



### MECHANICAL TECHNOLOGY

<b>Enrollment year</b>	2019/2020
<b>Academic year</b>	2021/2022
<b>Regulations</b>	DM270
<b>Academic discipline</b>	ING-IND/16 (PRODUCTION TECHNOLOGIES AND SYSTEMS)
<b>Department</b>	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
<b>Course</b>	INDUSTRIAL ENGINEERING
<b>Curriculum</b>	Meccanica
<b>Year of study</b>	3°
<b>Period</b>	1st semester (27/09/2021 - 21/01/2022)
<b>ECTS</b>	6
<b>Lesson hours</b>	46 lesson hours
<b>Language</b>	Italian
<b>Activity type</b>	WRITTEN AND ORAL TEST
<b>Teacher</b>	REBAIOLI LARA - 6 ECTS
<b>Prerequisites</b>	The student does not need any particular previous knowledge, but knowledge of basic elements heat transmission, continuum mechanics (stresses, deformations, constitutive equations), mechanical characterization of materials, technical drawing (in particular, tolerances) can be useful.
<b>Learning outcomes</b>	At the end of the course the student will know the basic principles, the characteristics, the needs, the constraints and the industrial application fields of the main casting, forming and chip removal processes. The learnt models will allow the student to perform a basic design of the processes.
<b>Course contents</b>	<ol style="list-style-type: none"><li>1. Introduction: Industrial production and materials for engineering applications.</li><li>2. Casting: Solidification and cooling of castings and related issues</li></ol>

	<p>(withdrawal, gas solubility, solidification structures, etc.). Sand casting and other processes with expendable mold. Die casting. Investment casting. Other casting processes.</p> <p>3. Forming: Basic concepts of plasticity. Main processes for plastic deformation: open-die forging, impression-die forging, rolling, direct and indirect extrusion, wire and tube drawing, sheet metal processing (blanking and piercing, bending, deep drawing).</p> <p>4. Chip removal: Orthogonal cutting and chip formation. Tool materials. Basic elements of tool wear. Main chip removal operations: turning, milling, drilling, grinding. Minor processes (shaping, planing, broaching, etc.). Method of specific cutting pressure method to determine the involved forces.</p>
<b>Teaching methods</b>	<p>Lectures through which the student learns the main theoretical aspects and models related to casting, forming and chip removal processes. Numerical exercises aiming at the application of the studied models.</p>
<b>Reccomended or required readings</b>	<p>[1] Lecture and exercise slides available at:  <a href="https://elearning2.unipv.it/ingegneria/course/view.php?id=280">https://elearning2.unipv.it/ingegneria/course/view.php?id=280</a>  [2] Mikell P. Groover, Tecnologia Meccanica, Editore: Citta' Studi, Anno edizione: 2014  [3] M. Santochi, F. Giusti, Tecnologia Meccanica e studi di fabbricazione, Editore: Ambrosiana</p>
<b>Assessment methods</b>	<p>The exam consists of a written test (duration = 2 hours) and an oral test that is mandatory only for those who obtain a score <math>\leq 20</math> and <math>\geq 28</math> in the written test. The written test consists of two questions on theoretical aspects and three numerical exercises. The oral test covers the whole course programme and a positive result may produce a change in the final grade up to +3.</p> <p>The final evaluation is based on the degree of in-depth and understanding of the presented topics. The student has to: demonstrate to know the basic principles, the characteristics, the needs, the constraints and the application field of the technological processes; demonstrate the ability to represent graphically tools, equipment, machines and mechanical components to which the manufacturing process are applied; know the main models regarding each process.</p>
<b>Further information</b>	<p>None</p>
<b>Sustainable development goals - Agenda 2030</b>	<p><a href="#">The goals</a></p>