

# Physics 3332 Thermodynamics

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Office Location VIN 125

Office Hours 2:00-4:30 pm MR or by appointment

## Course Description

A study of thermodynamics and statistical methods in physics with applications from classical and quantum physics.

## Learning Outcomes and Assessment

Upon completion of this course, the student will understand the concepts of temperature, work, heat, entropy, canonical formalisms, and quantum statistics; be able to discuss laws of thermodynamics and thermodynamic potentials; solve practical problems involving gas laws, cycles, and radiation. Class presentation of a peer reviewed article on thermodynamics or statistical mechanics is required.

Learning outcomes will be assessed through two in-class exams (40%), out-of-class assignments (30%), Article Presentation Project (10%), IDEA student evaluation of instruction, and a final exam (20%). Late assignments will receive zero credit.

## Required Materials

There is no required text for this course. Students desiring a text may refer to opensource texts available in Blackboard.

Chapter	Homework Assignment	Lesson Dates
1: Zeroth and First Laws of Thermodynamics	In PowerPoint	Aug 26-30
<i>Holiday</i>		Sep 2
2: Second Law of Thermodynamics	In PowerPoint	Sep 4-9
3: Entropy and Microcanonical Formalism	In PowerPoint	Sep 11-16
4: Gases, Potentials, and Maxwell's Relations	In PowerPoint	Sep 18-23
5: Applications of Maxwell's Relations	In PowerPoint	Sep 25-30
<i>Exam 1 Review</i>		<b>Oct 2</b>
<b>Exam 1</b>		Oct 4
6: Canonical Formalism	In Blackboard	Oct 2
6: Debye Model		Oct 4
6: Density of States		Oct 7
6: Electromagnetic Radiation		Oct 9
6: Quantum Rotor		Oct 11
6: Ideal Gas		Oct 14
6: Paramagnets and Negative Temperature		Oct 16
6: Equipartition Theorem		Oct 18

6: Relation to Microcanonical Formalism		Oct 21
Article Presentation Project Guidelines		Oct 23
<i>Exam 2 Review</i>		Oct 30
<b>Exam 2</b>		<b>Nov 1</b>
7: Information Theory and Disorder	In Blackboard	Nov 4
7: Grand Canonical Formalism		Nov 6
7: Significance of Grand Partition Function		Nov 8
8: Quantum Statistics	In Blackboard	Nov 11
8: Fermi-Dirac Statistics		Nov 13
8: Bose-Einstein Condensation		Nov 15
8: The Photon Gas		Nov 18
8: Chemical Potential		Nov 20
8: Photodisintegration of Hydrogen		Nov 22
9: <i>Article Presentations</i>		Nov 25
<i>Holidays</i>		Nov 27-29
9: <i>Article Presentations</i>		Dec 2
9: <i>Article Presentations</i>		Dec 4
<i>Final Exam Review</i>		Dec 6
<b>Final Exam</b>	10:30 AM-12:30 PM	<b>Dec 9</b>

## Disclaimers

*Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is contained in both print and web versions of the Student Handbook.*

*Persons with disabilities which may warrant academic accommodations must contact the Student Life Office, Room 001 of the University Center, 325-942-2062 to request such accommodations.*

*Attendance is required. Make-up exams must be pre-arranged with the instructor before scheduled exam dates on the syllabus.*

*A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.*

*Warranty void if broken, batteries not included.*