Course unit title:	Computer Aided Design and 3D Printing				
Course unit code:	ME306				
Type of course unit:	Elective				
Level of course unit:	Master (1st Cycle)				
Year of study:	1				
Semester when the unit is delivered:	2 (Spring)				
Number of ECTS credits allocated :	6	Lectures:	0	Labs:	3
Name of lecturer(s):	Dr. Antonios Lontos				
Learning outcomes of the course unit:	1. Discussing the wide variety of new rapid prototyping technologies such as liquid or solid based rapid prototyping systems. 2. Apply rapid prototyping technologies in product development 3. Be able to use 3D printing, stereolithography, selective laser sintering, and fused deposition modeling to the product development process. 4. Be able to design, optimize, manufacture, and validate a physical system component. 5. Use additive manufacturing as an automated technique for direct conversion of 3D CAD data into physical objects using a variety of approaches 6. Be able to select the appropriate rapid prototyping technology in the automotive, aerospace, medical, and consumer products industries				
Mode of delivery:	Face-to-face				
Prerequisites:	ME203		Co-requisites:	None	
Recommended optional program components:	None				
Course contents:	• **3D Printing and Prototyping process.** Process chain, 3D Shape Technologies, 3D modelling, Software Engineering, Digital Representation of Shapes, 3D laser scanners and surface generation, Computer tomography and Solid creation, Different algorithms to represent solid objects. Rapid prototyping data formats, Data conversion and transmission, Postprocessing. • **Rapid Prototyping Techniques.** Stereolithography, Three-dimensional models from liquid photosensitive polymers, Stereolithography apparatus (SLA) machines, Laminated Object Manufacturing, adhesive-coated sheet material, Selective Laser Sintering, Laser beams, Fused Deposition Modeling, Solid Ground Curing, 3-D Ink-Jet Printing • **Liquid, solid and powder based rapid prototyping**. 3D Systems, Models and specifications, Processes and principles, Microfabrication, Deposition Manufacturing process. • **Applications of 3D Printing.** Applications in design, engineering, Analysis and planning, Applications in manufacturing and tooling, Aerospace, automotive, biomedical, Jewellery industry.				
Recommended and/or required reading:	Gibson Ian, Rosen David, Additive Manufacturing Technologies, Gibson Ian, Rosen David, Additive Manufacturing Technologies, Springer, New York, 2010				
Textbooks:	Chua C.K, Leong K.F, Lim C.S, Rapid Prototyping Principles and Applications, World Scientific, New Jersey, 2005 Bartolo, Jorge Paulo, Virtual and Rapid Manufacturing, Taylor And Francis, London, 2008 Manufacturing Engineering and technology, Six Edition, Serope Kalpakjian, Steven R. Schmid, Prentice Hall Manufacturing Processes for Engineering Materials, Fifth Edition, Serope Kalpakjian, Steven R. Schmid, Prentice Hall				
References:					

Planned learning activities and teaching methods:	The taught of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. Furthermore theoretical principles are explained by means of specific examples and solution of specific problems.
Assessment methods and criteria:	• Assignments: 40% • Final Test: 60%
Language of instruction:	English
Work placement(s):	No