

Course Title	<b>Design and Manufacturing</b>				
Course Code	<b>MME 347</b>				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	3 <sup>rd</sup> Year / 5 <sup>th</sup> semester				
Teacher's Name	Denis Politis				
ECTS	6	Lectures / week	3+1 hours	Laboratories / week	1 hour
Course Purpose and Objectives	Provide an overview of design methods and manufacturing techniques to understand how things are made.				
Learning Outcomes	<ul style="list-style-type: none"> <li>• Familiarity with computational design methods</li> <li>• Description and modelling of manufacturing processes</li> <li>• Understanding of machining and shaping processes</li> <li>• Knowledge of rapid prototyping and surface patterning processes</li> <li>• Description and modelling of integration, metrology, automation and robotics methods</li> <li>• Familiarity with methods above in the laboratory and practice</li> </ul>				
Prerequisites	MME 145	Required	None		
Course Content	<p>Introduction to modern Computer-aided Design and Manufacturing Technology, with emphasis on geometrical aspects (material aspects are covered in MME 348). Design by CAD, representation of 2D/3D lines, surfaces and objects, geometric processing by homogeneous transformations. Rapid prototyping with material deposition - technologies, systems and applications. Machining processes, material removal, non-traditional technologies, manufacturing by CAM. Shaping by deformation/flow of foil and bulk material, CAE analysis. Surface patterning by lithography, coating and etching, micro- and nanotechnology. Metrology, microscopy, scanning and machine vision, instruments and image processing. Tolerances, fits, surface quality and defects. Assembly and transportation with automation, robotics and navigation systems. Applications of design and manufacturing systems.</p> <p><b>Laboratory Exercises</b></p> <ul style="list-style-type: none"> <li>• Metrology</li> <li>• Screws and thread-generating processes</li> <li>• Manual turning exercises and project (spinning top competition)</li> </ul>				
Teaching Methodology	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Tutorials</li> <li>• Laboratory demos and projects in machining shop</li> <li>• Educational field trips to local industries</li> <li>• Communicative, Collaborative</li> </ul>				

	<ul style="list-style-type: none"> <li>• During the first week of the semester, the Syllabus of the course is given by the teacher, which includes information on the course content, expected learning outcomes, assessment and office hours</li> </ul>
Bibliography	<ul style="list-style-type: none"> <li>• Tempelman, E., H. Shercliff and B. Ninaber van Eyben, <i>Manufacturing and Design: understanding the principle of how things are made</i> (1<sup>st</sup> Edition). Elsevier.</li> <li>• Kalpakjian, S. and S. Schmid, <i>Manufacturing Engineering &amp; Technology</i> (7<sup>th</sup> Edition). Pearson.</li> <li>• Groover, M.P., <i>Fundamentals of Modern Manufacturing: Materials, Processes and Systems</i> (6<sup>th</sup> Edition). Wiley.</li> </ul>
Assessment	<ul style="list-style-type: none"> <li>• Homework &amp; Labs      30%</li> <li>• Midterm Exam          30%</li> <li>• Final Exam              40%</li> </ul>
Language	Greek