**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>
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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) Scheduling Problems and Solutions (SPaS)</td>
<td>Lecture/ 4 SWS</td>
<td>45h</td>
<td>115 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>75 h</td>
<td>3</td>
</tr>
<tr>
<td>c) Scheduling Problems and Solutions (SPaS)</td>
<td>Lab/ 1 SWS</td>
<td>10 h</td>
<td>20 h</td>
<td>1</td>
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</tbody>
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### Language

**English**

### Content Elements 1 and 2

1. Scheduling language and classes of schedules
2. Complexity
3. Single machine environments: makespan and total weighted completion time, lateness and tardy jobs, total tardiness and a non-regular objective function, a simple bicriteria problem
4. Online problems in single machine environments
5. Parallel machine environments: makespan, total weighted completion time, lateness, and online problems
6. Flow shop, job shop, and open shop problems

### Content Element 3: Practical approaches to solve scheduling problems including the use of Matlab and CPLEX

**Literature**


### 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.

### Examination Requirements

Oral exam (40 min)
The students must successfully participate in the lab course as preparation for the exam.

### Formality of Examination

- Module Finals
- Accumulated Grade

### Module Requirements (Prerequisites)

Good knowledge in fundamentals of discrete mathematics and basics of algorithms

### Allocation to Curriculum:

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

### Responsibility/ Lecturer

Prof. Dr.-Ing. Uwe Schwiegelshohn/ Prof. Dr.-Ing. Uwe Schwiegelshohn