## Scheduling Problems and Solutions

<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>bi-annually SS</td>
<td>1 Semester</td>
<td>2nd (Semester)</td>
<td>7 SWS</td>
<td>10</td>
<td>300 h</td>
</tr>
</tbody>
</table>

### 1. 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) Scheduling Problems and Solutions (SPaS)</td>
<td>Lecture/ 4 SWS</td>
<td>45h</td>
<td>135 h</td>
<td>6</td>
</tr>
<tr>
<td>b) Scheduling Problems and Solutions (SPaS)</td>
<td>Tutorial/ 2 SWS</td>
<td>25 h</td>
<td>95 h</td>
<td>4</td>
</tr>
<tr>
<td>c) Scheduling Problems and Solutions (SPaS)</td>
<td>Lab/ 1 SWS</td>
<td>15 h</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2. Language

English

### 3. Content

1. Single Machine Models: Classification, complexity, total weighted completion time, maximum lateness and multiple objectives
2. Parallel Machine Models: Makespan, total completion time, preemption
3. Shop Systems: Flow shop, flexible flow shop, job shop, open shop
4. Online Scheduling: Competitive factors, non clairvoyant scheduling
5. Scheduling in Practice: Computer intelligence, Integer linear programming

### Literature:

- Yves Robert, Frédéric Vivien (ed.): Introduction to Scheduling, CRC Press, 2010

### 4. Competencies

The students know the classification of scheduling problems as well as the application of practical algorithms, heuristics, and methods in order to solve these combinatorial resource allocation tasks. They can evaluate the efficiency of classical solution methods and will be able to develop new solution approaches for complex scheduling problems based on their acquired knowledge.

### 5. Examination Requirements

Dependent on the number of participants the final exam is takes place as oral (40 min) or written exam (2h). The students must successfully participate in the lab course as preparation for the exam.

### 6. Formality of Examination

- Module Finals
- □ Accumulated Grade

### 7. Module Requirements (Prerequisites)

### 8. Allocation to Curriculum:

Program: Automation & Robotics, Field of study: Robotics, Cognitive Systems

### 9. Responsibility/ Lecturer

Prof. Dr. Uwe Schwiegelshohn/ Prof. Dr. Uwe Schwiegelshohn