



Course Code MENG-312	Course Title Manufacturing Processes	ECTS Credits 6
Department Engineering	Semester Fall, Spring	Prerequisites None
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 2 nd or 3 rd	Lecturer(s) Dr Vasileios Drakonakis
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Provide an introduction to several basic processes for creating both metallic and polymeric parts
- Introduce students to the complexity of engineering practice and to follow the development of an idea from its conception to the construction of a prototype.
- Develop the technical skills necessary to generate an engineering drawing and an engineering assembly.
- Develop a 'hands on' experience through shop training and the construction of a physical artifact.
- Introduce the elements of engineering communications, including graphical representation of artifacts, teamwork, written reports, and oral presentations.
- Introduce uncertainty as an element of engineering practice, including material properties, process performance, and market demands.
- Obtain a basic understanding of various engineering materials and the manufacturing techniques used to produce these materials into useful products as well as a broad appreciation of the breadth of Manufacturing Science & Engineering.

Learning Outcomes:

After completion of the course students are expected to:

- Demonstrate the ability to work both as an individual and as a team member.
- Correctly utilize a variety of technical terminology needed to communicate in a manufacturing environment.
- Understand some basic principles of materials properties and testing
- Be able to select manufacturing processes appropriate for particular applications.
- Have obtained a deep understanding of the various manufacturing processes.
- Be able to choose the appropriate manufacturing processes for particular materials processing and thus, products development.
- Calculate proper speeds, feeds and depths of cut for machining operations.

- Comprehend the various tooling and equipment of the manufacturing machines.
- Take into account all the technical parameters in order to produce materials into useful products.
- Understand the concept of mass production and quality control within the manufacturing processes.
- Understand the basics in manufacturing systems design and operation.
- Writing technical reports and making technical presentations.

Course Contents:

- Overview of Manufacturing Processes:
Fundamentals of metal casting and processes; Fundamentals of metal forming; Bulk deformation processes in metal working; Sheet metalworking; Theory of metal machining; Machining operations and machine tools (Milling, Drilling, Lathe, etc.); Cutting tool technology; Grinding and other abrasive processes; Fundamentals of welding and welding processes; Brazing, soldering and adhesive bonding
- Overview of Advanced Manufacturing Processes (Rapid prototyping, 3d Printing, Laser Cutting etc.)
- Overview of other Manufacturing processes:
Glass working; Shaping processes for plastics; Shaping processes for rubber and polymer matrix composites; Powder metallurgy; Processing of ceramics and cements; Heat treatment of metals
- Machine Tools and Manufacturing Equipment
- Processes Planning
- Design of Manufacturing Systems
- Mechanical Assembly
- Operation of Manufacturing Systems
- Writing technical reports and making technical presentations.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises, laboratory work, in-class activities, videos. The course format is 3 h lectures and 1 h laboratory tutorial session per week.

Assessment Methods:

In-class activities, homework & lab reports, mid-term exam, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
George Chrysolouris	Manufacturing Systems: Theory & Practice	Springer	2006	9780387284316

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Mikell P. Groover	Introduction to Manufacturing	John Wiley & Sons,	2011	9781118214886

	Processes	Inc.		
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