Physics 362L, Subatomic Physics

UNIQUE NUMBER 56090
Spring 2024

Class Meets: 1 – 2 PM, PMA 5.120

Instructor: Rory Coker
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Pronouns: he, him
Office hours: Thursday, 2 – 3 PM
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COURSE DESCRIPTION

UNIVERSITY CATALOG COURSE DESCRIPTION

PHY 362L. QUANTUM PHYSICS III: PARTICLES AND NUCLEI.
Nuclei and nucleons, their gross properties; the hadrons; symmetries and conservation laws; nuclear stability; electromagnetic, weak, and hadronic interactions; nuclear reactions at low, medium, and high energies; nucleon structure; tools of experimental nuclear physics; models of theoretical nuclear physics; nuclear technology.
Three lecture hours a week for one semester. Prerequisite: Physics 373 with a grade of at least C-; Physics 362K is recommended.

PRE-REQUISITES FOR THE COURSE

Phy 373 and Phy 362K

LEARNING OUTCOMES

1. By the end of the semester students should have a good working familiarity with the key concepts related to the fundamental particles of nature and their interactions, nuclear physics and nuclear technology, astrophysics and cosmology.
2. By the end of the semester students should have the ability to critique the accuracy of mass media coverage of recent developments in fundamental physics and cosmology.
3. Students who plan to attend graduate school and focus their studies on topics within subatomic physics should find that they have a good conceptual basis for appreciating the current status of the field and the areas where future advances could be expected.
HOW WILL YOU LEARN?

TEACHING MODALITY INFORMATION
This is a lecture course, conducted face to face, and regular class attendance is expected. However, the CNS lecture capture system will be used when possible to record class lectures, and the recordings will be posted on Canvas—this is the only thing for which Canvas will be used during the semester.

COMMUNICATION
The course Canvas site can be found at utexas.instructure.com. Please email me directly, when required. 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 me through class rosters or Canvas. The class web page is https://web2.ph.utexas.edu/~coker2/PHYSICS%20362L-%20Prof.%20Rory%20Coker.htm

ASKING FOR HELP
The instructor and TA will hold regular office hours, and also be available via e-mail. See the class web page for details and updates.

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
The textbook is SUBATOMIC PHYSICS, by Henley and Garcia. It is available on-line in various places as a free pdf file, and a search on title and authors will turn up downloadable links.

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

Students are assumed to have access to smart phones, and laptop or desktop computers. All important course material is available direct from the class web page.

CONFIDENTIALITY OF CLASS RECORDINGS

Class recordings on Canvas and elsewhere 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: Attendance is checked with in-class pop quizzes, which also serve to check student comprehension of the lectures to date. Attendance counts 15% of the overall course grades.

Class participation: Students in attendance during class lectures are warmly encouraged to ask questions at any time. The instructor may also ask specific questions to the class, at various points in a given lecture.

Behavior expectations: See Section 11-400 of the Institutional Rules in the General Information Catalog. Students are expected to treat the other students in the class, and the instructor, with courtesy.

CONTENT WARNING

Our classroom provides an open space for the critical and orderly exchange of ideas through discussion. It is very unlikely that any student would find the presentation of established and verified facts of nature to be emotionally disturbing in any way, so no lecture on physics is expected to “trigger” or disturb any student. Student comments about personal reactions to facts of nature are welcome during class.

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.

Existing AI programs simply scour the internet for scraps and bits of “information” relevant to a given request. Because of the nature of the internet, most if not all of such “information” is wrong or garbled.

For more information about AI in education, see the Center for Teaching and Learning’s “5 Things to Know about ChatGPT” webpage.

ASSIGNMENTS
Homework assignments appear on the class web page, and are also handed out directly, as paper copies in class. Homework counts 85% of the overall course grade.

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<th>Assignments</th>
<th>Points Possible</th>
<th>Percent of Total Grade</th>
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LATE WORK AND MAKING UP MISSED WORK
Late homework can be accepted in special cases, when the instructor and TA are promptly made aware of the circumstances. Missed classwork can, in general, not be made up, certainly not at the end of the semester or after the semester is over.

ABSENCES
Class attendance is checked at intervals by a pop quiz handed out in class. The quiz tests comprehension of topics covered in lectures, but is not graded apart from proving attendance.

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
There is no provision for dropping homework grades, unless the instructor decides to drop a specific homework grade for reasons specific to a particular unpredictable circumstance. There are no examinations.

EXTRA CREDIT
A student can earn extra credit points by finding errors in material presented in class, such as on projected class notes, or on projected class “slides.” The error should be pointed out by the student during the lecture.

+/- GRADING POLICY
The usual plus/minus grade system will be used to assign final course grades.
GRADE BREAKS
Grade breaks will be determined by the position of grade clusters in the overall class averages. In other words, the grading is “on the curve,” and grade breaks will be placed in positions of gaps between clusters, so that there are no borderline cases. The overall class average will otherwise determine the assignment of letter grades.

ACADEMIC INTEGRITY EXPECTATIONS
Because the overall course grade is based mainly on homework, it is assumed that every student will do his or her homework independently, just as if they were taking an exam. 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 essential information will appear on the course web page. Changes to the schedule and deadlines may be made at my discretion if circumstances require. I will announce any such changes in class, via e-mail, and on the class web page. It is your responsibility to note these changes when announced, and I will do my best to ensure that you are notified of changes with as much advance notice as possible.

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<th>Week</th>
<th>Date</th>
<th>Class Topic</th>
<th>Out of Class Activities</th>
<th>Assignments Due</th>
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Wee Date Day Class Topic Out of Class Activities Assignments Due

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.