**Mechanical design methods in robotics**

**Credits: 5   Semester 1   Compulsory: Yes**

<table>
<thead>
<tr>
<th>Format</th>
<th>Lectures  25 h</th>
<th>Supervised project  15 h</th>
<th>Private study  85 h</th>
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**Lecturers:** (D.Chablat; Ph.Wenger) (ECN), M.Krzysztof (WUT), (R.Molfino; M.Zoppi) (UG)

**Objectives:** This course presents the overview of the design process – specification, conceptual design, product design. The students will learn basic principles of industrial robot design.

**Contents:**
The following subjects will be discussed:
- Conceptual design: concept generation, concept evaluation.
- Product design: documentation, product generation, evaluation for function and performance, evaluation for cost, ease of assembly and other measures.
- Computer aids for mechanical design. CAD/CAE/CAM systems.
- The design of robotic production cell.
- Fundamentals of integrated design of control and drive systems taking into account measurement, gearing and transmission systems.
- Design of a serial robot manipulator (using CAD).

**Practical Work:** CAD design of manipulator.

**Abilities:** After completing this course, the students will be able to:
- Design a serial robotic manipulator.
- Formulate properly the needed information for conceptual design (requirements),
- Use CAD systems on the basic level for the design of typical mechanism (serial arm),
- Elaborate the design on general level without material, drive systems and actuators consideration,
- Provide the conceptual documentation for the arm design.

**Assessment:** 30% continuous assessment, 70% from end of semester examination.

**Recommended texts:**

**Further readings:** CAD software documentation