COURSE DESCRIPTION

Course Title	Manufacturing Processes				
Course Code	ME 201				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	2nd / Fall				
Teacher's Name	Dr. Sotiris Omirou				
ECTS	5	Lectures / week	3	Laboratories/week	0
Course Purpose	This course focuses on the introduction to basic mechanical manufacturing methods by which materials are processed into different shapes. The overall goal is to develop an understanding of how the shape, materials and cost of a product influence manufacturing process design.				
Learning Outcomes	**1.** Describe the various manufacturing processes that are used to produce mechanical parts. **2.** Classify manufacturing processes according to the needs of products construction. **3.** Relate the properties of materials and the selection of the proper manufacturing process **4.** Employ the theoretical knowledge of various manufacturing processes when a specific product must be manufactured. **5.** Compare the advantages and limitations of different manufacturing processes. **6.** Select the appropriate tooling and equipment for a specific manufacturing process. **7.** Evaluate the better way of manufacturing and construction of mechanical parts or products by means of various manufacturing processes and the corresponding manufacturing machines. **8.** Explain the impact and importance of adopting Computer Aided Manufacturing and CNC Technology in modern manufacturing. **9.** Calculate machining time, material removal rate, and proper cutting conditions for machining operations. **10.** Prepare technical presentation for a manufacturing process				
Prerequisites	**ME106**	Corequisites	None		
Course Content	• **Introduction to manufacturing processes**: Definition of manufacturing, purpose of manufacturing, classification of the various types of manufacturing processes, selecting materials and manufacturing process, manufacturing industries, resources for manufacturing. • **Properties of engineering materials.** Physical, mechanical, electrical,				

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<tr><td></td><td>thermal and chemical properties. The properties as a criterion for selecting the appropriate material in a manufacturing process
• Material-removal processes: Technology and machines for milling, turning, shaping, drilling, broaching, mechanics of chip formation, tool wear, surface finish and integrity, cutting-tool materials, cutting fluids.
• Introduction to Computer Aided Manufacturing and CNC Technology: Basic concepts, structure of CNC machines, manual programming for simple parts, CAM programming for complex parts, demonstrations on CNC simulator and CAM software.
• Forming processes: Technology of forging, rolling, cold and hot extrusion, rod, wire and tube drawing, sheet-metal forming processes, shearing, bending of sheet and plate, deep-drawing, formability of sheet metals
• Casting processes: Solidification of metals, cast structures, casting metals and alloys, technology and machines of casting processes, sand casting, shell mold casting, expendable mold casting, investment casting, permanent mold casting, hot and cold die casting, centrifugal casting, vacuum casting, solidification time, casting defects.
• Joining processes: Fundamentals of welding and welding processes.</td></tr>
<tr><td>Teaching Methodology</td><td>The course material is delivered to the students by means of lectures, conducted with the help of computer presentations, videos, software demonstrations, in class solution of problems and discussions. Lecture notes and presentations are available through the web for students to use in combination with the textbooks.</td></tr>
<tr><td>Bibliography</td><td>Textbook:
Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, by Mikell P. Groover, John Wiley & Sons, 6th edition, 2016.

References:
Materials and Manufacturing Processes, by Kaushik Kumar Hridayjit Kalita Divya ZindaniJ. Paulo Davim, Springer ebook, 2019

Manufacturing Processes for Engineering Materials, by Serope Kalpakjian, Steven R. Schmid, Prentice Hall, 2007.</td></tr>
<tr><td>Assessment</td><td><u>(a) Methods:</u> Students will be assessed with coursework that involves one in class written test, a preparation of a power point presentation and a final exam.
<u>(b) Criteria:</u> Assessment criteria are available in test and in the final exam. Criteria for the presentation are given to students together with the instructions of preparation.

Coursework 40%

Final Exam 60%

Coursework
Test: 70%
Presentation of a manufacturing process: 30%</td></tr>
<tr><td>Language</td><td>English</td></tr>
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