11. COURSE CLASSIFICATIONS: ▲ nd▬ ▬ d , co▬ ▬ ▬ on y ▬ ▬ o d▬ ▬ ▬ o nd on ▪ o ,

This course will provide our students with knowledge and skills in computer aided manufacturing and prepare our students with a CAM background to increase employment opportunity.
This action may have no to minimal effect on faculty teaching load.

JUSTIFICATION FOR ACTION REQUESTED

SEE ATTACHED SIGNATURES.

A A M L LLAB o c on

No, d n on n

Course: **ME 406 – Computer Aided Manufacturing (CAM)** (*3 credit elective course*) (Hours: 1.5+4.5)
Pre/Co-requisites: ME 321 (Pre)
Department: Mechanical Engineering

Textbook: No required text. Software & machine tool instruction manuals from specific vendors will be used. See the class Web site.
Class Web Site: Follow links from: http://medept.engr.uaf.edu.

Professor: H. Ed Bargar, PhD, PE
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Phone: 474-5873
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Office: Duckering Rm. 351A
Office Hours: Mon/Wed/Fri xx:xx – xx:xx
Tue/Thu xx:xx – xx:xx
(or as arranged).

Meeting Times & Locations:

Lecture:	Tue	xx:xx – xx:xx	Duckering 333
Lab:	xxx/xxx	xx:xx – xx:xx	Duckering 333

Catalog Description:

Introduction to computer aided manufacturing. This includes the principles of computer aided process planning (CAPP) and an introduction to computer numerical control (CNC) tools used in manufacturing. Emphasis will be on methodology with hands-on applications of computer software and specific machine tools.

Objectives:

This course covers how computer aided design (CAD) relates to computer aided manufacturing (CAM). Emphasis is placed on the requirement that the entire process, from the inception of the idea for a part to the completion of its manufacture, must include integrated planning in order that the manufacturing process be efficient. Students utilize Solidworks (CAD) and CAMWorks (CAM) software to produce example parts. The machine interpretable code produced by CAMWorks is used by CNC machine tools in the lab to manufacture the parts. Upon completion of this course, the student should be familiar with:

1. Why an efficient manufacturing process requires considerations other than just the design of the particular part.

2. Basic machine tool considerations and additional considerations required for CNC machines to take advantage of software generated machining instructions.

3. How Solidworks and CAMWorks work together to produce code that can be used by CNC machine tools.

4. How to modify the CAMWorks output code for a specific CNC machine tool.

ABET Criteria 3 – Program Outcomes:

This course helps students meet outcomes:

(c)	*ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.*
(i)	*recognition of the need for, and an ability to engage in life-long learning.*
(k)	*ability to use the techniques, skills and modern engineering tools necessary for engineering practice.*

ABET Criteria 4 - Professional Component:

This course meets requirements set forth in ABET evaluation guidelines under Criteria 4. (b) Professional Component. Specifically, this course is part of the engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study.

Grading:

Grading shall be on the standard straight scale:

90 – 100	A	70 – 74	C
87 – 90	A–	67 – 70	C–
84 – 87	B+	64 – 67	D+
80 – 84	B	60 – 64	D
77 – 80	B–	57 – 60	D–
74 – 77	C+	< 57	F

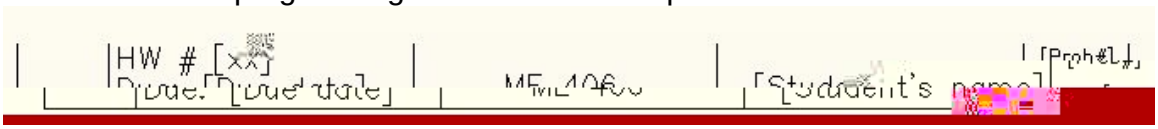
The grade structure is:

Midterm Exam	25%	Final Exam	25%	Homework/Lab	50%

Attendance is **required**.

Homework and lab assignments will consist of specific project tasks. All assignments shall be submitted on the due date noted.

student's name in the right header tab; and the problem number and page number in the top right margin block. An example is shown below:



The beginning of each task will start with a section heading of "**Problem:**" followed by a statement of the task. This may be paraphrased or copied directly from the assignment. It is a concise statement of the given information and the desired results.

Next comes the solution section titled with the heading "**Solution:**". This is where all work required to solve the task is shown. It includes diagrams, schematics, and plots necessary to show the process under investigation or fully describe the problem solving method. All sources for constants, table values, and/or equations are cited. Assumptions are stated along with reasoning justifying the assumptions. Solution methodology is explained. The intended solution or outcome of the task shall be made obvious by the presentation of the work.

Project drawings shall be presented in sufficient detail and views for the parts to be fully understood and manufactured. The drawings shall be submitted with the standard title block provided by the professor for use in the class with the Solidworks software.

Course Schedule:

The course schedule shall be approximately as shown below. Some adjustment may be made as warranted.

Week	Lecturer Topic	Lab Topic
1 – 3	Introduction. Design planning for efficient manufacturing. Introduction to CNC machine tools.	Review of Solidworks software. Using CAMWorks within Solidworks. Begin the design of project part #1.
4 – 6	Workholders and the relation between the workholder, the workpiece, and the machine tool. Modifying CAMWorks generated code to machine tool code for project part #1.	Complete project part #1 design and generate CAMWorks code. Modify the code for the specific CNC tooling. Machine project part #1.
7 – 9	Advanced CNC tools aid to CAM and their additional requirements.	Begin the design of project part #2.
10 – 12	Automated measuring and adjustment of CNC for enhanced manufacturing.	Complete project part #2 design and generate CAMWorks code. Modify the code for the specific CNC tooling. Machine project part #2.
13 – 14	Large scale CNC tooling in UAF's Machine Shop.	Select one of the project parts, make the required modifications, and machine it on the SL-20 or VF-2 in the Machine Shop.