Course Title	Computer Aided Design and 3D Printing				
Course Code	ME306				
Course Type	Elective				
Level	BSc (Level 1)				
Year / Semester	3rd Year / 5th Semester				
Teacher's Name	Dr. Antonios Lontos				
ECTS	6	Lectures / week	3	Laboratories/week	0
Course Purpose	The purpose of the course is to learn and use 3D printers in order to be able to prepare prototype components.				
Learning Outcomes	By the end of the course, students must be able to: 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				
Prerequisites	ME203	Corequisites	None		
Course Content	• 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.
Teaching Methodology	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.
Bibliography	(a) <u>Textbooks:</u> • Gibson Ian, Rosen David, Additive Manufacturing Technologies, Springer, New York (b) <u>References:</u> • 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
Assessment	The assessment consists of following methods for both the theoretical and practical part of the course. Each assessment method is assigned with a weight which is used for the calculation of the final grade. Assignments: 40% Final Exam (written): 60%
Language	English