## Computer Systems

### AR-103

<table>
<thead>
<tr>
<th>Rota</th>
<th>Duration</th>
<th>Semester</th>
<th>SWS</th>
<th>Credit Points</th>
<th>Workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>annually WS</td>
<td>1 Semester</td>
<td>1st (Semester)</td>
<td>4 SWS</td>
<td>6</td>
<td>180 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>
</tr>
</thead>
<tbody>
<tr>
<td>a) Computer Systems (CS)</td>
<td>Lecture/ 3 SWS</td>
<td>35 h</td>
<td>85 h</td>
<td>4</td>
</tr>
<tr>
<td>b) Computer Systems (CS)</td>
<td>Tutorial/ 1 SWS</td>
<td>15 h</td>
<td>45 h</td>
<td>2</td>
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</tbody>
</table>

### Language

- English

### Content

1. **Microprocessors**: Processor performance, instruction set, compilers, pipelining, and superscalar architectures
2. **Storage Technology**: SRAM, DRAM, ROM, magnetic recording, optical recording
3. **Data Communication**: Bus systems, Ethernet, TCP/IP
4. **Memory Hierarchy**: Caches, virtual memory, RAID systems

### Literature:

- Optical Storage: Alan Marchant, "Optical Recording", Addison Wesley, 1999

### Competencies

By attending this course, students learn the architecture and the components of modern computer systems. This knowledge is directly required for advanced courses on distributed systems and communication systems. As computers are vital components of most robots and complex process automation systems, a basic understanding of computer systems is necessary for most practical work in this area, like project groups and lab courses.

### Examination Requirements

All students are required to successfully complete 2 out of 4 special assignments in order to be admitted to the final exam. The final exam is a written test (3 hours). The grade is solely determined by the final exam.

### Formality of Examination

- Module Finals
- Accumulated Grade

### Module Requirements (Prerequisites)

### Allocation to Curriculum:

Mandatory Course
Program: Automation & Robotics

### Responsibility/ Lecturer

Jun.-Prof. Dr. Fang-Jing Wu / Jun.-Prof. Dr.-Fang-Jing Wu