Physics 355, Modern Physics

Unique # 56080
Spring 2024

Class Meets: MWF noon to 1 PM in PMA 5.114

Instructor: Rory Coker
Office: PMA 8.312
Pronouns: he, him

Office hours: Thursday, 2 to 3 PM
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Phone: 512 203 7826 (mobile)

COURSE DESCRIPTION: PHY 355. MODERN PHYSICS AND THERMODYNAMICS.

Introduction to modern physics and thermodynamics: photons (spectra, photoelectric effect, blackbody radiation, Compton effect), atoms (Rutherford, Bohr), matter waves (Planck, deBroglie, probability interpretation, Schroedinger), nuclei, particles, special relativity, the laws of thermodynamics, and statistical physics. Three lecture hours a week for one semester. Prerequisite: Physics 303L 316 with a grade of at least C-. [Contrary to the course catalog, this course does not cover Thermodynamics, which is an entirely separate course, Physics 369.]

PRE-REQUISITES FOR THE COURSE: PHYSICS 303L 316 WITH A GRADE OF AT LEAST C-.

LEARNING OUTCOMES

1. Students should finish the semester possessing a good or very good qualitative understanding of the details of progress made in fundamental physics between roughly 1905 and the present.
2. Students should be able at the end of the semester to critique correctly many aspects of the frequently misleading “news” about recent “discoveries” in fundamental areas of physics, as presented by mass media.
3. Students should be well prepared at the end of the semester to take further undergraduate courses in 20th Century physics, including Physics 373, 362K and L.
HOW WILL YOU LEARN?

TEACHING MODALITY INFORMATION
The structure of the course focuses on in-person, face-to-face learning in a classroom environment, with many visual and study aids. Class attendance is expected of every enrolled student unless special individual arrangements are made. When possible the CNS lecture capture system will be used to provide video material available through links on the Canvas page for the class---a page that is not otherwise used.

COMMUNICATION
The course Canvas site can be found at utexas.instructure.com. You are encouraged to e-mail me directly. You are responsible for ensuring that the primary email address you have recorded with the university is the one you will check for course communications, because that is the email address that is available to the instructor.

ASKING FOR HELP
Office hours for the instructor and TA are posted on the class web page, https://web2.ph.utexas.edu/~coker2/PHYSICS%20355%20-%20Prof.%20Rory%20Coker.htm
You can make a personal appointment with either the instructor or the TA at any reasonable time. Help with homework is available, usually throughout any weekday, at the coaching tables on the 5th level of PMA.

UNIVERSITY POLICIES AND RESOURCES
For a list of important university policies and helpful resources that you may need as you engage with and navigate your courses and the university, see the University Policies and Resources Students Canvas page. The page includes the language of the University Honor Code, Title IX legal requirements for Texas employees, and information about how to receive support through the office of Disability & Access.

COURSE REQUIREMENTS AND GRADING

REQUIRED MATERIALS
Text: Modern Physics from α to Z by James William Rohlf. There are free pdf and other versions of this book in several places on the internet, and used book dealers sell it for $15 to $25, depending on condition. Four copies are on reserve in the PMA Library.

SHARING OF COURSE MATERIALS IS PROHIBITED
No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class without my explicit, written permission. Unauthorized sharing of materials may facilitate cheating. The University is aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in initiation of the student conduct process and include charge(s) for academic misconduct, potentially resulting in sanctions, including a grade impact.

REQUIRED DEVICES

In order to access on-line course materials such as pdf files and html pages the student assumed to have a smartphone, or a laptop or desktop computer available at all times. Students can also access the same materials during class lectures when needed, using smartphone or laptop.

CONFIDENTIALITY OF CLASS RECORDINGS

Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

GETTING HELP WITH TECHNOLOGY

Students needing help with technology in this course should contact the ITS Service Desk.

CLASSROOM EXPECTATIONS

Class attendance: This is a lecture course and class attendance is expected. Notify the instructor as soon as possible if circumstances arise which will interfere with regular attendance.

Class participation: You are considered to be participating in the class if you are present during the lectures, and don’t hesitate to ask questions when they arise in your mind as you listen to the lectures.

Behavior expectations: Students are expected to treat the instructor and other students in the class with basic courtesy.

CONTENT WARNING

Our classroom provides an open space for the critical and orderly exchange of ideas through lecture, questions and discussion. Physics does not generally offend, dismay or trigger students by virtue of its factual and descriptive content.

ARTIFICIAL INTELLIGENCE

The creation of artificial intelligence tools for widespread use is an exciting innovation. These tools have both appropriate and inappropriate uses in classwork. The use of artificial intelligence tools (such as ChatGPT) in this class:
• is strictly prohibited. This includes using AI to generate ideas, outline an approach, answer questions, solve problems, or create original language. All work in this course must be your own or created in group work, where allowed.

ASSIGNMENTS
Regularly assigned homework will constitute 60% of the overall course grade. A midterm in-class quiz will constitute 25% of the overall course grade.

LATE WORK AND MAKING UP MISSED WORK
Late homework can be submitted if you obtain consent of the instructor. Missed homework cannot be made up.

ABSENCES
Class attendance is regularly checked and will constitute 15% of the overall course grade.

RELIGIOUS HOLY DAYS
By UT Austin policy, you must notify me of your pending absence for a religious holy day as far in advance as possible of the date of observance. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

EQUITABLE ACCOMMODATION
In general if a large amount of class work is missed, there is no practical way to “make up” any part of the missed credit, especially at or past the end of the semester. Please contact the instructor immediately if unexpected circumstances arise which will affect your class attendance and participation.

EXTRA CREDIT
Students who point out mistakes made by the instructor during class lectures, especially if they occur in material projected on-screen, can receive extra credit points to be applied when the final course grade is computed.

+/- GRADING POLICY
Grading is based on the usual system of A, A-, B+, B, B-, etc.

GRADE BREAKS
The course will be graded “on the curve,” or in other words, the actual class average at the end of the semester will determine the dividing lines between letter grades. Generally in a large class the grades form into clusters, and the positions of the clusters, and the spaces between them, determine where the boundaries are drawn between letter grades.
ACADEMIC INTEGRITY EXPECTATIONS

Students who violate University rules on academic misconduct are subject to the student conduct process. A student found responsible for academic misconduct may be assigned both a status sanction and a grade impact for the course. The grade impact could range from a zero on the assignment in question up to a failing grade in the course. A status sanction can include a written warning, probation, deferred suspension or dismissal from the University. To learn more about academic integrity standards, tips for avoiding a potential academic misconduct violation, and the overall conduct process, please visit the Student Conduct and Academic Integrity website at: http://deanofstudents.utexas.edu/conduct.

COURSE OUTLINE

All instructions, assignments, readings, rubrics and related essential information will be on the course web page. Changes to the schedule may be made at my discretion if circumstances require. I will announce any such changes in class and will also communicate them via an e-mail announcement. It is your responsibility to note these changes when announced, and I will do my best to insure that you are notified of changes with as much advance notice as possible. Assignment due dates are stated on the assignments themselves.

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<th>Class Topic</th>
<th>Out of Class Activities</th>
<th>Assignments Due</th>
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IMPORTANT SAFETY INFORMATION

CARRYING OF HANDGUNS ON CAMPUS

Students in this class should be aware of the following university policies related to Texas’ Open Carry Law:

- Students in this class who hold a license to carry are asked to review the university policy regarding campus carry.
- Individuals who hold a license to carry are eligible to carry a concealed handgun on campus, including in most outdoor areas, buildings and spaces that are accessible to the public, and in classrooms.
- It is the responsibility of concealed-carry license holders to carry their handguns on or about their person at all times while on campus. Open carry is NOT permitted, meaning that a license holder may not carry a partially or wholly visible handgun on campus premises or on any university driveway, street, sidewalk or walkway, parking lot, parking garage, or other parking area.