## Syllabus

### Course description

<table>
<thead>
<tr>
<th>Course title</th>
<th>Introduction to Robot control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course code</td>
<td>43079</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>ING-INF/04</td>
</tr>
<tr>
<td>Degree</td>
<td>Bachelor in Industrial and Mechanical Engineering</td>
</tr>
<tr>
<td>Semester</td>
<td>II</td>
</tr>
<tr>
<td>Year</td>
<td>OPT</td>
</tr>
<tr>
<td>Academic Year</td>
<td>2019/20</td>
</tr>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Modular</td>
<td>//</td>
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</tbody>
</table>

### Lecturer

Prof. Angelika Peer, e-mail: angelika.peer@unibz.it, https://www.unibz.it/de/faculties/sciencetechnology/academic-staff/person/38684-angelika-peer

### Scientific sector of the lecturer

ING-INF/04 – AUTOMATION

### Teaching language

English

### Office hours

After consultation and agreement with lecturer

### Teaching assistant (if any )

-  

### Office hours

-  

### List of topics covered

1. Short review of selected topics of control theory as well as robot kinematics and dynamics
2. Trajectory planning
3. Motion control
4. Interaction control
5. Control of redundant manipulators
6. Control of haptic devices
7. Telemanipulation
8. Visual servoing
9. Computer-aided simulation and design

### Teaching format

The lessons are divided into theoretical classroom lessons, and exercises using blackboard and slides as well as exercises.

### Learning outcomes (ILOs)

The learning outcomes need to refer to the Dublin Descriptors:

<table>
<thead>
<tr>
<th>Specific educational objectives</th>
<th>The student should understand the basic principles of the theory of the control of robot manipulators.</th>
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</thead>
</table>

- The student should understand the basic principles of the theory of the control of robot manipulators.
Knowledge and understanding
Knowledge and understanding in the field of:
1. Theory of control of robot manipulators

Applying knowledge and understanding
2. Ability to apply knowledge for solving given problems, including solving them with numerical data, possibly with the help of software packages like Matlab/Simulink.

Making judgements
3. Ability to judge plausibility of results.

Communication skills

Ability to learn
5. Learning skills to independently study and apply methods of systems and control for specific applications beyond topics covered in this lecture.

Assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Formative assessment</th>
<th>Summative assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Form</td>
<td>Length / duration</td>
</tr>
<tr>
<td>In-class exercises</td>
<td>Continuously as part of course-accompanying exercises</td>
<td></td>
</tr>
<tr>
<td>Written</td>
<td>% 100</td>
<td>Length / duration 90 minutes</td>
</tr>
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</table>

Assessment language English
Evaluation criteria and criteria for awarding marks
The written exam consists of two parts: A first part with a series of questions with to-be-freely formulated answers, as well as a second part consisting of several mathematical problems to be solved, which are distributed among the various topics covered.

Judged will be:
- the correctness of the approach and the mathematical steps of the solution, the calculation of numerical results;
- the correctness of the provided answers and arguments presented and the terminology used.

Required readings Blackboard and slides
Supplementary readings Robotics – Modelling, Planning and Control, Bruno
