a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM207Y02	*Semester*	7
Course title	**Manufacturing processes**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	3	5.5
Laboratory exercises	2	

Course type	Knowledge deepening/consolidation
Course category	Compulsory for Direction 2
Prerequisite courses	-
Language of instruction and examinations	Greek
Is the course offered to Erasmus students	Yes
Course website (url)	http://triblab.puas.gr

b) Learning outcomes and general competences

b1. Learning outcomes

Upon successful completion of this course, the student will be able to:

- Describe the main processes for shaping mechanical components and their joining to integrated assemblies.
- Distinguish among the physical mechanisms that take place during shaping via (a) forming, (b) casting and (c) powder metallurgy techniques.
- Recognize the crucial manufacturing parameters for shaping via (a) plastic deformation (rolling, extrusion, drawing), (b) melting and solidification (casting, welding) and (c) pressing, firing and sintering.
- Design/calculate components to be shaped in accordance to specific technical requirements and evaluate the quality of the final product.
- Suggest the most appropriate shaping technique per material.
- Evaluate/classify multiple proper solutions based on techno-economic criteria.

b2. General competences

Upon completion of the course, the students would develop, also, general competences, concerning:

- Search, extraction, analysis and synthesis of scientific data and knowledge, using screening of large scientific databases.
- Decision making capabilities on the particular item of manufacturing technique selection.
- Understanding the requirements for generic approaches in a worldwide environment.
- Project planning and management
- Capability of performing individual- and team-working case studies.
- Ability to approach the multi-disciplinary character of various engineering applications.

c) Syllabus

Based on the distinct fundamental mechanisms that are activated during shaping/joining of components, sub-assemblies and assemblies, the theoretical part of the course deals with techniques including: (a) forming at ambient or medium temperature, via plastic deformation of bulk material or sheet metal-working (rolling, extrusion, drawing, shearing, deep drawing, etc.), (b) melting and re-solidification (casting and welding) and (c) compression, shaping and firing of final products via sintering.

The laboratory part of the course per shaping process family is focused on: (a) hands-on

<table>
<tr><td colspan="3">experience of students with a range of relevant equipment and devices and familiarization with their peculiarities , (b) the protocols/ technical specifications to be followed for assuring products quality and (c) the general guidelines and particular directions imposed by the health and safety regulations at international level.</td></tr>
<tr><td colspan="3">d) Teaching and learning methods - Evaluation</td></tr>
<tr><td>Delivery</td><td colspan="2">Lectures of theory and laboratory exercises face-to-face, within the classroom.</td></tr>
<tr><td>Use of information and communications technology</td><td colspan="2">Teaching using ICT, Laboratory education using ICT and experimental devices, communication and electronic submission</td></tr>
<tr><td rowspan="7">Teaching methods</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Tutorials</td><td></td></tr>
<tr><td>Laboratory exercises</td><td>26</td></tr>
<tr><td>Computational exercises</td><td></td></tr>
<tr><td>Individual work</td><td>91</td></tr>
<tr><td>Course total</td><td>156</td></tr>
<tr><td>Student performance evaluation</td><td colspan="2">Theory: Intermediate assessment and written final examination.
Laboratory: evaluation of practical skills and multiple-choice exams.</td></tr>
<tr><td colspan="3">e) Suggested bibliography</td></tr>
<tr><td colspan="3">1. Kalpakjian, S. and Schmid, S. (2014). Manufacturing Engineering & Technology (7th edition). Pearson Editions.
2. Schey, J.A. (2000). Introduction to Manufacturing Processes. McGraw-Hill Education.
3. Handbook of Workability and Process Design (2003). G.E. Dieter, H.A. Kuhn, S.L. Semiatin (editors), ASM International.</td></tr>
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