

CALIFORNIA STATE UNIVERSITY, CHICO
Department of Mechanical and Mechatronic Engineering and Advanced Manufacturing
Spring 2021

SMFG/AMAR 260 – APPLIED ADVANCED MANUFACTURING [3 units]

Prerequisites: SMFG 160 (grade of C- or higher) Recommended: PHYS 202A

Course Time Schedule:

Lecture	Tues, Th 12:30 to 1:45 pm	On-line
Lab 1	Friday 11:00 to 1:50 pm	PLMS 121

Instructor: Harold Koehler

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Office: OCNL 425

Office Phone: 898-5676

Office Hours: M 2-4pm, TH 10–12pm

MMEM Department Phone: 898-5346

Course Objectives:

This course is designed to familiarize the student with the manufacturing processes associated with material removal (mass reduction by chips) and Additive Manufacturing. The focus of this course is on calculating the material removal rate (MRR) when using machine tools, including speeds, feeds, and depth of cut. It includes machine set up and selection of cutting tools along with the responsibilities of a setup machinist and a machine operator. An introduction to manual control of CNC machines is included. The course will also cover Additive Manufacturing. This will include: machines, materials and costs, as well as applications for tooling and production.

Catalog Description:

A study of the industrial applications of material-removal technology. Emphasis will be placed on the management of the application of the technology, including the application of sustainable materials, consumables and power management. Units involving the physics of metal-cutting, cutting-tool materials and geometry, conventional and semi-automatic machine tools, and cost-estimating are included. 2 hours lecture, 3 hours laboratory.

Textbook:

- Technology of Machine Tools, 5th or 6th edition, Krar **[REQUIRED]**
- Shop Reference for Students & Apprentices, Second Edition, Christopher McCauley, 2000, Industrial Press Inc. New York Published: June, 2001 ISBN: 9780831130794 **[RECOMMENDED]**

Costs During Term Of Course:

Safety Glasses: **[REQUIRED]**
Dial or Digital Caliper and 6" steel rule **[REQUIRED]**

Evaluation Procedure:

Laboratory exercises & Journal	35%
Article Reviews.....	10%
Process Research Presentation	15%
Mid-term exam	20%
Final exam.....	20%
Total	100%

Safety Policy & Cell Phones

Everyone in Plumas 121 must wear eye protection and closed-toed shoes at all times. **CELL PHONES MUST BE STORED IN YOUR BACK PACK OR LOCKER IN PLUMAS 116** This is a matter of safety and respect to all those attending the class. Anyone failing to comply with all posted lab safety rules will be told to leave the lab immediately and not be allowed to return to the lab that day. Repeated offenses will result in failing the course.

Dropping and Adding Class

You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc., found in the [CSU Chico University Catalog](#). The last day to add or drop the class without instructor's permission is Friday, February 5, 2021.

University Policies and Resources Academic integrity

Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found on the Student Judicial Affairs web site.

Americans with Disabilities Act

If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

Accessibility Resource Center

530-898-5959

Student Services Center 170

arcdept@csuchico.edu

Student Learning Center

The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at <http://www.csuchico.edu/slc>.

SMFG 260 -- MATERIAL REMOVAL -- SPRING 2021

WEEK	DATE	PLANNED TOPICS	READING	WORK DUE
1	1/26-28/21	Course introduction: Additive & Subtractive Advanced Manufacturing. The history of machine tools and tool geometry	Units 1 & 30	
	Lab	Carbide Insert application.	Unit 37	
2	2/2-4/21	The Physics of Metal Cutting , and Cutting Tool Materials	Units 27-29	
	Lab	Carbide Insert Turning and HSS drill bit grinding and drilling		
3	2/9-11/21	Intro to drilling machines and work holding.	Units 38 - 44	
	Lab	Drilling Exercise and continue Carbide Insert Turning, Quiz 1	Unit 41	
4	2/16-18/21	The Lathe, work holding, and machining between centers	Units 45 - 53 & 56	
	Lab	Sweeping in Lathe Four Jaw Chuck and turning between centers Demo	Unit 47	
5	2/23-25/21	Tapers, threads and thread turning. Advanced lathe topics.	Units 54 & 55	Writing Assignment 1
	Lab	Sweeping in Milling Machine and Aligning Vice		
6	3/2-4/21	Milling machines, and types of milling cutters.	Units 55 - 58	
	Lab	Acme thread demonstration	Unit 60	
7	3/9-11/21	Review for Midterm 3/2/21 MIDTERM EXAM 3/4/21		
	Lab	First Vise Operation, establishing the datum.	Unit 68	
8	*** SPRING BREAK *** (March 15th through 19th)			
9	3/23-25/21	Introduction to CNC milling Concepts. Basic G - code functions. EDM & CMM	Units 85 - 89	Writing Assignment 2
	Lab	CNC Milling of small vise sliding jaw casting.		
10	3/30/21 - 4/1/21	Introduction and history of additive manufacturing.		
	Lab	CNC Milling of small vise casting with program control, adding the slot.		
11	4/6-8/21	Additive Manufacturing. Assign Presentation Topics		
	Lab	Machining the movable jaw, and drilling/tapping operations.		
12	4/13-15/21	Additive Manufacturing		Writing Assignment 3
	Lab	Finishing Vise Operations		
13	4/20-22/21	Additive Manufacturing		
	Lab	Open Lab.		
14	4/27-29/21	Additive Manufacturing		
	Lab	Open Lab		
15	5/4-6/21	Additive Manufacturing		Writing Assignment 4
	Lab	Open Lab.		
16	5/11-13/21	Presentations, Final Exam review session		
	Lab	-- All Lab Work Due --		
17	5/15/19	FINAL EXAM		

