1. **OBJECTIVES:** The objectives of this course are:
   - To provide a thorough understanding of the basic concepts of classical thermodynamics;
   - To learn how to apply the basic concepts of classical thermodynamics to the solution of practical problems;
   - To develop the skills necessary for a systematic approach to problem solving.

2. **TEXTBOOK:** Fundamentals of Engineering Thermodynamics, 8th ed., Moran, Shapiro, Boettner, and Bailey

3. **PREREQUISITES:** The material in ME 200 requires mastery of: (i) calculus, including ordinary differentiation, integration, and partial differentiation; (ii) physics, including Newton’s laws, concepts of work and energy, simple DC circuits, and gravity; and (iii) chemistry, including concepts of moles, molar mass (molecular weight), and the ideal gas law. Consequently, students must have successfully completed CHEM 115 and PHYS 172, in addition to MA 261 before or concurrent with enrollment in ME 200. If you cannot meet these requirements you should drop this course immediately.

   Because a background in physics and chemistry is required, you must be conversant with this material or to review it on your own. The ME 200 class time and resources are reserved for developing your understanding and appreciation of thermodynamics.
4. **ASSIGNMENTS:** The course syllabus is provided as a separate document. It provides a list of topics to be covered during each lecture, along with the homework assignments for the entire semester. Duplicates are posted on the course Blackboard page.

As basic preparation for each lecture, you should read the assigned material **before** coming to class. In class example problems are designed to help prepare you for homework assignments. Homework problems are illustrative of those found on examinations. However, exam problems are designed to test your understanding of thermodynamics so they will not be “just like the assigned homework problems.”

In addition to the reading and homework assignments, you should review your past class notes on a daily basis. Another suggestion is to work additional problems to hone your skills.

You are responsible for all material listed in the syllabus and discussed in lecture. Note that even if your instructor does not cover every single topic on the course syllabus in the order that it is listed, or may not have time in lecture to cover all the material listed in the syllabus, you are still responsible for all the material that is listed in the syllabus.

5. **HOMEWORK:** Homework assignments consist of electronic homework through WileyPlus and Special Problems, problems developed by the instructors (Special Problems) that are to be worked and handed in. There are also suggested textbook problems that you should attempt to work on your own that will not be collected.

**Electronic Homework:** The electronic homework problems are meant to be introductory and less complex than the Special Problems. They should be very straightforward as long as you keep up with the required reading for the class. The electronic homework will be due the day after the lecture period in which the homework set is assigned, except for the first few assignments. Extra time will be allotted for the first assignments to make sure that everyone is signed up and is able to use the WileyPlus electronic homework system. Since this is the first time we have used electronic homework in ME 200, we anticipate that there may be some initial glitches. Most of the electronic homework problems are multiple choice and they will be automatically graded.

**Special Problems:** There is one Special Problem assigned per lecture period, although there may be multiple parts to the Special Problems. The Special Problems must be turned in at the start of the class lecture period on the due date. The due dates for the Special Problems are listed in the class syllabus. Usually, but not always, the Special Problems will be due on Friday. Special Problem assignments will be collected on the due date **at the start of class. Late homework will not be accepted.**

You should attempt to solve, or at least look at, the assigned Special Problems before each lecture period. The Special Problems will require you to develop a systematic approach to defining the thermodynamic system, formulating a strategy to solve the problem, and to apply the basic concepts of thermodynamics in the problem solution. It will be very difficult to complete the homework if you start the Special Problems too close to the due date (i.e., the night before). When working the Special Problems you must follow the problem solution format outlined below to receive full credit.

Solutions to assigned problems will be posted on Blackboard. Copying homework directly from a friend, or from a file or solution manual (or other such resource), will be considered cheating and will be handled in the same manner as cheating on examinations (See Section 8).

**Special Problem Solution Format:**

A. Use 8 1/2 by 11 inch Engineering paper, only one side and only one problem per page. If more than one page is needed for a problem, all pages should be stapled together in order. At the top of the engineering paper there are 5 boxes. Starting from the left:
   i. Box 1: leave blank,
   ii. Box 2: put your name (last, first, middle),
   iii. Box 3: put the problem number, i.e. Prob. 1, 2 17, …
iv. Box 4: put the page number of the problem/total pages for this problem, i.e. 1/3 or 3/3

B. Below the boxes put the following information in this order. Also note that credit is given for each piece of information, not just for the final answer.

i. **Find**: List what the problem wants you to find. Example “Pressure \( P_2 = ? \)” You use this information to guide you in your choice of basic equation(s); obviously, the basic equation(s) you chose must include the quantity (quantities) of interest.

ii. **A sketch of the system.** Make sure you also include the appropriate energy transfer processes (heat, work) into/out of your system. Your sketch will help you identify where energy and mass flow into/out of your system.

iii. **Given**: State in your own words what is given in the problem statement. Example “Initial temperature \( T_1 = 30^\circ C \)”

    Given information serves two purposes. First, it helps you determine which terms in your basic equations you can calculate directly. Second, it helps you determine how many equations you need—the number of equations must equal the number of unknowns.

iv. **Assumptions**: Examples: “Steady state” “Uniform flow” “Ideal gas” etc. Assumptions are listed to help you eliminate terms in your basic equations.

v. **Basic Equations**: Your basic equation must be one listed on the attached ME 200 basic equation sheet.

vi. **Solution**: This includes correct units.

**Suggested Problems**: There are several suggested problems for each lecture. You are urged strongly to work these problems on your own. These problems will give you important practice in the definition of thermodynamic systems, formulation of a solution approach, and practice in evaluating thermodynamic properties. A list of answers for these problems will be provided so that you can check your work.

6. **EXAMINATIONS**: There are three one-hour examinations and one two-hour comprehensive final examination. Make-up hourly examinations are not given. If you are ill (with acceptable medical proof from a physician, considerably more detailed than a note indicating that you have visited PUSH), have an emergency (with proof), or have prior approval from your instructor to miss an examination, your percentage grade for the missed examination will be the average of the remaining two one-hour examinations and the final exam. In all other cases you receive a grade of zero for that examination. Make-up final examinations are only given in case of a registered conflict. You must resolve this conflict with your instructor prior to 20 April 2016.

All examinations, including the final, are closed book and closed notes. The same is true of quizzes. A list of basic equations is supplied as a separate document. A similar equation sheet will be provided to you at the time of each examination. In addition, the only calculator allowed during quizzes and exams is one of the TI-30X models.

You should bring to each examination your TI-30X calculator, pencil(s), an eraser, and a straight edge for help when drawing systems.

**IMPORTANT NOTE**: The use of PDAs, Droids/i-Phones (or other smart phones), Blackberries, cell phones, laptop computers, i-Pads or any other sources of communication (wireless or otherwise) are strictly prohibited during examinations. Doing so is cheating.

If you bring a cell phone or other communication device to the examination, it must be turned off prior to the start of the exam, stored out of sight and below your seat, and only picked up as you leave the examination room for the final time. They are not to be turned on again until after you have exited the examination room. Otherwise it will be considered a form of cheating and treated as such.
7. **EXAMINATION PREPARATION:** In order to be properly prepared for examinations, you should be: (i) attending *and actively participating* in all lectures; (ii) reviewing your class notes on a regular basis (every day); and (iii) completing and studying all the homework assignments. If you neglect any aspect of this trio you almost certainly guarantee yourself a poor grade. In order to perform well on examinations, you must understand how to solve new problems in thermodynamics, as well as being comfortable with the basic concepts. This is because the examinations are developed to test your understanding of thermodynamics through various types of questions that are not exactly like those you’ve already seen.

8. **EXAMINATION GRADING:** On the examinations, points will be deducted if you do not follow the problem solution format as outlined in Item 7B. The problems will be set up so that the Given and Find can be identified. Points will be deducted if you do not list your assumptions, include a system sketch, and indicate which basic equations you have used. In addition, you will lose points if you do not provide sufficient detail during your analysis so that the instructor can understand what you have done and why you did it (i.e., which terms have been dropped from any and all basic equations, as well as your justification for dropping those terms, where the energy interactions are and in which direction energy flows, …). Finally, you must carry units through during your analyses, avoid sign errors in all energy quantities, and correctly identify the direction of work and heat terms. Problem solutions that cannot be followed because of illegibility will also lose points.

**IMPORTANT NOTE:** Any form of dishonesty (including cheating) on an examination (or quiz or homework), as defined by Section III.B.2 of the University Regulations, results in a grade of zero for that exam (or a semester long zero for quizzes or home works) and a letter will be sent to the Dean of Students recommending that you be placed on academic probation. After more than one such instance you will receive a failing grade for ME 200 and a letter will be sent to the Dean of Students recommending that you be expelled from Purdue University. Any dishonesty on the final examination will result in a zero on the final examination and the final examination will be given the 45% weighting when calculating the final grade.

9. **QUIZZES:** There will be a number of short quizzes, especially in the class periods immediately prior to each exam. Their purpose is to help evaluate how well you are mastering each new concept prior to being tested on an exam. **Unannounced quizzes may be given at any time. You must be present in the classroom at the start of the quiz to get credit for the quiz.**

10. **HELP:** There are two main sources of help available outside of lecture. The first is the ME 200/300 tutorial room (room 2142 in the ME Building Gatewood Wing), the second is instructor office hours. Tutorial room hours are MTWTF from 9 am to 5 pm.

    When you bring a question to the tutorial room or instructor’s office, the TA/instructor will ask to see what you have accomplished and where you got stuck. In particular, they will ask you to identify what you are trying to find, what you have chosen for your system, what basic equation(s) you think you should be using, what information you were given (to determine if you have an equal number of equations and unknowns), and what assumptions you have made (to help reduce the number of unknowns to equal the number of equations, and to eliminate terms in the basic equations). If you have not completed these steps you will only receive a suggestion as to how you should go about completing the next step in the problem solution process. The tutorial room is not for obtaining easy answers. It exists only to assist you in the process of learning thermodynamics.

11. **COURSE GRADING:** Your course grade is based on the higher score obtained from the following two algorithms:

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three One-hour Examinations</td>
<td>45%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>85%</td>
</tr>
</tbody>
</table>
Note that the above grading scheme allows you to still earn a good grade for the course, even if you do poorly on one examination (as long as you do well on all the others). Course grading will not be more stringent than a straight-scale (90-100 for an A, 80-90 for a B, etc.). Grade break scores may vary from straight-scale, and may be curved, but this cannot be known until the end of the semester. **Please don’t ask as your instructor is unable to predict the future.** Scores for assignments will be posted on Blackboard. You will need to check for discrepancies before the final exam.

If you do miss one of the hourly examinations and you have a valid excuse, your percentage score for the examination that you miss will be the average of your percentage scores on the two one-hour examinations and the final examination:

\[
\text{Missing Exam\%} = 0.25\times\text{Exam1\%} + 0.25\times\text{Exam2} + 0.5\times\text{Final Exam\%}
\]

Your instructor reserves the right to employ the right hand distribution should you miss any of the one-hour examinations;

**12. CAMPUS EMERGENCY POLICY:** In the event of a campus emergency, the course requirements, deadlines, and grading percentages are subject to changes that may necessitate a revised semester calendar. In such an event, your instructor will advise you of the new course policy by using remote communication such as class email.

**13. CLASSROOM RULES:** Common courtesy while in the classroom is a pre-requisite for learning. The following is the minimum expected of all students in ME 200:

- **Turn off all cell phones, PDAs, pagers, beepers, etc.** before entering the lecture room. It distracts and annoys those sitting near you when your phone, beeper, or pager goes off during lecture. If your phone/PDA/etc. does go off during class you will be chastised.
- **Do not read the newspaper (or any other non-course material) once lecture has started.** Those behind you cannot see the board/overhead screen through the paper. It is also insulting to your instructor.
- **Remove newspapers, drink cans/bottles, candy/food wrappers, and anything else you bring into the lecture room when you leave.** There are trashcans outside for any refuse, as well as containers for recycling.
- **Class time is not for socializing.** Please restrict your conversations during lecture to subjects related to ME 200. You are welcome to discuss course related topics while lecture is progressing. However, it is distracting and annoying to those sitting near you if you’re talking about non-class issues. Plus, you’ll invariably miss important information. Finally, it’s disrespectful of your instructor.

**14. SOME ADVICE:** It is expected that you will ask questions when you don’t understand, actively participate in class discussions, be prepared to answer when called upon, and generally be alert in class.

Reading assignments and reviewing your class notes, and working the homework problems on a daily basis, plus completing additional problems, is the best way to ensure you learn the material and are well prepared for examinations. Hard work and perhaps some struggle is generally required, especially in the early stages of the class. Do not procrastinate—once you fall behind in this class it is very hard to catch back up.

If you continue to have difficulties, consult your instructor who can almost always provide suggestions on how you can study to improve your score.