

Syllabus

Course description

Course title	Advanced Manufacturing Technologies and Systems
Course code	47541
Scientific sector	ING-IND/16
Degree	Master in Industrial and Mechanical Engineering
Semester	1
Year	I
Academic year	2020/21
Credits	5
Modular	No

Total lecturing hours	28
Total lab hours	
Total exercise hours	18
Attendance	No
Prerequisites	Bachelor degree in Industrial Mechanical Engineering.
Course page	

Specific educational objectives	<p>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.</p> <p>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).</p>
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Professor	Dr. Cristian Cappellini, e-mail cristian.cappellini@unibz.it
Scientific sector of the lecturer	ING-IND/16
Teaching language	English
Office hours	15
Teaching assistant (if any)	
List of topics covered	<ul style="list-style-type: none"> • Introduction to manufacturing, • CNC evolution, • Manufacturing systems, • Introduction to Industry 4.0,

	<ul style="list-style-type: none"> • Additive Manufacturing, • Design for Manufacturing, • Hydroforming and Sheet incremental forming, • Laser, • Micromachining, • EBM, • EDM
Teaching format	Frontal lectures, exercises, case studies, group work
Learning outcomes	<p><u>Knowledge and understanding</u> This course provides bases and opportunities to originally develop and/or apply knowledge and ideas both in a manufacturing and in a research context.</p> <p><u>Applying knowledge and understanding</u> Knowledge provided by the lessons will be applied in the development of a project connected to the studied technologies.</p> <p><u>Making judgments</u> 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.</p> <p><u>Communication skills</u> This course provides the ability for the students to work in group and communicate this conclusions both to specialist and non-specialist audiences.</p> <p><u>Learning skills</u> 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.</p>
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	<p>Written exam (50%) and project report presentation (50%)*</p> <ul style="list-style-type: none"> • 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	Slides of the course
Supplementary readings	Boothroyd G, Dewhurst P, Knight WA, Production Design for Manufacture and Assembly, Taylor & Francis Group. Gibson I, Rosen D, Stucker B, Additive Manufacturing Technologies, Springer. Hassan E, Advanced Machining Process, McGraw Hill