

IE 352 Manufacturing Processes – 2 4(4,1,1)

Catalog Data	Cutting mechanisms; Material removal operations; Tool materials and geometry; Cutting tools assembly techniques; Effects of cutting variables on machining operations; Effects of machining parameters on machine tool elements; Non-traditional machining; Process design selection.			
Prerequisite	IE-252 – “Manufacturing Processes – 1”			
Co-requisites	None			
Level	7			
Textbook	<i>Manufacturing Engineering and Technology</i> . Serope Kalpakjian, Steven R. Schmid. Fourth Edition. Prentice Hall: New Jersey, 2001. ISBN: 0-13-017440-8			
Reference	<i>Fundamentals of Modern Manufacturing</i> . Mikell P. Groover. First Edition. Prentice Hall: New Jersey, 1996. ISBN: 0-13-376583-0.			
Learning Objectives	The course familiarizes students with metal removal machines and processes; trains students to operate and carryout experiments on metal removal machines; and introduces students to the basic techniques required to choose optimal machines, decide on optimal sequences of operations, and to determine optimal cutting parameters and demonstrate them clearly in an operation sheet.			
Topics (classes)		Topic	Week	Contact, hr
	1.	Dimensional and geometric tolerances and linear measurements	2	12
	2.	Machine tool elements and motions	3	18
	3.	Machining operations: turning; boring; shaping; drilling; and milling	1	6
	4.	Metal cutting analysis; single point tool; tool materials;	4	24
	5.	force and power calculations; tool wear; machinability	1	6
	6.	Finishing operations: grinding; honing; lapping	1	6
	7.	Non-traditional machining processes	2	12
Laboratory Topics	1.	Metal cutting related measurements		
	2.	Machine tools and machine tools operations		
	3.	Cutting tool geometry		
	4.	Experimental study in metal cutting: chip formation; tool wear and cutting force measurements		
	5.	Non-traditional machining processes		
	6.	Developing routing sheets		
Project work	The project entails production of a given component, with requirements including necessary tooling and measurements, machining variables, and machining time. Alternatively, students may be asked to perform a literature review related to advances on one of the machining processes discussed in this course.			
Computer Usage	Exercises are assigned regarding the usage of the statistical package of <i>Dynaware</i> software in performing cutting force analysis.			
Learning outcomes	1. Work piece design analysis for manufacturing (tolerancing, dimensioning, material requirement) [a, b, e]. 2. Machining process operations (traditional and non-traditional) [a, e]. 3. Metal cutting analysis (force, power, machining time calculations in different machining processes. [a, b, e]. 4. Process design and planning (cutting and material conditions selection) [c, e]. 5. Economics of metal cutting operations [a, c, e].			
Estimated Category Content	Engineering science: 3 credit hours (75%) Engineering design: 1 credit hour (25%)			

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