

**CALIFORNIA STATE UNIVERSITY, CHICO**  
Department of Mechanical and Mechatronic Engineering and Sustainable Manufacturing  
Spring 2019

**SMFG 260 -- MATERIAL REMOVAL [3 units]**

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

**Course Time Schedule:**

Lecture	Monday, Wednesday 11:00 to 11:50 pm	OCNL 121
Lab 1	Friday 11:00 to 1:50 pm	PLMS 121

**Instructor:** Harold Koehler

**E-MAIL:** TBD

**Office:** OCNL 425

**Office Phone:** 898-5676

**Office Hours:** M, W 12:00 – 2:00pm

**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). 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.

**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, 5<sup>th</sup> or 6<sup>th</sup> 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 **[RECOMMENDED]**

## **Evaluation Procedure:**

Laboratory exercises .....	35%
Article Reviews .....	15%
Spot tests .....	10%
Mid-term exam .....	20%
Final exam.....	<u>20%</u>
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 1, 2019.

## **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 2017**

WEEK	DATE	PLANNED TOPICS	READING	WORK DUE
1	1/23/19	Course introduction: The history of machine tools and tool geometry	Units 1 & 30	
	Lab	Carbide Insert application, and show band-saw blade welder.	Unit 37	
2	1/28-30/19	The Physics of Metal Cutting , and Cutting Tool Materials	Units 27-29	
	Lab	Carbide Insert Turning and HSS drill bit grinding		
3	2/4-6/19	Intro to drilling machines and work holding.	Units 38 - 44	
	Lab	Drilling Exercise and continue Carbide Insert Turning	Unit 41	
4	2/11-13/19	The Lathe, work holding, and machining between centers	Units 45 - 53 & 56	Writing Assignment 1
	Lab	Begin lathe turning exercise	Unit 47	
5	2/18-20/19	Tapers, threads and thread turning. Advanced lathe topics.	Units 54 & 55	
	Lab	Lathe turning Exercise, Acme thread demonstration		
6	2/25-27/19	Milling machines, and types of milling cutters.	Units 55 - 58	
	Lab	Sweeping in the vertical mill.	Unit 60	
7	3/4-6	<b>MIDTERM EXAM</b>		
	Lab	Setting up the universal indexing head and horizontal mill. First Vise Operation, establishing the datum.	Unit 68	
8	3/11-13/19	Introduction to CNC milling Concepts. Basic G - code functions.	Units 85 - 89	Writing Assignment 2
	Lab	CNC Milling of small vise casting and Gear Blank with manual and program control using the Boss 5.		
9	<b>*** SPRING BREAK *** (March 18th through 22nd)</b>			
10	3/25-27/19	Dimetral Pitch, involute gear terms, geometry, and calculations.	Units 64 - 69	
	Lab	CNC Milling of small vise casting with program control, adding the slot.		
11	4/3-4/19	Contour band-saws, types, accessories, and operations. Blade geometry, type, and size.	Units 35 - 37	
	Lab	Machining the movable jaw, and drilling/tapping operations.		
12	4/8-10/19	Grinding Technology, types of abrasives, grinding wheels, surface grinding, cylindrical grinding.	Units 71 - 75	
	Lab	Finishing Vise Operations		
13	4/15-17/19	Advanced Manufacturing Technology. The EDM and the CMM.	Units 96 - 97	Writing Assignment 3
	Lab	Open Lab.		
14	4/22-23/19	Lean Manufacturing discussion.	Units 79 - 84	
	Lab	Open Lab		
15	4/29/19 5/1/19	Sustainable Manufacturing and Industrial Ecology		
	Lab	Open Lab.		
16	5/6/19	Dead Week -- Final Exam review session		
	Lab	-- All Lab Work Due --		
17	5/15/19	<b>FINAL EXAM</b>		