td>50 h</td>
<td>2</td>
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**Language:** English

#### Content

1. Introduction and motivation
2. Human-oriented design methods
3. Biomechanics
   a) Motions, measurement, and analysis
   b) Biomechanical models
4. Elastic robotics
   a) Elastic actuators
   b) Control of elastic robots
5. Human-robot interaction
6. System integration and fault treatment
7. Empirical research methods
   a) Research process and experiment design
   b) Research methods, threats, and ethics.

**Literature:**
- Selected research articles.

#### Competencies

On successful completion of this module, students will be able to:
1. Tackle the interdisciplinary challenges of human-centered robot design.
2. Use engineering methods for modeling, design, and control to develop human-centered robots.
3. Apply methods from psychology (perception, experience), biomechanics (motion and human models), and engineering (design methodology) and interpret their results.
4. Develop robotic systems that are provide user-oriented interaction characteristics in addition to efficient and reliable operation.

#### Examination Requirements:
The final exam will be an oral or written exam.

#### Formality of Examination
- Module Finals
- Accumulated Grade

#### Module Requirements (Prerequisites): Required knowledge: none

#### Allocation to Curriculum:
Program: Automation & Robotics, Field of study: Robotics

#### Responsibility / Lecturer
P JProf. Dr.-Ing. Philipp Beckerle / JProf. Dr.-Ing. Philipp Beckerle