

Course Title: Manufacturing Processes- II; ME-313

Semester: First- 1447 H- 2025/ 2026 G

Lecturer and Lab.

Instructor: Dr. Muhammad Farzik Ijaz

mijaz@ksu.edu.sa

[Room 2C-46]

Textbook: Manufacturing: Materials, Processing, and Systems, K. P . Groover,
Fundamentals of Modern, Second Edition, John Wiley, New York.

Reference:

- Materials and Processes in Manufacturing, De Garmo, Black, Kohser, Tenth Edition, Wiley.
- Manufacturing Processes for Engineering Materials, Fourth Edition, Serope Kalpakjian, AdisonWesely

Credit Hours: 3; [2] Lecture, [1] Tutorial, and [2] Laboratory

Pre-requisite: Materials Engineering; ME-312

Course Outline:

Week #	Topic
1	Introduction to Manufacturing Processes, Classification.
2	Relationships among activities in manufacturing and process planning; Responsibilities of manufacturing engineers.
3	Classification of machine tools; Fundamentals of Machining; Machinability
4	Types of chip and their formation mechanisms; tool geometry; tool materials; Tool Wear; Tool Life.
5	Cutting forces and power calculation in Orthogonal and Oblique Cutting.
6	Mechanics of machining and Merchant circle.
7	Variables Affecting cutting Temperatures; Chatter.
8	Turning machines and their related processes.
9	Drilling machines and their related processes.
10	Milling machines and their related processes.
11	Grinding machines and their related processes.
12	Welding Processes and classification; Weldability
13	Fusion Arc Welding Processes.
14	Calculation of welding parameters and energy in arc welding.

Grade Distribution:

- Quizzes and/or Assignments	10%	At any time
- Lab Reports	10%	Submission after each lab session
- Lab Exam.	10%	After completion of lab sessions
- Course Project	10%	Within the 4 weeks
- Mid-Term Examination	20%	On October 21 st . 2026- 16:00 pm
- Final Term Examination	<u>40%</u>	
- TOTAL	100%	

Minimum Attendance is 75 % in BOTH Lectures and Laboratory sessions.

ATTENDANCE

Attendance is very important. If happens, and the student is absent for whatever the reason is, he is responsible for obtaining class notes and any other materials that he may have missed.

ASSIGNMENTS

Late assignments are NOT normally accepted. Any student who has any difficulty with anything that would affect his academic performance should talk to the instructor as early as possible.

Activities:

One industrial trip is organized to a typical local industry within the semester.

Computer Usage:

Students are encouraged to make their home assignments and type their reports using software available on PCs.

Course Objectives

1. Review and discuss the various metal cutting and fusion welding processes those who are most popular and available in the present industry and relate them to the material properties and design requirements [1].
2. Learn and apply the basic terminology, formulas associated with various metal cutting and welding processes including machinery [2].
3. Recognize the strong interrelationships between theory and experimentation in various metal cutting and fusion welding fields [3].

Course Learning Outcomes

- 1- Identify and recognize the basic metal cutting, and welding processes including their classifications and applications as well as to apply the basic terminology of these processes in drawn sketches.

- 2- Calculate metal cutting forces, power, and energy requirements and calculate heat input in fusion welding parameters such as amperes, voltage, and energy input.
- 3- Recognize the term manufacturability including machinability and weldability, and name their criteria based on the process parameters and work piece material properties hence comprehend the interrelationships between material behavior and properties and suitable manufacturing processes.
- 4- Recognize machinery and illustrate their main parts using sketches and to conduct, illustrate and demonstrate various practical experiments, interpret data, and apply a process or combination of processes which are used to fabricate a part bearing in mind its quality and present them in laboratory report
- 5- Through an assigned project the students demonstrate their skills in team work through presenting a topic in manufacturing (out of syllabus) and explain several aspects in the selected topic within a specific time in the oral presentation and elaborate the whole project in one poster.

Assessment Tools:

1. Quizzes
2. Lab. reports and lab exams
3. Course Project
4. Mid-Term exams
5. Final Term exam

Revised 20.08.2026