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Chien-Peng Yuan

PHY215, Fall 2025 - Thermodynamics and Modern Physics

Michigan State University

Course Coordinator	Chien-Peng Yuan
Teaching Assistant	Maya Bostock , Chien-Peng Yuan

- Wed Sep 17 11:59:00 pm 2025 (EDT):**Due: Folder/Map - Set #03: Heat (09/17, Wed) (All Students)**

Instructor Information

Professor C.-P. Yuan
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Course Description

PHY 215: Thermodynamics and Modern Physics

Topics: special relativity, thermodynamics, phenomenological quantum physics, quantum mechanics, atomic and molecular physics, nuclear physics, particle physics.

Prerequisites

Physics II: (PHY 184 or PHY 184B or LBS 272 or PHY 294H or PHY 234B) and Differential Equations: (MTH 234 or MTH 254H or LBS 220).

Class Hours

Tuesday, Wednesday, Thursday: 1:50-2:40 PM, BPS 1415.
8/25/2025 - 12/7/2025

Helproom Hours

TA's schedule

Teaching Assistant: Maya Bostock
Email: bostockm@msu.edu

- Recitation:
Mondays, 1:50 PM - 2:50 PM. BPS 1415

- Help Room Hours:
Wednesdays, 3:00 PM - 5:00 PM. BPS 1248
Fridays, 1:00 PM - 3:00 PM. BPS 1248

Exam Information

For the exams each student should bring several #2 pencils, an eraser and a calculator with fresh batteries. Graphing calculators are allowed, but not necessary. A two-sided, hand-written, 8.5 by 11 inch US letter sized help sheet is allowed on each midterm plus the help sheet(s) from the previous midterm(s). On the final exam three, two-sided help sheets - two from the midterm exams plus a third sheet - are allowed.

Students with disabilities or other circumstances that require special arrangements should inform their instructors as soon as possible (ideally in the first two weeks) and well ahead of the exams so that proper arrangements can be made. Please present the instructor with your RCPD form.

Exam #1: Oct 7, Tuesday, 1:50-2:40 PM.
Exam #2: Nov 11, Tuesday, 1:50-2:40 PM.
Final Exam: Dec 10, Wednesday, 5:45-7:45 PM, BPS 1415.

Grading Information

Percent weights: Homework: 40%. Two midterm exams: 2x16% = 32%. Final Exam: 28%. Total: 100%. Homework questions: Every homework question is worth 1 point. Maximum score on a midterm exam: 50 points. Maximum score on the final exam: 100 points. The midterm exams will have corrections as a homework: 30% of the positive difference between the correction and the exam will be added to your exam score as bonus. The corrections are optional. The corrections can only raise your scores, they CANNOT lower your score. The eXam and the Correction

scores are combined together to the Total test score as follows: If C>X, then T = X + 0.30*(C-X), otherwise T = X. For example, if you got 31 points on the midterm and got 46 points on the correction exam, you new total will be 31 + 0.30*(46-31) = 31 + 4.5 = 35.5. In this example, if you get less than 31 points on the correction exam, then your total exam score would still be 31. Maximum score on the final exam: 100 points. The final exam doesn't have correction.

Grading scale:
4.0 >= 92%,
3.5 >= 84%,
3.0 >= 76%,
2.5 >= 68%,
2.0 >= 60%,
1.5 >= 52%,
1.0 >= 44%.

This grading scale might be lowered, but it will not be raised.

The Spartan Code of Honor: As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.

Readings

Wk	Chapter and Topic
01	Ch.1, Ch.2 Sec.1-9 Special Relativity 1
02	Ch.2 Sec.10-14 Special Relativity 2
03	Thermodynamics 1: Temperature
04	Thermodynamics 2: Heat
05	Thermodynamics 3: The Laws of Thermodynamics
06	Ch.3 Sec. 1-5 Basis of Quantum Physics I.
07	Exam #1: Oct 7, Tuesday
07	Ch.3 Sec. 6-9 Basis of Quantum Physics II.
08	Ch.4 Structure of the Atom
09	Ch.5 Quantum Mechanics I
10	Ch.6 Quantum Mechanics II
11	Ch.7 The Hydrogen Atom
12	Exam #2: Nov 11, Tuesday
12	Ch.8 Atomic Physics
13	Ch.12 The Atomic Nucleus
14	Ch.13 Nuclear Interactions and Applications
15	Final Exam: Dec 10, Wed, 5:45-7:45 PM, BPS 1415

Textbook

Title: Modern Physics for Scientists and Engineers
Author: Stephen T. Thornton, Andrew Rex, Carol Hood
ISBN: 9781337919456
Publisher: Cengage Learning
Edition: 5th
Copyright/Published Date: 2021
Required Material: Yes
Used During: Both
Previous Edition OK: Yes
Material Part of a Bundle: No
Copies on Reserve in Libraries: No
Comments: An eBook, or the 2nd, 3rd, or 4th Editions are also sufficient.

Title: Custom eBook "PHY215"
Author: Gary Westfall, Wolfgang Bauer
ISBN: 9798219000980
Publisher: McGraw-Hill Education
Binding: McGraw-Hill Create™ eBook
Required Material: Yes
Used During: Both
Previous Edition OK: Yes
Material Part of a Bundle: No
Copies on Reserve in Libraries: No
Comments: This is a custom eBook for PHY215 that only includes Chapters 17 - 20 of Bauer & Westfall's book University Physics, 3rd Edition. Purchasing it is only necessary if you don't already have Bauer & Westfall's book from previous courses. Students can locate and purchase the book online by following these steps: 1. Go to `https://www.mheducation.com/highered/custom/product/9798219000980.html` 2. Add the book to your cart and pay using a credit card or access code. 3. Follow on screen instructions to checkout.

We will use LON-CAPA, MSU's own web-based course management system. If your book has a course management system bundled with, don't open it and don't try to access it, because we will not use it.

Scientific calculator. Graphing calculators are allowed, but they are not required. The recommended calculator is the TI-30X IIS for $10-14.

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