

**Faculty of Engineering & Technology**  
**Fundamentals of manufacturing Processes**

**Information :**

**Course Code :** MAN 321      **Level :** Undergraduate      **Course Hours :** 2.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	SAMAH ELSAYED ELMETWALLY ELKHATIB	4
Teaching Assistant	Ahmed Ibrahim Sadek Mostafa Elgindy	1

**Area Of Study :**

Prepare students to Get a basic idea of solidification and casting, alloys, structure and properties, casting products and applications.  
 Develop the students' knowledge about the different casting processes, mould and core-making, sand properties and testing, behavior of liquid metals, melting and melt treatment.  
 Develop the students' knowledge about the different welding processes  
 Train students to optimize the welding parameters.  
 Prepare students to recognize manufacturing technologies in general and the concept of forming techniques

**Description :**

Fundamentals of metal casting, metal-casting processes and equipment, casting design, materials and economics. Powder-Metal processing and equipment. Metal Extrusion and drawing processes and equipment. Plastics and Composite Materials: Forming and shaping. Fusion-Welding Processes, brazing, soldering, adhesive-bonding, and mechanical-fastening processes, Finishing processes.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	Identify of solidification and casting, alloys, structure and properties, casting products and applications
2 -	Describe the concepts and theories of forming and engineering material processes
3 -	Explain the importance and applications of metal welding

**b. Intellectual Skills: :**

1 -	Calculate the casting pattern and casting mould using basic equations.
2 -	Apply the machine difference materials problem.
3 -	Modify the force acting in casting and casting solidification time using basic equations

**c. Professional and Practical Skills: :**

1 -	Use workshop equipment to gain knowledge and personal experience.
2 -	Classify the interaction between the mechanical, thermal and loads in forming operations.
3 -	Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or processes of manufacturing and applications.

**d.General and Transferable Skills: :**

1 -	Work in stressful environment and within constraints through assignments and course project
2 -	Effectively manage tasks, time, and resources
3 -	Search for information and engage in life-long self-learning discipline through self-learning assignments.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to metal casting processes, continuous casting	3	2	1
Sand, molding and core-making processes Shaped casting, & products, and processes	6	4	2
Casting design, and pattern design	4	2	2
Design of gating system and feeding system	6	4	2
Design of feeding system	5	4	1
Heat extraction & solidification	3	2	1
Special Casting Techniques	3	2	1
Metal Forming & bulk forming	3	2	1
Sheet Metal Forming	3	2	1
Joining Processes	3	2	1
Casting project	3	2	1
Introduction to Manufacturing Technology & Materials Introduction	3	2	1

**Teaching And Learning Methodologies :**

Discussion
Experiential learning
Problem-based Learning
Report
Interactive Lecture

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00		
Final Exam	40.00		
Mid- Exam 1I	20.00		
Mid- Exam I	20.00		
Oral Exam	10.00		
Quizzes	5.00		

**Course Notes :**

Lecture notes on the course Moodle page, FUE website.

**Recommended books :**

- Materials Handbook, v. 15 Casting, ASM Int., USA, 1998.
- Journal of Metals, ASM, USA
- Websites on casting and websites on casting.