

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	Gang Sheng	Phone	5649 (Gang Sheng)
Email Contact	gsheng@uaf.edu	Faculty Contact	5649 (Gang Sheng)

1. ACTION DESIRED (CHECK ONE):

Trial Course	<input type="checkbox"/>	New Course	<input checked="" type="checkbox"/>
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2. COURSE IDENTIFICATION:

Dept	ME	Course #	489	No. of Credits	2
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Justify upper/lower division status & number of credits: This course needs one semester with two hour lecture each week (>1600 minutes of lecture in a semester) and students are supposed to complete an integrated engineering design with two reports.

3. PROPOSED COURSE TITLE: Senior Design II

4. To be CROSS LISTED? YES/NO

No	If yes, Dept:	Course #
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(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. To be STACKED? YES/NO

No	If yes, Dept.	Course #
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6. FREQUENCY OF OFFERING:

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

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

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 6 weeks to full semester
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OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc) Lecture and projects (prototype and test)

9. CONTACT HOURS PER WEEK:

2	LECTURE hours/weeks		LAB hours /week		PRACTICUM hours /week
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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) 6 (project)

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

ME F489, design project II, 2 credit

The course is focused on pursuing the prototype and design optimization based on the design of a real or simulated project completed by students in senior design I. Emphasis will be on the design improvement, product development, prototype, project management and benchmark. The survey of contemporary design methodologies will be introduced in lecture. Each design team is supposed to complete a prototype, complete test/benchmark and improve design.

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?

CREDIT
S

13. GRADING SYSTEM: Specify only one.

LETTER

☒

PASS/FAIL:

☐

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X, ME441, ME488, co-requisite ME403, or permission of instructor; senior standing.

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

15. SPECIAL RESTRICTIONS, CONDITIONS

No

16. PROPOSED COURSE FEES

\$

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?

No

Yes/No

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

18. ESTIMATED IMPACT

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

There is no negative impact to be caused by this action.

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 ☐

There is no need to improve the library/media collections, equipment, and services for the proposed course

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)

The program/ME department will not be affected by this action.

21. POSITIVE AND NEGATIVE IMPACTS

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

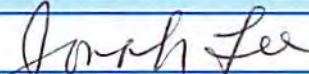
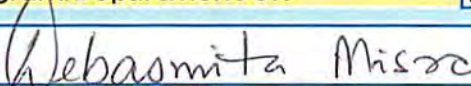

Positive impact is to allow senior students to complete the prototype and testing of their design with sufficient time.

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.

- As a capstone design course, the past experience shows that it needs longer time than one semester for many students to complete a full design process, which includes project definition, specification, concept design, development, fabrication and test.
- ME department once had a meeting discussing this issue in Nov. 2010, and a consensus was reached.
- The research shows many other universities (for example, Clemson University, RIT) uses the structures of senior design I & II, to enable students to conduct design and complete prototype and testing using two semesters.
- This proposal is the senior design II. This course will give senior students sufficient time to improve their design completed in senior design I, and to prototype their design and conduct testing, and finally benchmark and improve their design.

APPROVALS:

	Date	2/14/2011
Signature, Chair, Program/Department of: Mechanical Engineering		
	Date	2/23/11
Signature, Chair, College/School Curriculum Council for: CEM		
	Date	2/24/11
Signature, Dean, College/School of: CEM		
	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

<input type="text"/>	Date <input type="text"/>
Signature, Chair, UAF Faculty Senate Curriculum Review Committee	

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

<input type="text"/>	Date <input type="text"/>
Signature, Chair, Program/Department of:	<input type="text"/>

<input type="text"/>	Date <input type="text"/>
Signature, Chair, College/School Curriculum Council for:	<input type="text"/>

<input type="text"/>	Date <input type="text"/>
Signature, Dean, College/School of:	<input type="text"/>

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."

ME F489 Senior Design II

Senior Design - ME F489 F01 CRN:

University of Alaska Fairbanks
Mechanical Engineering Department
Spring 2012

Instructor: Dr. Gang Chen (Gang Sheng)
Office: Duckering 349C
Phone: (907) 474-5649
E-mail: gsheng@alaska.edu
Course Meetings: two hours, DUCK 252.
Office Hours: three hours or by Appointment
Class Web: UAF Blackboard (<https://classes.uaf.edu/>)

Prerequisites

Senior standing, ENGL 111X, COMM131X or 141X, ENGL 211X or ENGL 213X, ME441, ME488, co-requisite ME403, or permission of instructor

Course Goals

The course seeks to provide senior student with an integrated and summative design experience focusing on prototype and benchmark. It incorporates the disciplines of mechanical engineering in one project. The course is to understand and exercise design processes and skills for developing products and testing the end product. The survey of contemporary design methodologies will be presented. In addition, throughout this course we will emphasize the perspectives of globalization and life-long learning.

Course Description

The course is focused on pursuing the design improvement and prototype of the designs that completed by students in senior design I. Emphasis will be on the development of product and benchmark the prototypes. In the course, each team is supposed to improve the design completed in senior design I, to buildup a prototype, test prototype, optimize the design.

The course curriculum provides students a highly interactive environment in design and prototyping. Course activities include regular lectures; students' practice in project implementation, preparation of technical reports and final presentations (in public); and students' practice in interpersonal communications with team members and advisors. The course will try to provide a realistic industrial management structure and professional background for the design project activities.

The course will likely be presented in a combines lecture style (e.g., in-class group discussions, office visit and discussion with the instructor, etc.) by comprising two parts – the lecture topics and discussions. Every week the lecture topics will focus on the survey of contemporary design methodologies. The instructor will present a topic that accommodates the chronological order of Design Process as to allow each design team to apply the topic to their exercise of design. On a parallel base, an informal discussion will be held during each class meet, to provide a symposium-like environment to all design teams for any issues arisen in the process of the design optimization, prototyping, and documentation / presentation.

Objectives (ABET's outcome criteria)

1. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
2. an ability to function on multi-disciplinary teams
3. an ability to communicate effectively

4. an appreciation of significant engineering issues in the North

References

1. Instructor notes, handouts and materials that are periodically uploaded on the course web.
2. SAE International seminars: design processes/techniques series, 2007
3. P. G. Dominick, J. T. Demel, W. M. Lawbaugh, R. J. Freuler, G. Kinzel, and E. Fromm, "Tools and Tactics of Design," John Wiley & Sons, Inc, 2001.
4. J. Knutson, *Succeeding in Project-Driven Organizations*, John Wiley & Sons, Inc., 2001.

Course Contents

- Course outline
- Design improvement and benchmark: Target setting & cascading; Top-down & Bottom-up Processing; Concept proving and benchmarking.
- Special design topic 1: Routine/domain design, innovative design and creative design: Theory of Inventive Problem Solving
- Special design topic 2: Optimization Design
- Special design topic 3: Reliability Design
- Special design topic 4: Robust Design, Failure Mode and Effects Analysis in Design
- Others, design for sustainability, etc
- Documentation, Presentation.

Course Activities

(1) Class Events

- A schedule of class activities is distributed with this syllabus at the first meeting of the class. It lists the events we will go through during this semester. They include improving / prototyping /test the design, giving presentations, and submitting reports, etc.
- Class participation is mandatory. **Notice of absence is required.** (If you will be participating in some events like the Engineering Week, you need to be cautious of balancing your schedules between your course burdens and your role duties.)

(2) Team Work

- Students need to maintain the teams formed in senior design II.

(3) Reports

- One design improvement report, one prototype report and one final report and several in-class presentations will be completed. The report format will be distributed by the instructor.
- **Final report is due to the instructor and the advisor(s) by 3 days before their final presentation date.**

(4) Presentations

- Three formal presentations will be given by each team in this semester. Weekly informal presentation up to 5 minutes will be asked from each team to update their work progress.
- Each team needs to inform the instructor for their visual/audio needs for the presentation.
- Each team must give their final presentation in public during the last two weeks of this semester. Each team is responsible to schedule their presentation with the instructor and their advisors, and to invite the advisors to attend the presentation.
- All the ME faculty members and advisors will be invited to participate the presentations and give evaluations. All the evaluations will be collected and averaged for grading.

(5) Ownership of the Intellectual Property (IP)

- Students own the intellectual properties of their finished project.
- Talk to the instructor if you want to pursue IP issues.
- Talk to individual advisors for their interests of sharing/waiving the ownership of the intellectual properties (usually depends on how much the advisor has involved in the project).

- For the teaching purpose only, the instructor holds a right to take pictures of the final prototype, collect reports and presentation materials. The instructor will post students' projects on the class webpage. Address any intellectual property issues to the instructor if you have concerns about the posting.

Grading Policy

- All students must pledge to work hard toward prototyping and final presentation.
- Any team completing a project without a prototype at the end of the semester will be failed in this course.
- Attendance is mandatory. One absence without advance notice will take 2 points off from your final grade until 10 points in maximum are accumulated.
- A late turn-in report will be under a penalty of 2 points/day from the final grade of each team member.

	Design improvement 15%	Prototype 25%	Final 35%	Evaluation from advisors/audience 25% (avg report & pres)
Report (prototype)	10%	20%	30%	
Presentation	5%	5%	5%	

A+(97-100%),A(93-96%),A-(90-92%),B+(87-89%),B(83-86%),B-(80-82%),C+(77-79%),C(73-76%),C-(70-72%),D+(67-69%),D(63-66%),D-(60-62%), F(<60%)

Campus Resources

- ME Workshop (Mr. Eric Johansen)
- Office of Intellectual Property & Licensing

The Office of Intellectual Property works with UA employees to facilitate and protect UA's innovative activities and bring the results into public use through commercialization. The Office of Intellectual Property assists UA faculty and departments with IP, patent, copyright, trademark and licensing issues, and contractual issues regarding intellectual property and technology transfer. The Office of Intellectual Property also processes patent applications, markets inventions to the private sector, markets UA trademarks and service marks to the private sector, manages income from IP licensing, and actively seeks new opportunities for UA and private industry collaboration. The office locates at 212 West Ridge Research Building, 474-7765.

- 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. The instructor will work with the Office of Disabilities Services (208 WHIT,474-5655) to provide reasonable accommodation to students with disabilities. Contact: Mary Matthews, Disability Services, fmkm@uaf.edu, x5655.

- Writing Center

The Writing Center is a student-staffed, student-oriented service of the English Department. They collaborate with each student on a one-to-one basis, and work with students at any phase of the writing process -- planning, drafting, and revising. They also help writers discover ways of improving grammar, mechanics, and punctuation. Contact: UAF Writing Center, 907-474-5314, 801 Gruening Blod., PO. Box 755720, Fairbanks, Alaska 99775-5720.