Thermodynamics – Physics 530
Fall 2019
SUNY College at Cortland
Physics Department

Catalog Description

Study of the thermal properties of matter from macroscopic and microscopic points of view. Topics include heat, temperature, entropy, classical and quantum statistical mechanics, and the laws and applications of thermodynamics to such systems as heat pumps, engines, and refrigerators.
Prerequisites: PHY 410 and MAT(122 or 237). PHY 410 may be taken concurrently (3cr. hr.)

Textbooks

Required

- *Thermodynamics an Engineering Approach* (8^{th} Ed.) by Yunus Cengel and Michael Boles ISBN:0073398179.

Recommended

- *A Modern Course in Statistical Physics* (3^{rd} Ed.) by Linda Reichl ISBN: 9783527407828.

Instructor Information

Instructor: Douglas Armstead
Office: 127 Bowers (607) 753-2919
Office Hours: MWR T 1-2pm and by appointment.
Email: douglas.armstead@cortland.edu
Lecture meets: MW 4:25pm-5:40pm in Bowers 139.
Course Website: http://facultyweb.cortland.edu/douglas.armstead/F18/Thermodynamics.html

Expectations

What you should expect from me:

- Explanations of physical concepts that include concrete examples and, where reasonable, demonstrations.
- In-class examples that help you to develop the level of reasoning that is necessary to do the problems you will encounter in the homework and on exams.
- Careful and respectful consideration of your questions.
- An open door policy–if my office door is open you should feel free to come in and talk about physics. This is in addition to my regularly scheduled office hours listed above.

What I expect of you:

- Your presence in class, both physical and mental, for the entire class period.
- To prepare for class. This includes doing the reading at a level that you arrive with questions in hand about the material.
- When you have a question, ask it. Your fellow classmates will thank you–if you are unclear on something, chances are the person next to you is, too.
- Submit work for grading that is your own. If you copy from another student or source and submit it for a grade, then you risk receiving an F in the course.

Grades

The final score for the class is found in the following way:

$$score = \frac{H + E_1 + E_2 + F}{4} \tag{1}$$

where H =homework average, $E_i = i$th in semester exam, and F =final exam.

The homework is a vehicle for your mastering the concepts, techniques, and thought processes relevant to Thermodynamics and for communicating this in a way that leads from beginning to end using a clear, methodical plan. There are a number of aids at your disposal: the book, the instructor, in and out of class; and your classmates. But in the end nothing beats quiet concentration and gradually sorting things out for yourself.

Homework will typically be assigned on Thursday and due on the following Thursday, when solutions will be provided. Allowing late homework is not really in your best interest and will generally not be accepted.

Make-up exams will only be administered for "Excused Absences" (see University Catalog for details). Supporting documentation to excuse your absence will be required.

The score is mapped into a grade roughly as:

Final %	Grade
90-100	As
80-89	Bs
70-79	Cs etc.

Improvement and class participation may be used raise a border line grade.

Class Schedule

All dates are tentative. Note that some weeks will have a single extended class session that starts early.

Week of	Chapter(s)	Topic
8/27	1 & 2	Introduction and Energy Balance
9/3	2 & 3	1^{st} Law and Phases
		No class on Labor Day
9/10	3 & 4	Equations of State
9/17	4	Closed System Energy Analysis
9/24	5	Open System Energy Analysis
10/1	5 & 6	Steady Flow Devices and 2^{nd} Law
10/8	6	Reversible vs Irreversible Process
		Exam 1 on 10/10 (Chapters 1-5).
10/15	7	Entropy
		No class during fall break.
10/22	7	Entropy and Devices
10/29	8 & 9	Energy Degradation and Gas Power Cycles
11/5	10 & 11	Vapor Power Cycles and Refrigeration
11/12	11 & 12	Refrigeration and Differential Relationships
11/19		Exam 2 on 11/19. (Chapters 6-11)
11/26	12 & Reichl Chapters 1& 2	Differential Relationships and Statistical Physics
		Thanksgiving break, no class on Wed.
12/3	Reichl Chapter 2 & 3	Statistical Physics

Final Exam at 4-6pm on Monday December 9, 2019

Required Statements

Academic Integrity Statement

All students are expected to uphold academic integrity standards. Plagiarism is defined as taking the ideas of others and using them as one's own without due credit. Students who cheat in examinations, course assignments, or plagiarize in this course may be disciplined in accordance with university rules and regulations.

Disability Statement

As part of SUNY Cortland's commitment to a diverse, equitable, and inclusive environment, we strive to provide students with equal access to all courses. If you believe you will require accommodations in this course, please place a request with the Disability Resources Office at disability.resources@cortland.edu or call 607-753-2967. Please note that accommodations are generally not provided retroactively so timely contact with the Disability Resources Office is important. All students should consider meeting with their course instructor who may be helpful in other ways.

Diversity Statement

SUNY Cortland is dedicated to the premise that every individual is important in a unique way and contributes to the overall quality of the institution. We define diversity broadly to include all aspects of human difference. The College is committed to inclusion, equity, and access and thus committed to creating and sustaining a climate that is equitable, respectful and free from prejudice for students, faculty and staff. We value diversity in the learning environment and know that it enhances our ability to inspire students to learn, lead and serve in a changing world. We are committed to promoting a diverse and inclusive campus through the recruitment and retention of faculty, staff and students. As a community, we hold important the democracy of ideas, tempered by a commitment to free speech and the standards of inquiry and debate. To this end, we are dedicated to developing and sustaining a learning environment where it is safe to explore our differences and celebrate the richness inherent in our pluralistic society.

Inclusive Learning Environment Statement

SUNY Cortland is committed to a diverse, equitable and inclusive environment. The course instructor honors this commitment and respects and values differences. All students enrolled in this course are expected to be considerate of others, promote a collaborative and supportive educational environment, and demonstrate respect for individuals with regard to ability or disability, age, ethnicity, gender, gender identity/expression, race, religion, sex, sexual orientation, socio-economic status or other aspects of identity. In an environment that fosters inclusion, students have the opportunity to bring their various identities into conversation as they find helpful, but are not expected to represent or speak for an entire group of people who share aspects of an identity. If you have any questions or concerns about this statement, contact the Institutional Equity and Inclusion Office at 607-753-2263.

Title IX Statement

Title IX, when combined with New York Human Rights Law and the New York Education Law 129-B, prohibits discrimination, harassment and violence based on sex, gender, gender identity/expression, and/or sexual orientation in the education setting. The federal Clery Act and NY Education Law 129-B provide certain rights and responsibilities after an incident of sexual or interpersonal violence. When a violation occurs, victims and survivors are eligible for campus and community resources. Where the College has jurisdiction, it may investigate and take action in accordance with College policy. If you or someone you know wishes to report discrimination based in sex, gender, gender identity/expression, and/or sexual orientation, or wishes to report sexual harassment, sexual violence, stalking or relationship violence, please contact the Title IX Coordinator at 607-753-4550, or visit cortland.edu/titleix to learn about all reporting options and resources. (Updated by SUNY Legal Feb. 1, 2018).