Submit original with signatures + 1 copy + electronic copy to UAF Governance. See [http://www.ua.edu/afgov/faculty/cd](http://www.ua.edu/afgov/faculty/cd) for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

<table>
<thead>
<tr>
<th>SUBMITTED BY:</th>
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<tbody>
<tr>
<td>Department</td>
<td>Mechanical Engineering</td>
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</tr>
<tr>
<td>Prepared by</td>
<td>Chuen-Sen Lin</td>
<td></td>
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<tr>
<td>Email Contact</td>
<td><a href="mailto:clin@alaska.edu">clin@alaska.edu</a></td>
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<tr>
<td>College/School</td>
<td>CEM</td>
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<tr>
<td>Phone</td>
<td>474-5126</td>
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</tr>
<tr>
<td>Faculty Contact</td>
<td>Chuen-Sen Lin</td>
<td></td>
</tr>
</tbody>
</table>

1. **ACTION DESIRED**
   (CHECK ONE):
   - [ ] Trial Course
   - [x] New Course

2. **COURSE IDENTIFICATION:**
   - Dept: ME
   - Course #: 404
   - No. of Credits: 3
   - 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:**
   - Computer Aided Design

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:**
   - Every other Fall
   - Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. **SEMESTER & YEAR OF FIRST OFFERING (if approved):**
   - Fall 2012

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)
     - Lecture and Lab
   - OTHER FORMAT (specify)
     - Mode of delivery (specify lecture, field trips, labs, etc)

9. **CONTACT HOURS PER WEEK:**
   - 1.5 LECTURE hours/weeks
   - 4.5 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.ua.edu/afgov/faculty/cd/credits.html](http://www.ua.edu/afgov/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 [x]

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 [x]

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

- TIMES

How many times may the course be repeated for credit?

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

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

- LETTER [x]
- PASS/FAIL:

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/No

17. **PREVIOUS HISTORY**

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

- Yes

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 (kdjansen@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.

- 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:

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) ___________________________ Date __________

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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee ___________________________ Date __________
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.

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

[Signature, Chair, Program/Department of: Mechanical Engineering]
Date 2/4/2011

[Signature, Chair, College/School Curriculum Council for: CEM]
Date 2/23/11

[Signature, Dean, College/School of: CEM]
Date 2/24/11
**ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)**

<table>
<thead>
<tr>
<th>Signature, Chair, Program/Department of:</th>
<th>Date</th>
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<tbody>
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</tr>
<tr>
<td>Signature, Dean, College/School of:</td>
<td>Date</td>
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</table>
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

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

<table>
<thead>
<tr>
<th>Week</th>
<th>Contents</th>
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<tbody>
<tr>
<td>1-6</td>
<td>Introduction to Solid Modeling</td>
</tr>
<tr>
<td></td>
<td>Introduction to SolidWorks</td>
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</tbody>
</table>
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.