MAE 320 –Thermodynamics, Summer 2017

Section 002: MTWR 9:00 am – 10:35 am, 251 ESB

Course Syllabus

Instructor: Dr. Christopher Griffin, Office: 939 ESB, Phone: (304) 293-3386, Email: cgriffin@mail.wvu.edu

Office Hours: **Tuesdays at 10:45 am to 11:45 am, or by appointment (open door policy)**.

Prerequisites: PHYSICS 111, MATH 156

Required Textbook: **Thermodynamics: An Engineering Approach**, 8th Edition, Y. A. Cengel and M. A. Boles, 2015.

Catalog Description: **MAE 320 Thermodynamics 3 Hr lecture.** Principles of thermodynamics; properties of ideal gases and vapors; closed and control volume system; first and second laws of thermodynamics; entropy and entropy generation; basic gas and vapor cycles; basic refrigeration cycles;

Course Format: The class format will be in the form of lectures with worked examples and time for student discussions and questions.

Course outline: See attached sheet. Exam dates are tentative and subject to change.

Course Goal: This course continues the knowledge gained in the PHYS 111 course with the introduction of the properties of ideal gases and vapors and the development of the 1st and 2nd laws of thermodynamics. The 1st and 2nd laws of thermodynamics are applied to simple gas and vapor power and refrigeration cycles. The student should be able to analyze and solve simple to complex thermodynamic problems.

Outcomes of ABET evaluation: Upon successful completion of this course, the student should have the have an ability to identify, formulate and solve engineering problems related to thermodynamics (ABET Outcome E). Additionally, the student should have the broad education necessary to understand the impact of engineering solutions in a global and societal context (ABET Outcome H) and the knowledge of contemporary issues (ABET Outcome J).

- Outcome E: Apply the 1st and 2nd law of thermodynamics to processes.
- Outcome E: Apply tabular and graphical data to thermodynamic problems.
- Outcome E: Apply an entropy balance to processes of both closed and control volume system.
- Outcome H: Demonstrate an understanding of the impact of thermodynamic solutions from global perspectives.
- Outcome J: Demonstrate an understanding of contemporary issues pertaining to the environment and society.
- Outcome J: Know and comprehend the importance of cost factors in engineering design.
- Outcome J: Understand and appreciate the importance of international standards and units.

Attendance Policy: Attendance is expected! Students cannot reasonably expect to master the course material without regular attendance in class. Unannounced quizzes will serve as the attendance check throughout the semester.

Homework Policy: All homework must be legible and must be turned in at the start of class on the day it is due. The homework assignments must be properly headed (**name, date, course, section and homework number**), and stapled together in the upper left corner. Late homework will not be allowed without prior approval, consistent with WVU policies. **HOMEWORK I CAN'T READ WILL BE GRADED AS ZERO.**

Mid-term Exams and Final Exam: There will be three mid-term exams: Exam 1 will cover Chapters 1 through 3; Exam 2 will cover Chapters 4 and 5; and Exam 3 will cover Chapters 6 and 7. A comprehensive Final Exam will be given on the last day of the summer session. All exams are closed book and closed notes.

Make-up exams will not be allowed without prior approval, consistent with WVU policies.

Statement on Academic Integrity: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Group study is expected and even encouraged in preparing the assignments to the extent to which it promotes understanding to questions by all involved. Students may discuss finding the solution but must prepare and submit his/her own solutions for assignments. Copy of solutions to assignments from other sources including, but not limited to, your fellow students, solution manual, online resources, or past year homework solutions will be considered as cheating. The penalty for the 1st offense of homework cheating is a grade of zero on that homework; The penalty for the 2nd offense of homework cheating is a grade of zero on all homework including those that have been graded.

No "group work" is allowed during exams. **The penalty for cheating on an exam is an unforgivable grade of F for this course and you will be reported to the Dean's office.**

Inclusivity Statement: The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu).

Course Grading:

Homework / Quiz	10%
Mid-term Exams (3)	60% (20% for each hour exam)
Final Exam	30%

The letter grade will be based on a standard scale: A (90 – 100); B (80 – 89); C (70 – 79); D (60 – 69); F (< 60)

NOTE: A final course score of 59.4% and below is a letter grade of "F", whether you are graduating or not, have a job lined up or not. No exceptions.

Teaching Philosophy: As the instructor, I will do everything possible to help you learn and understand the material, but you must do your part. In my course, a grade of "C" means you have gained an average knowledge of the topic material and have a grasp of only the basic concepts. It is not a trivial matter to obtain an "A" in my course, but it is also difficult to get an "F". If you have a question on the material, the textbook, homework, how I grade, or just life in general, please come and see me. I am always open to answering your questions or meeting to discuss your questions and concerns.

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TENTATIVE LECTURE SCHEDULE

(subject to change)

Week	Period	Day	Date	Activity
1	1	M	6/26	Chapter 1, Introduction and Basic Concepts
1	2	T	6/27	Chapter 1, Introduction and Basic Concepts
1	3	W	6/28	Chapter 2, Energy
1	4	R	6/29	Chapter 2, Energy
1	5	F	6/30	Chapter 3, Properties
2		**M**	**7/03**	**No Class**
2		**T**	**7/04**	**No Class**
2		**W**	**7/05**	**No Class**
2	6	R	7/06	Chapter 3, Properties
2	7	F	7/07	Chapter 4, Closed Systems
3	8	M	7/10	Chapter 4, Closed Systems and Review for Exam 1
3	**9**	**T**	**7/11**	**Exam 1 (Chapters 1 – 3)**
3	10	W	7/12	Chapter 5, Control Volumes (Open Systems)
3	11	R	7/13	Chapter 5, Control Volumes (Open Systems)
4	12	M	7/17	Chapter 5, Control Volumes and Review for Exam 2
4	**13**	**T**	**7/18**	**EXAM 2 (Chapters 4 – 5)**
4	14	W	7/19	Chapter 6, Second Law of Thermo
4	15	R	7/20	Chapter 6, Second Law of Thermo
5	16	M	7/24	Chapter 7, Entropy
5	17	T	7/25	Chapter 7, Entropy
5	18	W	7/26	Chapter 7, Entropy and Review for Exam 3
5	**19**	**R**	**7/27**	**EXAM 3 (Chapters 6 – 7)**
6	20	M	7/31	Chapters 9 – 11, Cycles
6	21	T	8/01	Chapters 9 – 11, Cycles
6	22	W	8/02	Chapters 9 – 11, Cycles and Review for Final Exam
6	**23**	**R**	**8/03**	**FINAL EXAM (Cumulative)**