

ENGR 381 THERMODYNAMICS**Fall Semester 2009**

- Instructors:** Dr. Camille M. George, lecture; Thomas Shepard, lab
- Time:** Section 01: Monday, Wednesday and Fridays, 1:35 - 2:40 PM
Section 51: Monday 2:55-5:20 PM; Section 52: Thursday 1:30-3:55 PM
- Location:** Section 01: OWS 257 - St. Paul Campus
Labs: OSS LL13
- Telephone:** 651-962-5763
- E-mail:** cmgeorge@stthomas.edu; shep0608@stthomas.edu
- Office Location & Office hours** OSS 112, MWF 11-12 & Tuesday 4-5 pm or by appointment
- Peer Mentor:** Kirsten Halstead knhalstead@stthomas.edu
- Homework help:** Monday 5:30-7 and Thursday 5:15-6:45 OSS 105A
- Required Text:** Thermodynamics: An Engineering Approach, 6th Edition. Y. Çengel, M. Boles, McGraw Hill (2008)

NCEES Handbook, 8th Edition http://www.ncees.org/exams/study_materials/ (Thermodynamics & Mech Engr)
- Course Description:** First law of thermodynamics (energy conservation); second law of thermodynamics (restrictions on energy transformations); entropy; thermo-physical properties of substances; power systems & cycles; psychrometrics.
- Course Objectives:** *The student will:*
1. Cover the basic principles of classical physical thermodynamics.
 2. Demonstrate competence in U.S. units and metric units.
 3. Analyze closed systems, open systems and basic cycles using the 1st & 2nd laws of thermodynamics.
 4. Obtain thermo physical properties using tables.
 5. Predict performance of common devices such as turbines, nozzles, compressors and pumps.

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6. Evaluate work and heat exchange in systems using ideal gases and two-phase fluids.
7. Explain basic principles of psychrometrics.
8. Be able to solve problems and analyze processes with a rational methodology and be able to use appropriate mathematics.
9. Be challenged to think about contemporary issues governing energy conversion.
10. Develop a critical appreciation of the depth of the subject matter and be able to realize when an advanced text would be necessary and when simplified models are not appropriate.
11. Evaluate a thermodynamic system and propose a design improvement.
12. Practice engineering communication in an oral format.
13. Develop team skills.

Learning Outcomes:

- A. **Homework Problems, Quizzes & Exams:** Demonstrate that the student understands and is able to apply basic terminology and theory to solve problems. (a, e)
- B. Homework and exam problems use both SI and English units to prepare students for professional work in the US. (k)
- C. **Memos:** Broadens the students' perspective on the impact of engineering in a global, environmental and societal context. (h)
- D. **Team Oral Presentation:** Enables students to engage in life-long learning (i); develops the ability to function on a team (d); and develops the ability to give an oral presentation (g).
- E. **Thermal Design Project:** Demonstrates the ability to apply thermodynamic knowledge to an open-ended design problem and develop practical skills (c).
- F. **Laboratory Work:** Develops ability to gather, analyze and interpret data and further understand the thermodynamic laws.(b)

(a)-(k) refer to outcomes articulated by the ABET criteria for accrediting Engineering programs

Course Methodology

Class sessions will consist of lectures, student presentations and problem solving. Laboratory will have hands-on work. Homework consists of book problems and memos on contemporary issues.

Major Assignments

- Assigned reading should be completed prior to the lecture. Not all details of the readings will be covered in class.
- **Team Research Presentation:** Each team will choose a contemporary topic exploring engineering's impact on society. An *oral presentation* (30 minutes) is required.
- **Thermal Design Project:** Teams will work on a laboratory design. A formal report is required.
- Exams: Closed book in-class exams.
- Final Exam: In- class exam with problems at the same order of difficulty as the national licensing exam. NCEES handbook will be allowed at exams & the final.

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Exam Policy:	No exam make-ups.
Assessment Method:	Homework (book problems & memos): 10% Quizzes: 15 % Labs: 10% Lab Project: 10 % Exams: 20 % Team Oral Presentation: 10 % Final: 25%
Classroom Policy:	The class will be conducted with a mature and respectful atmosphere. Everyone will be expected to actively participate.
Attendance Policy:	Students are expected to attend all class sessions. Circumstances which prevent attendance will be honored up to two instances. Contact the instructor when a special situation arises. All absences require that the instructor be informed in advance.
Disability Requests:	If you need course accommodations due to a disability, please make an appointment in the Enhancement Program-Disability Services, located on the St. Paul campus OEC 119, 651-962-6315. http://www.stthomas.edu/enhancementprog/
Academic Integrity:	All students are expected to understand and follow the University of St. Thomas policies on Academic Integrity. http://www.stthomas.edu/policies/student_policy_book/Academic_rights_and_procedures.asp
Instructor Biography:	Camille George grew up in Chicago. She is a third generation engineer. Her favorite activity is traveling (47 states and 45 countries).