

School of Engineering and Computer Science
MECH 476: Advanced Manufacturing Engineering

Catalog Data:	476 Advanced Manufacturing Engineering 3 Course Prerequisite: MECH 310. Advanced topics in manufacturing processes, including interrelationships between the properties of the material, the manufacturing process and design of components. Credit not granted for both MECH 476 and MECH 576. Offered at 400 and 500 level. Typically offered Fall.
Class Schedule:	Three 50-minute lecture sessions per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	MECH 310
Prerequisites by Topic:	<ol style="list-style-type: none"> 1. Overview of the various manufacturing processes. 2. The limitations and some of the critical factors about the processes. 3. Some of the design considerations for the processes to be used. 4. The relationship between the process and the properties of the materials being used. 5. Given a drawing, or part, determine the processes and sequence used for manufacture.
Textbook:	<i>Fundamentals of Modern Manufacturing: Materials, Processes, and Systems</i> by Mikell P. Grover (6 th Edition, 2015)
Course Coordinator:	Dr. Dave Kim
Course Objectives:	<ol style="list-style-type: none"> 1. Describe advanced manufacturing processes for various engineering materials (powder metallurgy, 3D printing, non-traditional machining processes, etc.). 2. Provide manufacturing decision-making information by calculating production, labor, and material costs; reviewing production schedules; estimating future requirements 3. Demonstrate knowledge on how to improve manufacturing efficiency by analyzing and planning work flow, facilities layout, and resources. 4. Use the statistical process control techniques to assure product and process quality by testing finished- product and process capabilities. 5. Define lean/6-sigma tools and apply them to modern manufacturing systems. 6. Understand the complex interrelationships between design and manufacturing processes.
Topics Covered:	<ol style="list-style-type: none"> 1. Advanced materials and manufacturing processes <ul style="list-style-type: none"> o Advanced materials. o Rapid prototyping, ceramic processing, powder metallurgy, nontraditional machining. 2. Manufacturing Systems <ul style="list-style-type: none"> o Manufacturing enterprise and facility design o Quality management and statistical process control o Production planning and control 3. Lean manufacturing <ul style="list-style-type: none"> o Quality management and 6 sigma o Continuous improvement (Kaizen) tools
Lab Experiments and Activities:	None

Course Outcomes:	Students will be able to:		
	Assessed for Student Outcomes	1-d. Examine materials science and mechanics principles to solve manufacturing engineering problems. 4-a. Assess lean manufacturing solutions in considerations of the global and economic impacts.	
	Other	1-a. Demonstrate knowledge of chemistry, physics and/or engineering principles in advanced manufacturing processes. 1-b. Evaluate manufacturing situations to define problems related production layout, planning, and capability.	
Required or Elective Course:	Elective		
Relationship of Course to Program:	Meets: Educational Objectives <u>1, 3</u> Student Outcomes <u>1, 4</u>		
Prepared by:	Dr. Dave Kim	Date:	4/6/2018 (4/23/18 mb)
Approved by USC:	4/16/2018		