MECH3710 Manufacturing Processes and Systems

Course Code: MECH 3710	**Course Title:** Manufacturing Processes and Systems
Required Course Or Elective Course: elective	**Terms Offered (Credits):** Fall (3 credits)
Faculty In Charge: David Lam	**Pre-Requisites:** MECH 2410
Course Structure: Lecture – 2 days per week, 3 hours; Lab – 1 day per week, 3 hours	
Textbook/Required Material: (1) Lecture Notes; (2) Reference Book: Principles of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover	
Bulletin Course Description: This is a required course for the BEng in Mechanical Engineering with Option in Design.	
Course Topics: 1. Overview on manufacturing; 2. Process and production planning and control; 3. Manufacturing material properties; 4. Surface and tolerances; 5. Rapid prototyping; 6. Metal casting; 7. Plastic and Rubber shaping; 8. Powder metallurgy (optional); 9. Ceramic processing (optional); 10. Metal forming (optional); 11. Machining product design (optional); 12. Coating and depositions (optional)	
Course Objectives: (correlated program objectives)	1. To introduce the relationships among the engineering material properties and process variables in a given manufacturing process (P-O1, P-O3) 2. To help students understand the principles of traditional and recently developed manufacturing processes; (P-O1, P-O3) 3. To provide process characteristics, capabilities and limitations; related machinery and equipment; (P-O3) 4. To introduce the automation and common aspects of manufacturing, including metrology and quality assurance (P-O3)
Course Outcomes: (correlated course objectives and program outcomes)	A. To be capable to identify manufacturing process according to given products (1, 2) (POC1, POC3, POC4, POC5) B. To master formula and detail flexibility in solving practical problems (2, 3) (POC2, POC3, POC4) C. To become expert to design and implement the manufacturing processes for different industrial tasks (1, 4) (POC2, POC6, POC7, POC9) D. To learn strategies for self-assessment and develop the ability to critically analyze engineering applications (POC1, POC3, POC9)
Assessment Tools: (correlated course outcomes)	Classwork: 20% (B) Assignment: 24% (B)

	Midterm: 28% (B) Final Exam: 28% (B)

BEng in Mechanical Engineering (4-year program)

Program Objectives:

P-O1. Be able to communicate and perform as an effective engineering professional in both individual and team-based project environments,

P-O2. Have an international outlook with clear perspectives on the Pearl river Delta and Greater China,

P-O3. Be able to research, design, develop, test, evaluate and implement engineering solutions to problems that are of complexity encountered in professional practice and leadership,

P-O4. Clearly Consider the ethical implications and societal impacts of engineering solutions,

P-O5. Continuously improve through lifelong learning.

Program Outcomes:

POC1. ability to identify and formulate problems in multidisciplinary environment with an understanding of engineering issues and constraints;

POC2. ability to design and conduct experiments as well as analyze and interpret data;

POC3. ability to apply knowledge of mathematics, science, and engineering for problem solving in mechanical engineering and related sectors or for further education in a research career;

POC4. ability to develop specification and to design system, component, or process to meet needs;

POC5. ability to understand the manufacturability, maintainability, and recyclability of engineering system and components;

POC6. ability to use modern engineering tools, techniques, and skills in engineering practice;

POC7. ability to communicate effectively;

POC8. ability to function in multi-disciplinary teams and provide leadership;

POC9. broadly educated with an understanding of the impact of engineering solutions on issues such as economics, business, politics, environment, health and safety, sustainability, and societal context;

POC10. clear understanding of professional and ethical responsibilities;

POC11. recognition of the need for life-long learning and continuing education;

POC12. international outlook with knowledge of contemporary issues.