



SACRAMENTO  
STATE

# Course Change Proposal Form A



<b>Academic Group (College):</b> <b>Engineering and Computer Sci.</b>	<b>Academic Organization (Department):</b> <b>Mechanical Engineering</b>	<b>Date:</b> <b>February 25, 2009</b>
<b>Type of Course Proposal:</b> New <input checked="" type="checkbox"/> Change <input type="checkbox"/> Deletion <input type="checkbox"/>	<b>Department Chair:</b> <b>Sue Holl</b>	<b>Submitted by:</b> <b>Tim Marbach</b>
<b>Does this course fulfill a requirement for single-subject or multiple subject credential students? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></b>	<b>For Catalog Copy: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></b> <b>CCE: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></b>	<b>Semester Effective:</b> <b>Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/>, 2009</b>

<b>This course replaces experimental course Subject Area (prefix) and Catalog Number (course number):</b>	
<b>This Catalog Number (course number) is being replaced:</b>	

**Change from:**

<b>Subject Area (prefix) &amp; Catalog No. (course no.):</b>	<b>Title:</b>	<b>Units:</b>

**Change to:**

<b>Subject Area (prefix) &amp; Catalog No. (course no.):</b> ME 128	<b>Title:</b> Thermal-Fluid Systems	<b>Units:</b> 3
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**JUSTIFICATION:**

Changes are required to update and improve the quality of the thermal fluid curriculum and to reduce the number of required units in our program. Thus, ME125 and ME127 will be combined into a comprehensive Thermal-Fluid Systems lecture and laboratory course. The primary topics of this new course include power systems, refrigeration systems, psychrometrics and chemical reactions. The fundamentals of experimental topics, including error/uncertainty, experiment design, data acquisition, analysis and presentation, will be learned and practiced by the students.

**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See <http://www.csus.edu/acaf/univmanual/crspsl.htm> - Guidelines for Catalog Course Description)

**Fundamentals of the Otto, Diesel, Brayton and Rankine power cycles, vapor-compression refrigeration, psychrometric processes and chemical reactions. Theory and application of temperature, pressure, flow, and velocity instruments, introduction to experiment design, errors, uncertainty and data acquisition, data analysis and presentation.**

<b>Note:</b>	
<b>Prerequisite: ENGR 124</b>	
<b>Corequisite:</b>	
<b>CAN (California Articulation Number):</b>	
<b>Graded: Letter <input checked="" type="checkbox"/> Credit/No Credit <input type="checkbox"/></b>	<b>Instructor Approval Required? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></b>
<b>Course Classification (e.g., lecture, lab, seminar, discussion):</b> Lecture two hours, Laboratory three hours	<b>Title for SIS+/CMS (not more than 30 characters)</b> Thermal-Fluid Systems
<b>Cross Listed?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<b>If yes, do they meet together and fulfill the same requirement, and what is the other course.</b>
<b>How Many Times Can This Course be Taken for Credit? <u>ONE</u></b>	
<b>Can the course be taken for Credit more than once during the same term? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></b>	

**FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:**

**Description of the Expected Learning Outcomes:** Describe outcomes using the following format: "Students will be able to: 1), 2), etc."  
See the example at <http://www.csus.edu/acaf/example.htm>

By the end of this course, students will be able to:

1. Explain to a colleague the fundamentals of the Otto, Diesel, Brayton and Rankine power cycles, refrigeration cycles, psychrometric processes and chemical reactions.
2. Explain to a colleague the theory and application of fluid and thermal measurement techniques.
3. Formulate and solve real-world problems related to power and refrigeration cycles, psychrometric processes and chemical reactions.
4. Plan and conduct experiments, analyze data, calculate experimental uncertainty, clearly present results and draw justified conclusions.
5. Evaluate and explain the environmental, economic and social impacts of energy systems.
6. Locate and utilize sources of thermal-fluid information and material properties.

**\*\*Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not Academic Affairs.**

**Assessment Strategies:** A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

Individual Assessments: Tests, homework, final exam  
Team Assessments: Laboratory reports, project report and presentation.

For whom is this course being developed?

Majors in the Dept  Majors of other Depts \_\_\_ Minors in the Dept \_\_\_ General Education \_\_\_ Other \_\_\_

Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes  No \_\_\_

If yes, identify program(s):

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes \_\_\_ No

If yes, attach a description of resources needed and verify that resources are available.

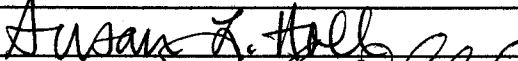
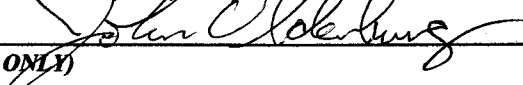
Indicate which department or programs will be affected by the proposed course (if any). \_\_\_\_\_

**The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.**

**Approvals:** If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

**Signatures:**

**Date**

Department Chair: 	3/20/09
College Dean or Associate Dean: 	3/23/09
CPSP (for school personnel courses ONLY)	
Associate Vice President and Dean for Academic Programs	

**Distribution:** Academic Affairs (original), Department Chair and College Dean. Dean's office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.

## ME128: Thermal-Fluid Systems

Instructor: Tim Marbach, Ph.D.  
E-Mail: tmarbach@csus.edu  
Phone: (916) 278-6089  
Office: Riverside Hall 4038

### Course Objectives:

By the end of this course, students will be able to:

1. Explain to a colleague the fundamentals of the Otto, Diesel, Brayton and Rankine power cycles, refrigeration cycles, psychrometric processes and chemical reactions.
2. Explain to a colleague the theory and application of fluid and thermal measurement instruments.
3. Formulate and solve real-world problems related to power and refrigeration cycles, psychrometric processes and chemical reactions.
4. Plan and conduct experiments, analyze data, calculate experimental uncertainty, clearly present results and draw justified conclusions.
5. Evaluate and explain the environmental, economic and social impacts of energy systems.
6. Locate and utilize sources of thermal-fluid information and material properties.

### Course Materials:

Text: Cengel and Boles, Thermodynamics: An Engineering Approach, 6<sup>th</sup> Edition, 2008.

### Communication:

E-mail: Administrative and content related information will be distributed through e-mail regularly.

Wiki: Homework assignments, solutions, etc. will be posted to the wiki. The web address is [ME128.wikispaces.com](http://ME128.wikispaces.com).

### Policies:

Due Dates: Homework assignments and lab reports are due at the BEGINNING of class.

I will accept one late report (up to 24 hours late) with no questions asked.

Additional late assignments are subject to the following:

0 to 24 hours late: 66 % credit

24 to 48 hours late: 33 % credit

More than 48 hours late: 0 % credit

Disabilities: If you have a disability and require accommodations, please provide disability documentation to SSWD, Lassen Hall 1008, 916-278-6955. Please discuss your accommodation needs with me after class or during my office hours early in the semester.

Plagiarism: I expect everyone to acknowledge all sources of information when writing. Plagiarism will not be tolerated. If you plagiarize, you will receive an "F" in the course and will be reported to the University.

Communications Devices: Turn all cell phones off or to vibrate mode. Do NOT text message and do NOT open laptop computers in class (unless the instructor says it is okay).

**Grading Policy:**

Homework	15 %
Laboratory Reports	30 %
Test 1	15 %
Test 2	15 %
Final Exam	15 %
Project	10 %

**Lecture and Lab Schedules:**

<b>Week</b>	<b>Lecture</b>	<b>Lab</b>
1	Introduction/Thermo Review	Create Teams, Lab Walk Through, Safety
2	Thermo Review and Otto Cycle	Run Calibration Lab
3	Otto and Diesel Cycles	Background and Theory of Laboratories
4	Brayton Cycle	Presenting and Writing about Experimental Work
5	Brayton and Rankine Cycle	Run Wind Tunnel Lab
6	Rankine Cycle	Experimental Error and Uncertainty
7	Vapor-Compression Refrigeration	Run Power Systems Lab
8	Vapor-Compression and Adsorption Refrigeration	Temperature, Pressure and Flow Measurement Instruments
9	Psychrometrics	Run Refrigeration Lab
10	Psychrometrics	Data Acquisition and Control Systems
11	Psychrometrics	Run Psychrometrics Lab
12	Combustion and Chemical Reactions	Discuss Projects
13	Combustion and Chemical Reactions	Run Combustion Lab
14	Advanced Topics and Project	Advanced Topics
15	Student Presentations	No Lab