COURSE SYLLABUS FOR
MECH 432 - ENERGY SYSTEMS - 4 UNITS

California State University, Chico
Fall Semester 2007

Instructor:	Dr. Jim Tan-atichat, OCNL 424, 898-6142, *jtan-atichat@csuchico.edu*
Office hours:	Tu 4:00-4:50 pm WF 2:00-3:50 pm
Class hours:	MWF 9:00-9:50am (lecture), LANG 302 M 2:00-4:50 pm (lab), LANG 122 R 2:00-4:50 pm (lab), LANG 122
Prerequisite:	MECH 338, Heat Transfer Recommended: MECH 306, Equation-Solving Techniques
Textbooks:	Cengel & Boles, *Thermodynamics: An Engineering Approach* **and** a basic heat transfer text such as: Incropera & DeWitt, *Fundamentals of Heat & Mass Transfer*
Web Site:	Course material will be made available at: *www.csuchico.edu/~jtan-atichat/Classes*

		Approx. Wt.
Grading:	Homework/Design Problems	25 %
	Laboratory	35 %
	Midterm Exam	15 %
	Final Exam	25 %

Lab Safety: A brief training session on lab safety in the Thermal-Fluids Laboratory (LANG 122) will be conducted during the first lab meeting. Students are required to read the Department's *Lab Safety Policies and Procedures* document and sign an acknowledgment form before conducting laboratory experiments.

Important Notes:

- If you are going to miss an exam due to illness or other legitimate reason, contact Dr. Tan-atichat **beforehand.** (You can call me at home on such occasions: 894-7432.) Make-up exams are only allowed for pre-arranged, legitimate absences.
- Equation-solving software with thermodynamic properties such as *IT: Interactive Thermodynamics* or *Engineering Equation Solver (EES)* is essential for solving some homework and design problems.
- Homework, design problems, and lab reports are due at the beginning of class on the due date. **Late work will not be accepted.**
- Final Exam will be given on Monday, Dec 17, 2007; 10:00–11:50 am in LANG 302

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Course Objective: To practice the applications of thermodynamics, fluid mechanics, and heat transfer through analysis, design, and laboratory testing of energy systems.

COURSE OUTLINE

Topics	Cengel & Boles Reading
Quick Review of Basic Thermodynamics	Chapters 1-6
Vapor & Gas Power Systems • Rankine cycle; reheat and regeneration • Otto and Diesel cycles • Internal combustion engines • Supercharging and turbocharging • Stirling cycle engine • Brayton cycle; regeneration, reheat and intercooling • Turbojet engines	Chapters 8-9
Refrigeration and Heat Pump Systems • Vapor-compression (V-C) cycle • Cascade and multistage V-C systems • Heat pumps • Absorption and gas refrigeration • Thermoelectric cooling	Chapter 10
Air Conditioning Systems • Laws of nonreacting gas mixtures • Psychrometric definitions, use of psychrometric chart • Conservation of mass and energy • Heating/cooling with humidification/dehumidification • Cooling towers	Chapters 12-13
Combustion Systems • Chemical reactions, mass balance • Conservation of energy of reacting systems • Adiabatic flame temperature • Entropy of reacting systems • Fuel cells	Chapter 14
Renewable Energy Systems • Solar-thermal • Solar-electric • Wind turbine	Instructor material