



**The University of Jordan**  
**School of Engineering**  
**Industrial Engineering Department**  
**Fall 2020**

<b>Course name:</b>	Manufacturing Processes			
<b>Course code:</b>	ME 0906310			
<b>Credits hours</b>	3			
<b>Contact hours/room:</b>	Section 1: 10:00 – 11:00 (Sun, Tue & Thu @ EW 101) OH: 09:00 -09:30 Mon, and Wed. 13:00 – 14:00 Sun, and Tue.			
<b>Course instructor's name, E-mail, and phone:</b>	Dr. Yazan Al-Zain			
	y.alzain@ju.edu.jo			
	22732			
<b>Course Coordinator:</b>	Dr. Yazan Al-Zain			
<b>Textbook:</b>	Principles of Modern Manufacturing (global edition), by Mikel Groover, Wiley Publishers			
<b>Other reference(s):</b>	Materials Science and Engineering, 9 <sup>th</sup> edition, by William D Callister, Wiley publishers.			
<b>Course Description:</b>	This course is designed to introduce the general concepts and analysis of metal forming processes. The course will cover Nature of Materials; Mechanical Properties of Metals; Melting and Casting of Metals; Bulk-Metal Deformation Processes; Sheet-Metal Deformation Processes.			
<b>Providing Department:</b>	Industrial Engineering			
<b>Prerequisite Course:</b>	0904372			
<b>Course type</b>	Mandatory			
<b>Assessment Methods:</b>	<b>Method</b>	<b>Weight %</b>	<b>Date</b>	
	Project / Presentation	10	12/12/2019	
	Mid Exam	30	To be announced	
	Project / Product	10	12/12/2019	
	Final Exam	50	To be announced	
<b>Course Learning Outcomes:</b>	<b>#</b>	<b>After successful completion of this course, the student will be able to</b>	<b>SO</b>	
	<b>CLO1</b>	Understand the importance of manufacturing processes in daily life	<b>1</b>	
	<b>CLO2</b>	Understand and avoid casting defects. Ability to design casting molds depending on type of metal/alloy of interest. Perform various casting-related calculations; e.g. time required for solidification	<b>1</b>	<b>2</b>
	<b>CLO3</b>	Understand the various bulk-metal	<b>1</b>	<b>2</b>

		deformation processes. The ability to chose the proper bulk-metal deformation process for the particular application		
	<b>CLO4</b>	Understand the various sheet-metal deformation processes. The ability to chose the proper sheet-metal deformation process for the particular application.		
	<b>CLO5</b>	The ability to work within a group, and deliver an effective presentation	<b>3</b>	

<b>Brief list of topics</b>	<b>Week #</b>	<b>Topic</b>
	1-2	Introduction To Manufacturing Engineering (MfgE): What is manufacturing, Manufacturing industries and products, Materials in manufacturing, and Classification of manufacturing processes.
	3	Nature of Materials: Atomic structure of elements; Bonding between atoms and molecules; Crystalline structures; Imperfections in crystals; Deformation in metallic crystals; Grains and grain boundaries; and Noncrystalline (amorphous structures).
	4-5	Mechanical Properties of Metals: Introduction to mechanical properties; stress-strain relationships; tensile properties; compression properties; bending and testing of brittle materials; shear properties; effect of temperature on properties; fluid properties.
	6-8	Fundamentals of Metal Casting and Metal casting processes: Overview of casting technology; Heating and pouring; Solidification and cooling; Sand casting; Other expandable mold-casting processes; Permanent mold-casting processes; Foundry practice; Casting quality; Metals for casting; and Product design considerations.
	9-11	Bulk-metal Deformation Processes: Introduction; rolling types and analysis; other deformation processes related to rolling, forging types ad analysis; forging hammers and presses; other deformation processes related to forging, extrusion types ad analysis; defects in extrusion; wire and bar drawing.
	12-14	Sheet-metal Deformation Processes: Introduction; Cutting operations (shearing, blanking and punching); Cutting operations and its engineering analysis; other sheet-metal cutting operations; bending operations and its types; engineering analysis of bending; other bending and forming operations; drawing and its mechanics and analysis; other drawing operations; defects in drawing; other sheet-metal forming operations; dies and presses

		for sheet-metal processes; sheet-metal operations not performed on presses; and bending of tube stock.
	15	Project Presentations
	16	Final Exam
<b>Important Notes:</b>		<ul style="list-style-type: none"> <li>• Do not hesitate to ask questions</li> <li>• You are required to bring a notebook and take notes in classes.</li> <li>• Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class.</li> <li>• Discuss the assignments among yourselves</li> <li>• Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an "F" for the course. There will be no exceptions.</li> <li>• All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused</li> <li>• Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works.</li> <li>• Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.</li> </ul>

	<i>The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)</i>
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
---	--