a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM207E02	*Semester*	7
Course title	**Advanced machining technology**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	2	4.0
Laboratory exercises	2	

Course type	Knowledge deepening/consolidation
Course category	Compulsory Elective for Direction 2
Prerequisite courses	-
Language of instruction and examinations	Greek
Is the course offered to Erasmus students	No
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:

- Recognize and select cutting tools and fluids, suitable for different machining processes and materials' grades.
- Predict the cutting surface quality based on machining parameters, via advanced statistics techniques (Taguchi, Artificial Neural Networks).
- Evaluate per material grade, the morphology and characteristics of the removed material, in order to propose optimisation actions (e.g. chemical composition differentiation) that could lead to machinability amelioration.

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 items of cutting tools and fluids, as well as process parameters 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 conceive the multi-disciplinary character of various engineering applications.

c) Syllabus

This course is focused on providing deeper knowledge on conventional material removal techniques, based on the use of cutting tools of specific geometry that operate under simple or multiple contact with the workpiece. In this perspective, special emphasis is given in the Merchant theory for the calculation of the forces developed at the cutting neighbourhood, the techniques for direct and indirect evaluation of the machining process, as well as the effects of primary and secondary motion on the process stability. Finally, the morphology and the characteristics of the removed material are used for the optimisation of the cutting tools lifetime per machined material grade.

d) Teaching and learning methods - Evaluation

<table>
<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>26</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>78</td></tr>
<tr><td>Course total</td><td>130</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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