

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	Mechanical Engineering	College/School	CEM
Prepared by	Chuen-Sen Lin	Phone	474-5126
Email Contact	clin@alaska.edu	Faculty Contact	Chuen-Sen Lin

1. ACTION DESIRED (CHECK ONE): Trial Course New Course

2. COURSE IDENTIFICATION: Dept Course # No. of Credits

Justify upper/lower division status & number of credits: This is an application course, which involves application of materials taught in the lower level courses. This is an upper division elective course. 3 credits provide sufficient time to present the course material.

3. PROPOSED COURSE TITLE:

4. To be CROSS LISTED? YES/NO If yes, Dept: Course #

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. To be STACKED? YES/NO If yes, Dept: Course #

6. FREQUENCY OF OFFERING:
Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved)

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check all that apply) 1 2 3 4 5 6 weeks to full semester

OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc)

9. CONTACT HOURS PER WEEK: LECTURE hours/weeks LAB hours /week PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty/cd/credits.html> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

ME-404- Computer Aided Design (CAD), 3 credits
Introduction to principles of computer aided design and engineering. Applications of software and hardware in solid modeling, design analysis, motion analysis, rapid prototyping, and interface between computer aided design and computer aided manufacturing. (1.5+1.5) Prerequisites: Senior standing or permission of instructor

11. **COURSE CLASSIFICATIONS:** (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core?

YES

NO

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6

W = Writing Intensive, Format 7

Natural Science, Format 8

12. **COURSE REPEATABILITY:**

Is this course repeatable for credit?

YES

NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?

TIMES

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

13. **GRADING SYSTEM:** Specify only one.

LETTER

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. **PREREQUISITES**

Senior standing or permission of instructor

These will be required before the student is allowed to enroll in the course.

15. **SPECIAL RESTRICTIONS, CONDITIONS**

Co-requisite ES331

16. **PROPOSED COURSE FEES**

\$ 25

Has a memo been submitted through your dean to the Provost & VCAS for fee approval?

Yes

Yes/No

17. **PREVIOUS HISTORY**

Has the course been offered as special topics or trial course previously?

Yes

Yes/No

If yes, give semester, year, course #, etc.:

This course is the result of the expansion of ME401 CAD/CAM (a 3 credits CAD & CAM course), which has been offered for many times. It will be split into this course and another course specializing in CAM only.

18. **ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

None

19. **LIBRARY COLLECTIONS**

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

x

Yes

Teaching materials include handouts from the instructor and computer software and hardware manuals.

20. **IMPACTS ON PROGRAMS/DEPTS**

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

None to minimum impact on faculty teaching load.

21. **POSITIVE AND NEGATIVE IMPACTS**

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

This course will provide our students with knowledge and skills in computer aided design and prepare our students with CAD background to increase their employment opportunity.

This action may have no to minimal effect on faculty teaching load.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

The CAD/CAM course was first added to ME curriculum in 1999. The offer of a single Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) class instead of a CAD class and a CAM class separately (as offered by most of the other universities) was due to insufficient CAM facilities at that time. After 1999 the department has gradually increased its CAD/CAM capability through purchasing more hardware and leasing more software using funds received from external funding agencies and the University as well.

During the last few years, the enrollment of ME Department has been increased drastically and more students expressed their desire/needs of learning more in CAD/CAM applications. The department, therefore, decided to expand the current CAD/CAM course (i.e. ME401) into two courses (i.e. ME404 CAD course and ME 405 CAM course).

The continuous growth of CAD technology and tools have made the applications expanding from earlier military and automotive industries into numerous other design areas, such as medical tools, chemical processing systems, therapeutic sports, etc. In order to prepare our students with up-to-date knowledge and competitive background in CAD area, an individual 3-credit CAD course instead of a 3-credit CAD/CAM course is justified.

APPROVALS:

	Date	
Signature, Chair, Program/Department of:		

	Date	
Signature, Chair, College/School Curriculum Council for:		

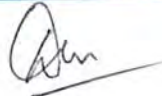
	Date	
Signature, Dean, College/School of:		

	Date	
Signature of Provost (if applicable)		

Offerings above the level of approved programs must be approved in advance by the Provost.

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		



18. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

None

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

Yes

Teaching materials include handouts from the instructor and computer software and hardware manuals.

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action? Include information on the Programs/Departments contacted (e.g., email, memo)

None to minimum impact on faculty teaching load.

21. POSITIVE AND NEGATIVE IMPACTS

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

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

Please see modifications elsewhere

JUSTIFICATION FOR ACTION REQUESTED

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The continuous growth of CAD technology and tools have made the applications expanding from earlier military and automotive industries into numerous other design areas, such as medical tools, chemical processing systems, therapeutic sports, etc. In order to prepare our students with up-to-date knowledge and competitive background in CAD area, an individual 3-credit CAD course instead of a 3-credit CAD/CAM course is justified.

APPROVALS:

Josh Lee Date *2/14/2011*

Signature, Chair, Program/Department of:

Mechanical Engineering

Debasmita Misra Date *2/23/11*

Signature, Chair, College/School Curriculum Council for:

CEM

AGAD Date *2/24/11*

Signature, Dean, College/School of:

CEM

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	
Signature, Chair, Program/Department of:		
	Date	
Signature, Chair, College/School Curriculum Council for:		
	Date	
Signature, Dean, College/School of:		

ATTACH COMPLETE SYLLABUS (as part of this application).

Note: The guidelines are online: <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:

Title, number, credits, prerequisites, location, meeting time
(make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:

Name, office location, office hours, telephone, email address.

3. Course readings/materials:

Course textbook title, author, edition/publisher.
 Supplementary readings (indicate whether required or recommended) and
 any supplies required.

4. Course description:

Content of the course and how it fits into the broader curriculum;
 Expected proficiencies required to undertake the course, if applicable.
 Inclusion of catalog description is *strongly* recommended, and
 Description in syllabus must be consistent with catalog course description.

5. Course Goals (general), and (see #6)

6. Student Learning Outcomes (more specific)

7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

Specify how students will be evaluated, what factors will be included, their relative value, and
 how they will be tabulated into grades (on a curve, absolute scores, etc.)

11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.

State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

ME404 SYLLABUS
University of Alaska Fairbanks
Mechanical Engineering Department
Fall 2012

Instructor: Dr. Chuen-Sen Lin
Office: Duckering 325
Office Hours: TR 1:00-2:00
Telephone: 474-5126

Teaching Assistant:
Office:
Office Hours:
Telephone: e-mail:

Class Schedule

Lecture: W 11:45 – 12:45 D333
Lab: TR 3:30 - 6:30 D333

Disabilities Services:

Disability Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insured that UAF students have equal access to the campus and course materials. We will work with the Office of Disability Services (203 WHIT, 474-7043)

to provide reasonable accommodations to students with disabilities.

Catalog description (1+6 credits)

ME404- Computer Aided Design (CAD), 3 credits

Introduction to principles of computer aided design and engineering. Applications of software and hardware in solid modeling, design analysis, motion analysis, rapid prototyping, and interface between computer aided design and computer aided manufacturing.

Pre-requisites: Senior standing or permission of instructor
Co-requisites: ES 331

Instructional Method: Lecture & lab

Textbook

No designated textbook. Handouts will be distributed in class.

References

1. "Principles of CAD/CAM/CAE systems," Lee, Addison Wesley.
2. "Rapid Prototyping Using the JP System 5," A.L. Anderson, SDC Publication.
3. "Rapid Prototyping and Manufacturing-Fundamentals of StereoLithography," P.F. Jacobs, SME.
4. "Reverse Engineering," K.A. Ingle, McGraw-Hill.
5. "Applied Finite Element Analysis," L.J. Segerlind, John Wiley.
6. "CAD/CAM," M.P. Groover, E.W. Aimmers, Prentice Hall.
7. "Engineering Drawing and Related Documentation Practices-Dimensioning and Tolerancing," ANSI/ASME.
8. "Tolerances of Form and of Position, Part I," ISO.

Grading Policy

Letters with plus and minus
Grades will be based on curve

Tests (20%)
Two tests.

Projects (60%)
Six projects. Project report may be turned in within 1 week after the due date with a 15% deduction. Project report submitted more than 1 week after the due date will receive 0 points.

Homework (20%)
Homework will be collected at designated times. Homework may be turned in within 2 days after the due date with a 30% deduction. Homework submitted more than two days after the due date will receive 0 points.

Course Objectives

To learn:
CAD process, solid modeling
Design analysis
Rapid prototyping process
Introduction to interface between CAD and CAM

To practice:
CAD using a solid modeling software
Design analysis using Motion and FEM software
Rapid Prototyping Procedure using a 3D rapid-prototyping printer
CAD/CAM data conversion using CamWorks

Week

Contents

1-6 Introduction to Solid Modeling
Introduction to SolidWorks

- Part
 - Assembly
 - Drawing
 - Advanced features
 - Project #1
 - Bottom up assembly/Top down assembly
 - Sheet metal
 - Project #2
- 7-10 Introduction to FEM
 - Introduction to SolidWorks/Simulation
 - Static analysis, frequency analysis, buckling analysis
 - Design optimization
 - Mixed meshing
 - Post processing
 - Project #3
- 11-12 Test #1
 - Introduction to kinematics/dynamics analysis
 - SolidWorks/Motion
 - Project #4
- 13 Introduction to ThermoJet- A solid object printer
 - Project #5
- 14-15 Introduction to CAD/CAM data conversion
 - Introduction to CAMWORKS
 - Project #6
 - Test #2

ABET Criteria - Program Outcomes

This course helps students meet outcomes:

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (c) An ability to design a system, component, or process to meet desired needs within realistic constraints.
- (e) An ability to identify, formulate, and solve engineering problems.
- (i) A Recognition of the need for, and an ability to engage in life-long learning.
- (j) Knowledge of contemporary issues.
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.