Course Title: Thermodynamics II
Course Prefix & No: MCEG 3023
Section: Z01
Credit: 3 Credit Hour

Instructor Name: Dr. Shafiee
Office Location: Meeting on Zoom
Office Phone: (936) 261-9792
Email Address: shshafiee@pvamu.edu
Office Hours: By appointment on Zoom

Class Days & Times: Class instructions: Online; Weekly quiz/exam: Friday 3:00-5:00 pm
Course Location: eCourses
Catalog Description: MCEG 3023. Thermodynamics II. (3-0) Credit 3 semester hours. Continuation of Thermodynamics I, including various power cycles, refrigeration cycles, fluid flow, combustion process, and advanced concepts of gas dynamic, such as shock waves.

Pre-requisites: MCEG 2013 and MATH 2024.
Co-requisites: None


M. J. Moran, H. N. Shapiro, D. D. Boettner and M.B. Bailey
ISBN-10: 0470495901

Access to Learning Resources:
PVAMU Library:
Phone: (936) 261-1500;
web: http://www.pvamu.edu/library/

University Bookstore:
Phone: (936) 261-1991;
web: https://www.bkstr.com/Home/10001-10734-1?demoKey=d
Course Goals or Overview

The goals of this course are to provide in-depth study of the concepts and analysis of exergy, reversible work, irreversibilities, second-law efficiency, gas power cycles, vapor and combined power cycles, refrigeration cycles, gas mixtures, gas-vapor mixtures & air-conditioning and reacting systems as they apply to the analysis of engineering systems and cycles. This goal is in support of ABET student outcome 1 (Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (including use of the techniques, skills, and modern engineering tools necessary for engineering practice).

Course Outcomes/Objectives

On completion of this course, the students will be able to solve the energy and exergy balance problems; to identify, formulate, solve intermediate and advanced thermodynamic engineering problems; to design a thermodynamic system (closed system or control volume), or process to meet desired needs.

Course Requirements & Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

Reading: Requiring students to read sections of the text book ahead of time
Homework: Requiring students to perform basic analysis of problem, formal homework presented using required format.
Quizzes: Several quizzes and the use of classroom performance system will be used to engage students in class throughout the semester.
Tests: There will be a total of two tests
Class Attendance: Students have to complete each week’s assignment before proceeding to next week.

Grading Matrix

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Assignments (Mainly for Practice only). May be individual or *Group</td>
<td>5</td>
</tr>
<tr>
<td>Quizzes</td>
<td>25</td>
</tr>
<tr>
<td>Complex Engineering Problems in Thermodynamics &amp; TaskStream Uploading</td>
<td>5</td>
</tr>
<tr>
<td>Test 1 (May be open or closed book with formula sheet)</td>
<td>25</td>
</tr>
<tr>
<td>Test 2 (May be open or closed book with formula sheet)</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

*Note: For any group assignment, only students who actually contributed to the assignment and certified by their names being written on the assignment will receive credit for the assignment. Anyone group member whose name is not written on the assignment submitted will not get any points. If you contributed to the assignment, make sure your name is on it before it is submitted.

Grade Determination

A = 90 - 100
B = 80 - 89
C = 70 - 79
D = 60 - 69
F = 0 – 59

Note:
The instructor reserves the right to alter it during the semester.

Course Policy

Academic Integrity

Academic dishonesty of any sort (plagiarism, cheating, fabrication or facilitation) is prohibited under any circumstance. There is a zero tolerance policy for academic dishonesty. Cheating of whatsoever will result in an automatic ‘F’ in this course and the matter will be turned over to the
appropriate student disciplinary committee.

**Use of E-Course, PVAMU email and Taskstream**
All class-related materials will be posted on E-courses. You may be able to consult the grade book in e-course for all of your graded assignments and your current grade. All emails will be sent to students’ registered PVAMU email addresses. Students are responsible for checking their PVAMU email frequently.

**Assignments & Due Dates**
Homework problems will be mainly for practice to get students ready for the class quizzes and tests. The instructor will select ONE question at random from each homework to grade for points. All due assignments will be submitted at the beginning of class on the due date. Late Assignments will be charged a 25% penalty for each day late – weekend days do count. Circumstances beyond your control (i.e. illness, computer failure, weather, etc.) will be considered as required, but should inform the instructor before the class begins except for the emergency.

**Attendance**
Following class instructions and assignments is mandatory. If you have 3 or more than 3 unmet or incomplete assignments, you will receive an “F” automatically.

**Examinations & Quizzes**
Quizzes and tests may be open book or closed book. For open book quizzes or exams, only the hard-copy textbook may be consulted. For closed book quizzes or exams, only the formula sheet distributed can be used and only the Table portion of the text book can be used when needed. There will be NO make-up test/quiz. Only students who missed an exam with valid excuse (for instances: medical emergency of him/herself and close relatives, with valid hospital records or doctor’s note) will be given make-up exam. There will be only one make-up exam for the semester.
# Thermodynamics II

**Tentative Topics and Schedule**

(please note the schedule may change based on the needs during the semester)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| #1   | **Course Overview**  
**A Quick Review of Thermodynamics I** |
| #2   | **Chapter 8**  
- Exergy: Work Potential of Energy  
- Reversible Work and Irreversibility  
- Second-Law Efficiency  
- Exergy Change of a System  
- Exergy Transfer  
- Exergy Destruction  
- Exergy Balance: Closed Systems  
- Exergy Balance: Control Volumes |
| #3   | **Chapter 9**  
- Basic Considerations / Carnot Cycle / Air Standard Assumptions  
- Otto Cycle  
- Diesel Cycle  
- Stirling and Ericsson Cycles  
- Brayton Cycle  
- Second-Law Analysis of Gas Power Cycles |
| #4   | **Chapter 10**  
- Rankine Cycle  
- Efficiency Enhancement of Rankine Cycles  
- Regenerative Rankine Cycle  
- Second-Law Analysis of Vapor Power Cycles  
- Combined Cycle |
| #5   | **Test 1: Friday, 06/26/2020 (CH 8, 9, 10)** |
| #6   | **Chapter 11**  
- Vapor-Compression Refrigeration Cycle  
- Second-Law Analysis of Vapor-Compression Refrigeration Cycle  
- Heat Pump Systems |
| #7   | **Chapter 13**  
- Composition of a Gas Mixture  
- Properties of Gas Mixtures |
| #8   | **Chapter 14**  
- Dry and Atmospheric Air  
- Properties of Moist Air  
- Air Conditioning Processes |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>#9</td>
<td><strong>Chapter 15</strong>&lt;br&gt;- Fuels and Combustion&lt;br&gt;- Theoretical and Actual Combustion Processes&lt;br&gt;- Enthalpy of Formation and Enthalpy of Combustion&lt;br&gt;- First-Law Analysis of Reacting Systems&lt;br&gt;- First-Law Analysis of Reacting Systems&lt;br&gt;- Second-Law Analysis of Reacting Systems</td>
</tr>
<tr>
<td>#10</td>
<td><strong>Review of Thermodynamics 2</strong></td>
</tr>
<tr>
<td>#11</td>
<td><strong>Test 2: Friday, 08/07/2020 (CH 11, 13, 14, 15)</strong></td>
</tr>
</tbody>
</table>
University Rules and Procedures

Disability statement (See Student Handbook):
Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:
1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else’s words, ideas, or data as one’s own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one’s own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor’s ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy:
Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student’s course grade being reduced or in assignment of a grade of “F”. Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.