

SYLLABUS – PHYSICS 222: Modern Physics

Fall 2022

Course Description: *Modern Physics* covers Relativity, Models of the Atom, an Introduction to Quantum Mechanics, Atomic Physics, Nuclear physics, and Modern Astrophysics.

Course Objectives: Conceptual student learning outcomes: (1) Understanding of the physical laws of the topics described above. (2) Learning about the historic context of the physical developments and their implications for science and technology today. (3) Learning to think critically/scientifically and developing the skills needed to attack complex problems.

Instructor Information:

Name: Prof. Hans Schuessler

E-mail: h-schuessler@tamu.edu (please start the subject line with **PHYS222**)

Office hours: All interactions outside the class will be electronic (i.e. through Zoom). Please email me with questions (I will try to answer speedily) or if you need to make an appointment.

TA Information:

Name: Carlos Rodriguez

E-mail: carlos.rodriguez@tamu.edu (please start the subject line with **PHYS222**)

Office hours: TBD. Office hours will be through Zoom unless otherwise noted.

Class times: MW 5:45pm - 7:00pm

Class Location: Mitchel Physics Building, MPHY 203

Class Website: <http://sibor.physics.tamu.edu/teaching/phys222/> & Canvas

Web Pages of Interest:

The main website for this course will be located at [the course website \(SIBOR\)](#) . All lecture notes, exam results and course information will be located here. Homework will be done through WEBASSIGN assignments, with a link located on the course Canvas page. Grades, exams, and extra notes will be located on Canvas.

I recommend having the lecture notes open on your computer during class and following along with the lecture.

Pre-Requisites: PHYS 206. You must have a working knowledge of geometry, algebra, and calculus. You should be proficient in the use of vectors.

Text and required materials:

Textbook: Modern Physics for Scientists and Engineers (Fifth Edition)
By Thornton , Rex, and Hood
(ISBN-10: 1337919454, ISBN-13: 978-1337919456)

Electronics:

- A computer with internet access (TAMU computer lab can be used in lieu of a personal computer).
- Students will need to obtain the necessary license to access the course homework.
- It is *highly* recommended that students have at least a four-function calculator (or better) for use during exams or homework.

Expected Material to be covered (schedule changes possible):

Week of:

August 24 Chapter 1

August 29 Chapter 2

September 5 Chapter 2

(Midterm Exam 1, September 12)

September 14 Chapter 3`
 September 19 Chapter 4
 (Midterm Exam 2, September 26)
 September 28 Chapter 5
 October 3 Chapter 5+6
 October 10 Chapter 6
 October 17 Chapter6
 October 24 Chapter 7
 (Midterm Exam 3, October 31)
 November 2 Chapter 8
 November 7 Chapter 8
 November 14 Chapter 12
 November 21 Chapter 12
 November 28 Chapter 15
 December 5 Chapter 15
 (December 8th, Reading day)
 (Comprehensive Exam, 7:30 – 9:30 a.m., December 9th, 2022)

Lectures:

Lectures are face-to-face. It is the students' responsibility to attend lectures regularly and pay attention during lectures. Class interactions will also be performed through two other means. The first is with a persistent Google Form for general questions. The second is through the use of Participation Quizzes. Both items are outlined farther below.

Video Lectures:

Should a student be unable to attend a lecture, or wish to review one, prerecorded video-lectures will be uploaded to the class webpage on SIBOR. While these lectures can be watched at any time when made available, they should not be considered a true substitute to class lectures as they are prerecorded and do not allow the same level of interaction as a live lecture. Please choose to attend the lectures.

Homework:

Homework consists of two components:

(1) Reading the relevant material ahead of class. This means that you should complete reading of the following chapters by the following due dates (in case we significantly deviate from the schedule, I will let you know):

Due date:	Reading material
August 25	Chapter 1
September 5	Chapter 2
September 14	Chapter 3
September 19	Chapter 4
October 3	Chapter 5
October 10	Chapter 6
October 24	Chapter 7
November 7	Chapter 8
November 21	Chapter 12
December 5	Chapter 15

(2) Completing homework assignments on WebAssign. Please log in through the WEBASSIGN tab in the Physics 222 Canvas course. If you run into any issues a help guide is available on the course website. If you still have issues, please email either myself or the class TA. For each wrong answer, 20% of that problem's score will be deducted, up to 3 possible attempts, then you get zero. You may want to think about each problem with the help of a piece of paper first. Also, watch significant figures!

While homework “only” contributes 15% to the grade, it is crucially important and there will be lots of it. It may seem like an excessive amount of work for the points given, but a diligent and successful effort on problems is your ticket to get high scores in the exams! This has been shown again and again! In addition to the assigned homework problems, you should do as many as you can from the back of the chapter. Also, I have seen a lot of students who get close to full homework points by scheming or not doing the homework themselves diligently and then wondering why they do so poorly on the exams.

Homework 0: due 09/11/2021 11:59pm

Homework 1: due 09/11/2021 11:59pm

Homework 2: due 09/11/2021 11:59pm

Homework 3: due 9/25/2021 11:59pm

Homework 4: due 9/25/2021 11:59pm

Homework 5: due 10/30/2021 11:59pm

Homework 6: due 10/30/2021 11:59pm

Homework 7: due 10/30/2021 11:59pm

Homework 8: due 12/8/2021 11:59pm

Homework 9: due 12/8/2021 11:59pm

Homework 10: Special Assignment of making 5 PowerPoint slides on a listed research topic. Please send it to me by email at any time during the semester but before the final exam. The grade for this assignment will contribute up to 10% of the maximum Homework score.

Persistent Google Form:

A persistent Google Form will be made available during the semester. The purpose of this Form is to allow you to ask questions you may have which went unanswered during the class lecture, but it is also open to general questions. We will typically respond within 24 hours.

Participation Quizzes:

To gauge the effectiveness of class understanding, an online in-class quiz on that day's or previous class day's material will be given, due an hour after the end of the class period. These quizzes will usually consist of one or two questions. Students will be rewarded with half credit for completion, and full credit for correct answers. Exceptions will be granted for extraneous circumstances.

Exams:

Midterm Exam 1 (Chapter 1-2): Monday, September 12,

Midterm Exam 2 (Chapter 3-4): Monday, September 26,

Midterm Exam 3 (Chapter 5-7): Monday, October 31,

Comprehensive Exam, 7:30 – 9:30 a.m., December 9, 2022

Exams generally consist of problems similar in content and difficulty to the homework, and they may include both multiple-choice and free-response questions. The exam will be online using the Respondus Monitoring Software. More information regarding this will be provided during the semester. These exams will be open resource, so you can use your textbook, notes, formula sheets, etc. However, seeking outside help from anyone is not allowed. Exams will take place online during the normal class period. In the event of a mass disruption, extra time may be given or the exam may be opened to an alternate time. Any contestations regarding the grading of an exam must be brought to my attention within 1 week of the exam. Please contact me as soon as possible if there is an issue preventing you from taking the exam at the scheduled time or in the scheduled format. The full list of rules and allowed/disallowed items will be provided approximately a week before the exam in the form of an exam guideline document.

Absences: If you miss an exam due to an authorized excused absence as outlined in the *University Regulations* (Rule 7), you should attempt to ***contact me prior to the exam but no later than the following day*** to arrange for a way to make up the score. **Note:** Only few conditions qualify as an authorized excused absence, so you must avoid missing exams except for extremely serious circumstances.

Identification: When taking exams, it must be YOU, the student and you must show your student ID.

Course Grade:

Course Score	Final Letter Grade
≥ 90 %	A
≥ 80 %	B
≥ 70 %	C
≥ 60 %	D
< 60 %	F

In case of unusually difficult, low-average exams, these boundaries MAY be lowered at the instructor's discretion at the end of the semester. The numerical score is computed as a weighted average over all different components of the course with the weights as determined in the table below.

Homework	15
Participation	10
Midterm Exams	3×15=45
Final Exam	30
Total Points	100

ADA Policy: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call (979)845-1637. For additional information visit <http://disability.tamu.edu>. All information and documentation concerning disability are kept confidential.

Honor Code: The Aggie Honor Code states, "An Aggie does not lie, cheat, or steal or tolerate those who do." Further information regarding the Honor Council Rules and Procedures may be found on the web at <http://aggiehonor.tamu.edu>.

Statement on Mental Health and Wellness: Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273- 8255) or at suicidepreventionlifeline.org.

Personal Illness and Quarantine: Students required to quarantine must participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence (See Student Rule 7, Section 7.2.2.) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7. While Student Rule 7, Section 7.3.2.1, indicates a medical confirmation note from the student's medical provider is preferred, for Fall 2021 only, students may use the Explanatory Statement for Absence from Class form in lieu of a medical confirmation. Students must submit the Explanatory Statement for Absence from Class within two business days after the last date of absence.

Operational Details for Fall 2022 Courses: For additional information, please review the FAQ on Fall 2022 courses at Texas A&M University.

A Message from the Texas A&M Senate:

“To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.”

-Dale Rice

Speaker, TAMU Faculty Senate, 2021-2022

A message from you instructor:

To contribute in protecting students in attendance I am providing masks at the classroom entrances. In the spirit of Aggieland let us fight together and continue to show that Aggies's are stronger than the pandemic and do not make other Aggies sick by not wearing masks.

-Hans Schuessler, Professor of Physics, Chair of Optical and Biomedical Physics