



Philadelphia University
Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title: Production Operation (620477)
Prerequisite: Materials Science (620274)
Credit Hours: 3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook: Materials science and engineering -7 th edition by William D. Callister Jr.

- References:**
- Manufacturing Engineering and Technology by Serope Kalpakjian and Steven R. Schmid, Sixth Edition in SI units.
 - Fundamentals of modern manufacturing: materials, processes and systems, 4th ed. Groover, Mikell P

Course Description This course provides the students with the needed material for understanding the principles of Manufacturing Processes, Materials Properties Fundamentals of Metal Casting & Metals For Casting, Mechanical Properties Of Materials, Bulk Deformation Processes in Metal Working, Sheet Metal Working Familiar with machine operations.

And modern production and manufacturing systems

Course requirement Computer, internet connection, production workshop

Instructor: Dr.Hasan Al Dabbas

Office: Mechanical Engineering building, room E61209, ext.: 2134

Week	Topic
1, 2	Fundamentals of production processes: <ul style="list-style-type: none"> • Introduction • Manufacturing Industries and Products • Materials in Manufacturing, • Manufacturing Processes. • Production Systems
3,4	<ul style="list-style-type: none"> • Materials Properties • Atomic Structure & The Elements • Crystalline Structures • Imperfections in Crystals • Deformation in Metallic Crystals • Noncrystalline (Amorphous) Structures • Engineering Materials
5,6	<ul style="list-style-type: none"> • Mechanical Properties Of Materials • • • Stress-Strain relationships • Bending & Testing of Brittle Materials • Hardness Measurements • Effect of Temperature on Properties • Fluid Properties
7,8	Fundamentals of Metal Casting & Metals For Casting: <ul style="list-style-type: none"> • Overview of Casting Technology • Solidification and Cooling • Expandable-Mold-Casting Processes • Permanent Mold Casting Processes • Casting Quality • Foundry Practice • Metals for Casting Ferrous and Nonferrous Casting Alloys • Product Design Considerations
9,10	Bulk Deformation Processes in Metal Working: <ul style="list-style-type: none"> • Rolling. • Forging • Extrusion • Wire and Bar Drawing
	Sheet Metal Working : <ul style="list-style-type: none"> • Cutting Operations Shearing, Blanking & Punching

11,12,13	<ul style="list-style-type: none"> • Engineering Analysis of Sheet-Metal Cutting • Other Sheet-Metal-Cutting Operations • Slotting, Perforating, and Notching • Trimming, Shaving, and Fine Blanking
14,15,16	<ul style="list-style-type: none"> • Bending Operations • V-Bending & Edge-Bending • Other Bending & Forming Operations • Mechanics of Drawing • Other Drawing Operations • Defects in Drawing • Dies and Presses for Sheet Metal Processes Presses • Sheet-Metal Operations Not Performed on Presses • Bending of Tube Stock • Final Examination

ABET Student Outcomes (SOs)

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

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Classify the type manufacturing and production in industries.	[, 2]
2.	Understand the concept of Production Systems and the concept of manufacturing Processes and how to obtain it for a given simple system.	[, 2]
3	Construct and implement the type of metal casting & metals for casting in industry how to inspect the casting Quality.	[1 , 2]
4	Effectively communicate in writing an assignment and solve specified home works in teams.	[5]
5	Training students to experiment with basic casting operations.	[6]

Teaching methodology: Online, Blended or both

Electronic platform: Microsoft-teams

Evaluation methods:

Evaluation of student's performance (final grade) will be based on the following categories:

Mid-term exam: Shall be given at the end of the seventh week of the course in the form of multiple choice questions and (or) specific problems to be solved and uploaded by the student using the University electronic platform.

Quizzes: A number of 10-minute quizzes in the form of multiple choice questions or an assignment using the University electronic platform. Will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

Homework: Problem sets will be given to students in the form of assignments using the University Electronic platform. Homework should be solved by each student individually and submitted using the platform before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during the online session (lecture) and the student is assessed based on his/her response

Final Exam: The final exam will cover all the class material.

Grading policy:

Mid-term Exam.	30%
Home works, Quizzes and participation	30%
Final Exam	40%
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Total:	100%
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Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.