Syllabus
Course description

<table>
<thead>
<tr>
<th>Course title</th>
<th>Advanced Manufacturing Technologies and Systems</th>
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<tbody>
<tr>
<td>Course code</td>
<td>47541</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>ING-IND/16</td>
</tr>
<tr>
<td>Degree</td>
<td>Master in Industrial and Mechanical Engineering</td>
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<tr>
<td>Semester</td>
<td>1</td>
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<tr>
<td>Year</td>
<td>1</td>
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<tr>
<td>Academic year</td>
<td>2020/21</td>
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<tr>
<td>Credits</td>
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<td>Modular</td>
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<tr>
<td>Total lecturing hours</td>
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<tr>
<td>Total lab hours</td>
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<tr>
<td>Total exercise hours</td>
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</tr>
<tr>
<td>Attendance</td>
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<tr>
<td>Prerequisites</td>
<td>Bachelor degree in Industrial Mechanical Engineering</td>
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Specific educational objectives

This course is part of characterizing activities for engineering studies and it is part of the curriculum of study of the Master in Industrial Engineering.

The course aims to furnish a general overview of the most important advanced technologies and manufacturing systems. At the end of the course the student will be able to face a manufacturing problem deciding how to process and manage a product and choosing the suitable manufacturing technology (in particular with focus on some specific advanced technologies such as Additive Manufacturing or Laser).

Professor
Dr. Cristian Cappellini,
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Scientific sector of the lecturer
ING-IND/16

Teaching language
English

Office hours
15

Teaching assistant (if any)

List of topics covered

- Introduction to manufacturing,
- CNC evolution,
- Manufacturing systems,
- Introduction to Industry 4.0,
### Teaching format
Frontal lectures, exercises, case studies, group work

### Learning outcomes

#### Knowledge and understanding
This course provides bases and opportunities to originally develop and/or apply knowledge and ideas both in a manufacturing and in a research context.

#### Applying knowledge and understanding
Knowledge provided by the lessons will be applied in the development of a project connected to the studied technologies.

#### Making judgments
This course provides the ability to integrate knowledge and handle complexity, and to formulate global judgements as well as specific technologic analysis, evaluating the most suitable production cycle also for complex parts by using advanced technologies.

#### Communication skills
This course provides the ability for the students to work in group and communicate this conclusions both to specialist and non-specialist audiences.

#### Learning skills
All the arguments are presented and discussed during the lectures. The study is autonomous and the students will have the possibility to discuss the achieved knowledge in the development of team course project.

### Assessment
Written and project work: written exam with review questions and project report presentation (to be discussed) done in groups.

### Assessment language
English

### Evaluation criteria and criteria for awarding marks
Written exam (50%) and project report presentation (50%)*

- Relevant for written exam: clarity of answers, ability to summarize, evaluate, and establish relationships between topics, use of drawing and scheme of the processes;
- Relevant for project: ability to work in a team, creativity, skills in critical thinking, ability to identify new solutions using the described technologies.
In case a written exam cannot be held due to “force majeure” such as COVID-19 restrictions, the course responsible reserves the right to hold an oral exam instead of the written exam.

**Required readings**
- Hassan E, Advanced Machining Process, McGraw Hill

**Supplementary readings**
- Slides of the course