Syllabus for
EGR 231—Heat and Thermodynamics
3 Credit hours
Spring 2009

I. COURSE DESCRIPTION

A course in thermodynamics, including first and second law, thermometry, kinetic theory, thermodynamic property relations, ideal gas mixtures, and elementary power and refrigeration cycle analyses. Includes lab experiments.
Prerequisites: PHY 111 Lecture and Lab and MAT 202.
Course fee: $35.

II. COURSE GOALS

The purpose of this course is to enable the student to do the following:

A. Gain an understanding of the relationships between thermodynamic properties.

B. Gain knowledge of methods of analysis of thermodynamic systems.

C. Gain an understanding of the relationship between engineering practices and stewardship.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing this course, the student will be able to do the following:

A. Describe the properties of and relationships between the thermodynamic properties of a pure substance.

B. Calculate the work done by or on a system when a change in the properties of the system occur.

C. Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process.

D. Apply fundamental principles of the thermodynamic relations to the analysis of the accuracy of thermodynamic property data.

E. Apply the methods of analysis applicable to mixtures of gases and gas-vapor mixtures.

IV. TEXTBOOK AND OTHER LEARNING RESOURCES

A. Required Materials
Textbooks
Cengel and Boles. Thermodynamics, An Engineering Approach, 6th Ed., New York McGraw-Hill, 2006.

B. Other
Scientific Calculator

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment of any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
    a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
    b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Grading
    a. The final grade is a composite result of performance in exams, quizzes, homework problems and class participation. You can also earn extra credit by doing a special project. The final exam constitutes approximately 25% of the final average, 25% of the final grade is based on 3 hour exams, 25% on homework problems and 25% on quizzes. The grading scale is as follows:

90 - 100	A	Excellent
80 - 89	B	Above Average
70 - 79	C	Average
60 - 69	D	Below Average
Less than 60	F	Fail

    b. Make-up assignments (for full credit) are given only in extremely unavoidable situations upon **prior arrangement with instructor** or with valid medical excuse; otherwise missed assignments will be graded with 20% penalty.
2. Homework Policies
    a. Homework and lab reports are to be turned in at the beginning of class on the day they are due.
    b. No points awarded for late homework and lab reports.
    c. Messy papers (non-trimmed, non-stapled, non-readable) will result in a lower grade.
3. Quizzes and Exams
    a. A short Quiz will be given every week after finishing the chapter. Exams will cover several chapters. Final exam will be comprehensive. Partial credit applied.

b. You could bring a formula sheet and submit it with your exam (handwritten, no copies, no work out problems). Illegal formula sheet will result in "0" score for the assignment.
No calculator sharing! No cell phone!
Show all work for the full credit.

4. Attendance Policy
   a. This policy allows for the missing of some classes in the case of extenuating circumstances such as illness or family tragedy.
   b. The first five absences (excused or unexcused) result in no grade reduction. Each absence thereafter results in a 1% reduction in the final score (100% maximum) that determines the grade. Perfect attendance results in a 2.5% increase in the final score.
   c. The number of absences allowed prior to grade reduction are designed to accommodate emergencies, illnesses, and so on, and are not designed for indiscriminate use. The final grade will be reduced by 2.5% if amount of missed classes will reach 25% of all total sessions.
   d. Students are expected to be prompt for classes. Two tardies equal one absence. Students are responsible for keeping up with the rest of the class (even if they are absent). Please find out what we studied during the class you missed from another student.
5. ePortfolio Requirements
   The final grade will be reduced by 5% for any ePortfolio artifacts that are not submitted by the end of the semester. (Not 5% per artifact, but 5% total.)

C. Other Policies and Procedures
1. Chapters to be covered during a class period should be read before the class. There is a direct relationship between the amount of time you invest in a course and how much you learn. In keeping with my goal to maximize your learning, this course will require a significant amount of your time.

   Form study groups. Learn from your mistakes: examine graded work carefully to understand your errors.
2. Courtesy
   Please turn off your cell phones.
   No food in the classroom without valid medical reason.
3. **Instructor may change the assignment schedule at any time by verbal or written notification to the class**.

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VI. COURSE CALENDAR

Week	Topic	Lecture	Homework
1-2	Chapter 1	**Q:** 1, 3, 6, 7, 16, 17, 21-24, 30, 31, 40, 41	**P**: 13, 36, 46, 47, 50, 56, 68
3-4	Chapter 2	**Q**: 1, 2, 5, 6, 24, 25, 43, 44, 59, 61, 83, 84, 94, 97	**P**: 12, 15, 33, 35, 36, 52, 63, 78, 88, 98, 109
5-6	Chapter 3	**Q**: 1,2,5,6,11,14,70,71,86,87	**P**: 31, 51, 75, 77, 94, 102, 110
		Test 1 (ch. 1-3)	
7	Chapter 4	**Q**: 1-3, 49, 52, 55, 56, 64, 98, 99, 100, 101.	**P**: 31, 51, 75, 77, 94, 102, 110
8	Chapter 5	**Q**: 1, 3, 19, 20, 26, 27, 45, 46, 65, 66, 75-77.	**P**: 15, 17, 22, 35, 37, 54, 59, 69, 78, 92, 98, 123
9-10	Chapter 6	**Q**: 4, 7, 9, 12, 30, 31, 59, 61, 62, 64, 65, 68-71, 75, 76, 89, 90, 116-118	**P**: 20, 22, 47, 53, 54, 86, 88, 99,102.
		Test 2 (ch 4-6)	
11		**SPRING BREAK**	
12-13	Chapter 7	**Q**: 3, 9, 10, 14, 18, 22, 32, 66, 79, 80, 108, 109, 123, 124.	**P**: 24, 30E, 39, 44, 60, 70, 87, 9, 13, 118
14	Chapter 8	**Q**: 1, 5, 7, 8, 11, 12, 28, 29	**P**: 18, 24, 34, 43, 47, 54, 57, 59, 60, 95
15	Chapter 13	**Q**: 1-4, 20, 23-25, 49-52	**P**: 13, 14, 33, 39, 58
16	Chapter 14	**Q**: 2, 3, 10, 25, 26, 38, 39, 51, 52, 61, 69, 77, 82, 96, 97	**P**: 19, 29, 32, 42, 100E, 107
17		**Final Examination - Chapters 1-8, 13, 14**	

Odd Concept Questions – required, even – extra credit.
We'll have 4 labs over the Semester, which will be graded as Homework

Course Inventory for ORU's Student Learning Outcomes
EGR 231-Heat and Thermodynamics

Spring 2009

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge				√
1B	Sensitivity to the Holy Spirit				√
1C	Evangelistic capability				√
1D	Ethical behavior				√
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking		√		
2B	Information literacy			√	
2C	Global & historical perspectives			√	
2D	Aesthetic appreciation			√	
2E	Intellectual creativity			√	
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle				√
3B	Physically disciplined lifestyle				√
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills				√
4B	Interpersonal skills				√
4C	Appreciation of cultural & linguistic differences				√
4D	Responsible citizenship				√
4E	Leadership capacity				√