### 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>I</td>
</tr>
<tr>
<td>Year</td>
<td>III</td>
</tr>
<tr>
<td>Academic Year</td>
<td>2021/22</td>
</tr>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Modular</td>
<td>//</td>
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| Total lecturing hours | 36                             |
| Total lab hours       | 0                              |
| Total exercise hours  | 24                             |
| Attendance            | Recommended                    |

**Prerequisites**
Lectures and exercises of Mathematical Analysis I and II, Geometry, Physics I, Mechanics of Machinery

**Course page**

**Specific educational objectives**
The student should understand the basic principles of the theory of the control of robot manipulators.

**Lecturer**
Prof. Angelika Peer, e-mail: angelika.peer@unibz.it, [https://www.unibz.it/de/faculties/sciencetechnology/academic-staff/person/38684-angelika-peer](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. Robot kinematics and dynamics
2. Trajectory planning
3. Motion control
4. Interaction control
5. Vision-based control
6. Remote control
7. 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:

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 and 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.

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**Assessment**

**Formative assessment**

<table>
<thead>
<tr>
<th>Form</th>
<th>Length /duration</th>
<th>ILOs assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class exercises</td>
<td>Continuously as part of course-accompanying exercises</td>
<td>1-5</td>
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</table>

**Summative assessment**

<table>
<thead>
<tr>
<th>Form</th>
<th>%</th>
<th>Length /duration</th>
<th>ILOs assessed</th>
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</thead>
<tbody>
<tr>
<td>Oral</td>
<td>100</td>
<td>30 minutes</td>
<td>1-5</td>
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**Assessment language**

English

**Evaluation criteria and criteria for awarding marks**

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

Introduction to Robotics – Mechanics and Control, John Craig, Pearson, 2018


Modern Robotics – Mechanics, Planning and Control,

Modelling, Indentification & Control of Robots, W. Khalil & E. Dombre, Kogan Page Science, 2004