MEC 301 THERMODYNAMICS – DRAFT 1 08/26/2020
FALL 2020

***** PLEASE NOTE SPECIAL COVID-19 REQUIREMENTS AT THE END OF THIS DOCUMENT *****

Instructor: **Prof. Jon Longtin**, 135 Light Engineering Building, (631) 632-9436, Jon.Longtin@stonybrook.edu

Instructor Office Hours: Monday 3:00 – 4:30pm, Wed 3:00 – 4:30pm Online via Zoom

Course Time and Location: Mon/Wed/Fri 11:45am – 12:40pm, Online via Zoom (see Appendix)

Bulletin Description: ***MEC 301: Thermodynamics***.
Variables that describe the thermodynamic state of a system or control volume, including absolute temperature, internal energy, enthalpy, and entropy are introduced, and basic principles governing the transformations of energy, especially heat and work, are developed. Underlying principles are used to analyze and solve problems related to thermodynamic systems and to determine the changes in properties of the systems and surroundings implied by changes in inputs, configuration, or constraints.

Prerequisites: AMS 261 or MAT 203; PHY 125 or 131 or 141; CHE 131

Learning Objectives: The emphasis in this course will be on learning the fundamentals of thermodynamics and in applying them to solve real-world engineering problems. Key topical areas include the first and second laws of thermodynamics, the concept of entropy, theoretical and practical maximum efficiencies for heat engines, and refrigeration, and the basics of gas power and refrigeration cycles.

Please note: I can only provide limited email support to the course. There are over a hundred people registered for this class. I am likely not going to be able to answer convenience questions such as what we covered in class, what will be on the exam, or how to do a particular homework problem, especially if these questions were already addressed in lecture. You will probably get a much faster and more focused answer to your question by asking questions in class, stopping by after class, and/or coming to either my or the TA's office hours.

Teaching Assistant: **Mr. Mahmoud Koraïem**
Office hours: Tuesday 1:00 – 2:30pm, Thur 1:00 – 2:30pm
Location: Online via Zoom

Note: please respect the TA and student assistant's office hours; like you they are students with a demanding schedule. Also, please do not email them for help; rather attend their office hours. Thank you.

Text: *Thermodynamics: An Engineering Approach* (9*th ed.*), Y. A. Çengel and M. A. Boles (2019). The textbook is required. We will also used McGraw-Hill *Connect*™ for all homework assignments. The *Connect*™ subscription includes electronic access to the textbook for one year, and is available at the bookstore (ISBN: 9781260673623). Connect is required. Optional loose-leaf hardcopy of text available ($60). Other options include rental or purchase of the textbook, if desired.

Schedule of Required Reading and Assignments: Homework assignments will be made every one or two weeks, depending on the material covered in the course during this time. We will be using the McGraw-Hill Connect™ online homework system. NO LATE HOMEWORK WILL BE ACCEPTED, except under documented emergencies (medical, death in the family).

Exams: *One midterm exam and a final exam.* **Note**: The details of the exam administration are still being worked out. I will provide updates to the class as the exam time nears.

Exam dates and times: In recognition that you have other classes with their own exams, projects and deadlines, I will, as a courtesy to the class, present several candidate dates for each midterm when we get close to the time for an exam. The class will then vote, with a simple majority determining the date on which the exam will be held. As a consequence, however, we will not know the specific date of the exam until a few weeks before each exam when the class has voted. Note also that the last day to withdraw from the course is **Friday October 23 at 4:00pm**. We need to have the first midterm completed and graded by this date so that anyone who wishes to drop the course will have an initial indication of how they are doing in the course. This means the *last* possible day for the midterm is Wednesday, October 21, although it could be earlier if the class votes to do so. The final exam will be held at the date and time as determined by the university's standard final

examination scheduling policy (https://www.stonybrook.edu/commcms/registrar/registration/_exams/fall20-finals.php). The exam room will be determined and made available before the end of the classes for the semester.

Basis for calculating final grade: The final grade for the course will be based on the following percentage breakdown:

- Homework: 15%
- Midterm exam: 35%
- Final examination: 50%.

The numeric score for each of these items will be weighted by the percentage stated to arrive at a final numerical score for the course, from which final letter grades will be issued.

Tips for success: Practice makes perfect and if you read the text, study the example problems, do the assigned problems (and others if you have time), and ask questions if you are not sure about any of the above you should do well in this course. This material is cumulative; if you fall behind you will find it hard to understand what is being discussed in class. *Thermodynamics is a very deceptive topic to study*: the math is not difficult and the concepts, when isolated, can seem trivial, however when combined together things can get very confusing.

Prerequisites by Topics: Concept of mechanical energy and work, Chemistry, Multivariable calculus
Topics: Chapters 1–7, portions of 8, 10, and 11 (time permitting)

Student Accessibility Support Center Statement. If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities.

Academic Integrity Statement. Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html.

Critical Incident Management Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Understand When You May Drop This Course: It is the student's responsibility to understand when they need to consider disenrolling from a course. Refer to the Stony Brook Academic Schedule for dates and deadlines for registration: http://www.stonybrook.edu/commcms/registrar/calendars/academic_calendars.

Incomplete Policy: Under emergency/special circumstances, students may petition for an incomplete grade. Circumstances must be documented and significant enough to merit an Incomplete. If you need to request an incomplete for this course, contact me for approval as far in advance as possible.

Course Materials and Copyright Statement: Course material accessed from Blackboard, Zoom sessions, Homework Assignments, Exams, Lecture videos or a Stony Brook Course website is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity. All federal and state copyright interests are reserved for all original material presented in this course through any medium, including lecture, electronic transmission or print. Individuals may not sell, be paid or receive anything of value for class notes made during this course from any person or entity without the express written permission of (author). In addition to legal sanctions, violation of these copyright prohibitions may result in University disciplinary action.

Allowed Calculators

Following the Mechanical Engineering Department's mandatory calculator policy, **only** the following calculators will be allowed to be used on the midterm and final exams. There will be no exceptions. This list of calculators is identical to that allowed for the *National Council for Examiners for Engineering and Surveying* (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better. If you have any questions on this policy please feel free to contact me. The NCEES policy on calculators can be found here: https://ncees.org/exams/calculator/ .

Casio:	All **fx-115** and **fx-991** models. (Any Casio calculator must have **fx-115 or fx-991** in its model name.)
Hewlett Packard:	The **HP 33s** and **HP 35s** models, but no others.
Texas Instruments:	All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

Appendix A – Special Considerations for Fall 2020 COVID Restrictions

Course Delivery Mode and Structure:

As mandated by university policy based on the number of students enrolled, this will be exclusively an online course. Regular in class lectures will be replaced by live and synchronous zoom sessions (to be held during class times, sessions will be accessible through blackboard). These sessions will be recorded and will be available to view afterwards. We will also use the Blackboard learning management system (LMS) for announcements, grade posting, course documents, and class scheduling. Students must be mindful of all course expectations, deliverables and due dates. All assignments and course interactions will utilize internet technologies. See "Technical Requirements" section for more information as well. The instructor will be available during regular office hours, via live Zoom sessions, also accessible through blackboard

How We Will Communicate:

For course-related questions and other personal/private issues, my preferred method of contact is via the email listed at the top of this syllabus. Your Stony Brook University email must be used for all University related communications. You must have an active Stony Brook University e-mail account and access to the Internet. *All instructor correspondence will be sent to your SBU e-mail account through Blackboard.* Please plan on checking your SBU email account regularly for course related messages.

Technical Requirements:

This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard course site can be accessed at https://blackboard.stonybrook.edu You are responsible for having a reliable computer and Internet connection throughout the term. The following list details a minimum recommended computer set-up and the software packages you will need to have access to, and be able to use:

- PC with Windows 10
- Macintosh with OS 10.13 or higher
- Latest version of Chrome, Firefox or Explorer; Mac users may use Chrome, Firefox or Safari. (A complete list of supported browsers and operating systems can be found on the My Institution tab of the Blackboard website.)
- High speed internet connection
- Word processing software (Microsoft Word, Pages, etc.)
- Speakers (either internal or external) or headphones
- Ability to download and install free software applications and plug-ins (note: you must have administrator access to install applications and plug-ins).
- Adobe Flash player with the latest update is crucial for playing multiple videos throughout the course
- Computer and Internet Connection: This course requires that you have a good, reliable (preferably wired internet connection) to a reliable and working computer with a webcam and microphone. Cheap wifi connections might not work well and in the past students have had difficulties taking exams when they were connected to unreliable wifi access points, such as at coffee shops. We will not be responsible for you not being able to connect to the servers during the exam and no extensions on time will be given. Please do not underestimate the importance of having a reliable computer and internet connection.
- Respondus LockDown Browser: You will need to use this browser to take quizzes and exams online; please download it from this link: http://www.respondus.com/lockdown/download.php?id=772113517 Please scroll to the end for detailed instructions

- Camscanner software

Technical Assistance:
If you need technical assistance at any time during the course or to report a problem with Blackboard you can:

- submit a help ticket on the web at http://it.stonybrook.edu/services/itsm)
- call (631) 632-9800 (technical support, log-in issues, computer support, wifi, software & hardware)
- call (631) 2-CELT [631-632-2358]