

## **IM 112 – MANUFACTURING TECHNOLOGY**

### **CREDIT HOURS**

2 Hours

### **CONTACT HOURS (Hours/week)**

Lecture: 1; Lab: 2;

### **TEXT BOOK**

T.F. Waters and F. Waters, "Fundamentals of Manufacturing for Engineers", Taylor & Francis, *latest edition*.

### **COURSE DESCRIPTION**

The course provides an introduction to engineering materials and their properties, production of common metals. It covers types of manufacturing, basic manufacturing processes such as casting, metal forming, welding and machining. An overview of some advanced manufacturing processes is also included. In addition, it introduces measurement standards, instruments, deviations and methods.

### **PREREQUISITE:**

None

### **RELATION OF COURSE TO PROGRAM**

Required

### **COURSE INSTRUCTION OUTCOMES**

The student will be able to:

- Understand the different stages or phases for engineering materials processing.
- learn the basic concepts of metal forming and casting, understanding the concepts of metal machining and welding techniques and associated applications.
- learn different measuring techniques and how they can be used for quality control purposes.

### **TOPICS COVERED**

- Production of steel and cast iron.
- Forming operations (Rolling – Drawing – Extrusion –Forging).
- Heat treatment operations (Hardening-Annealing-Tempering-Nor realizing).
- Cutting tools (Geometry & materials).
- Mechanics of metal cutting and turning operations.
- Cutting fluids (Function – Type – Selection).
- Exam # 1.
- Sand casting (Pattern design & mould preparations).
- Centrifugal casting, die casting and aspects of the casting process.

- Gas and Electric arc welding.
- Electric resistance and pressure welding and aspects of the welding process.
- Exam # 2
- Standards of measurements, Measuring Instruments.
- Measuring Instruments (Vernier, micrometer, dial gauge, block gauges).
- Measuring methods (Indirect and comparative measurements).

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:**

<b>Professional component Content</b>			
<b>Math and Basic Sciences</b>	<b>Engineering Topics</b>	<b>General Education</b>	<b>Other</b>
	✓		

**RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:**

<b>Student Outcomes</b>		<b>Course aspects</b>
A	An ability to apply knowledge of mathematics, science, and engineering	
B	An ability to design and conduct experiments, analyze and interpret data.	
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	c <sub>1</sub> c <sub>2</sub> c <sub>3</sub>
D	An ability to function on multi-disciplinary teams.	
E	An ability to identify, formulate, and solve engineering problems	e <sub>1</sub> e <sub>2</sub> e <sub>3</sub>
F	An understanding of professional and ethical responsibility	f <sub>1</sub> f <sub>2</sub>
G	An ability to communicate effectively	
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social content	
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	j <sub>1</sub> j <sub>2</sub>
k	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	k