Spring 2022 Syllabus
PHYS 232: Waves, Optics & Modern Physics

General Information:

Instructor: Dr. Nau Raj Pokhrel

Office: 214 Nielsen Physics Building, UTK

Email: npokhrel@utk.edu or, via the Canvas message system

Phone: (865) 974-5697

Classroom: Nielsen 415

Class Time: Monday, Wednesday, and Friday from 11:45 AM to 12:35 PM

Office Hours: Monday from 3:15 PM to 4:15 PM (or by email appointment)

Communication: The majority of classroom communication will be conducted via the Canvas for this class. To ensure prompt response from me, follow the email policy:

- Please put "**PHYS 232**" in the subject line of all course related emails. This practice will help me identify course related emails and respond promptly.
- You can expect delay in responding to emails; I will try to minimize such delays, but do not email me on the evening an assignment is due or before an exam expecting an immediate response. If you don't get response after a couple of days or according to urgency, please resend the email.
- Before emailing me with questions about the course, please ensure that the information is not already provided in the course syllabus or on Canvas.

Course Description & Goals:

Course Overview: PHYS 232 is a 4 credit hours course with laboratory for engineers and majors in mathematics and the physical sciences. This course covers the introduction to Mechanical and Electromagnetic Waves, Geometric and Physical Optics, Elements of Special Relativity, Introductory Quantum Mechanics, and Modern Physics. The goal is to make you familiar with concepts in these fields and give you the skills needed to work with these concepts to solve problems.

Prerequisite: PHYS 231.

Corequisite: MATH 241.

You will need the following materials for the course:

1. **Pearson MyLab and Mastering Physics for University Physics with Modern Physics (15th Edition) by Young and Freedman**. This the inclusive access content, you should already have received the **inclusive access** email from the VolShop to proceed. **You don't need to pay it separately, and you don't need any access code**. For the first-time registration, you can follow the Assignments/VitalSource Bookshelf tab on the left sidebar in Canvas.
2. University Physics with Modern Physics (15th Edition) by Young and Freedman**. If you prefer reading eText, it is included in the Pearson MyLab, you don't need to buy it separately.** If

you prefer reading physical book, you can have one, ***but you do not need to purchase the current edition of the textbook*.** The material does not change significantly between editions and any recent edition will meet your needs for the course. But please make sure that it includes all the chapters we cover during the semester.

3. Contemporary Introductory Physics Experiments, 2nd Edition by James E. Parks, Hayden-McNeil Publishing, ISBN 978-0-7380-6168-9. **You don't need to purchase the new Lab Manual if you already have it from PHYS 231.** If you don't have the Lab manual, you are required to purchase it.
4. **Turning Technologies (Clicker) Registration:** ***We will be using the clickers in almost all lectures, so, make sure you have the app, and it is ready by the first class.*** Follow the link provided on Canvas Module to register your app. The link is posted on the Canvas Modules section as well. Note that **you must use your UTK email ID** to register otherwise your score won't be integrated into Canvas. For instructions in details, visit the UTK OIT website (https://utk.teamdynamix.com/TDClient/2277/OIT-Portal/KB/ArticleDet?ID=117398).

Class Schedule:

The following is a class schedule along with lecture topics, assignments etc. This is a tentative schedule, and might differ as our class speed. Any changes, and notices made in the classes/announcements supersede the schedule.

Day	Week	Chapter	Topics	HW
24-Jan	1	Syllabus Review	Course Introduction	
26-Jan		Chapter 14	Periodic Motion	HW 1
28-Jan				
31-Jan	2			
02-Feb		Chapter 15	Mechanical Waves	
04-Feb				HW 2
07-Feb	3	Chapter 16	Sound and Hearing	
09-Feb				HW 3
11-Feb		Chapter 32	Electromagnetic Waves	
14-Feb	4			HW 4
16-Feb		Chapter 33	The Nature and Propagation of Light	
18-Feb		Mid-Term Exam I Review		
21-Feb	5	**Mid-Term Exam I (Chapters 14-16, 32)**		HW 5
23-Feb		Chapter 33	The Nature and Propagation of Light	
25-Feb		Chapter 34	Geometric Optics	
28-Feb	6			HW 6
02-Mar				
04-Mar		Chapter 35	Interference	
07-Mar	7			HW 7
09-Mar		Chapter 36	Diffraction	
11-Mar				
14-Mar	**8**	**Spring Break**		
16-Mar				
18-Mar				

21-Mar	9	Chapter 37	Relativity	
23-Mar				HW 8
25-Mar		Chapter 38	Photons	
28-Mar	10			
30-Mar		Mid-Term Exam II Review		
01-Apr		**Mid-Term Exam II (Chapters 33-37)**		
04-Apr	11	Chapter 39	Particle Behaving as Waves	HW 9
06-Apr				
08-Apr		Chapter 40	Quantum Mechanics I	
11-Apr	12			
13-Apr		Chapter 41	Quantum Mechanics II	
15-Apr		**Spring Recess**	**No Class**	HW 10
18-Apr	13	Chapter 41	Quantum Mechanics II	
20-Apr		Chapter 42	Molecules and Condensed Matter	
22-Apr				
25-Apr	14	Chapter 43	Nuclear Physics	HW 11
27-Apr				
29-Apr		Chapter 44	Particle Physics and Cosmology	
02-May	15	Mid-Term Exam III Review		
04-May		**Mid-Term Exam III (Chapters 38-43)**		
06-May		Chapter 44	Course Wrap-up	
09-May	16	Final Exam Review		
11-May		**Study Day**	**No Class**	
17-May	**TUE**	**Final Exam (1:00 PM - 3:00 PM), Cumulative (Chapters 14-16 & 32-44)**		

Course Repetition Policy:

If you are repeating the course, you may not need to repeat the laboratories. Please refer to the Laboratory policy regarding repeating a course and follow instructions there: http://www.phys.utk.edu/labs/Lab%20Repeat.pdf

Grading & Evaluation:

Clicker Quizzes & Discussion Participation: In the class meeting, you will be responding quizzes during the lectures. Clicker response grade is divided equally to participation (50%) and the correct response (50%). Your participation in discussion forum on canvas also includes the participation grade.

Homework Assignments: You will be assigned homework on MyLab and Mastering Physics. You can access them via the link provided on Canvas Assignments. You will have three attempts for each Homework, and the highest grade will be the HW grade. The assignments will be due on the indicted due date under the assignment module on Canvas.

Midterm Exams: There will be THREE midterm tests. The tentative dates for the midterms are indicated on the schedule. ***Please note that these dates are subject to change as we progress***

through the course material but they will be finalized at least a week prior so that you can plan accordingly. The midterm exams will be in the regular lecture room during the class time.

Final Exam: The final exam will be given as scheduled by the registrar's office (see the schedule). If you determine that you have a conflict with that time or have three or more exams scheduled on that day, please let me know as soon as possible. The Final Exam will be two hours in length and cumulative in scope, covering all the course materials discussed during the semester.

A formula-sheet will be available for each exam for a quick reference.

Laboratory: The laboratory sections are mandatory. If you fail the Laboratory section of the course, you will fail the course regardless of your scores in class. Lab reports will be turned in to your Teaching Assistant. Teaching Assistant is responsible for grading them. Please resolve any disputes regarding your laboratory grade with your TA. If you are unable to reconcile the issue, please write to me, or the Lab Director.

Grading Scheme:

Grades: Your grade is calculated based on many elements of the course. See the table below for details on this.

Course Element	%
Laboratory	22%
Mid Term I	10%
Mid Term II	10%
Mid Term III	10%
Final Exam	20%
Homework	20%
In-class Quiz/Discussion Participation	8%
Total	100%

Letter grade will be obtained using the conversion below:

%	Grade
90% and above	A
87% - 89%	A-
83% - 86%	B+
80% - 82%	B
77% - 79%	B-
73% - 76%	C+

70% - 72%	C
67% - 69%	C-
63% - 66%	D+
60% - 62%	D
57% - 59%	D-
< 57%	F

(Note: The instructor reserves the right, when necessary, to alter the grading policy, change examination dates, and modify the syllabus and course content. Modifications will be announced in class. Students are responsible for announced changes.**)**

Other Information:

Class Rules: Students need to follow the following guidelines and class room etiquette in order to ensure a positive and respectful learning environment for everyone:

- **Please arrive to the class on time:** don't make it a habit to join late.
- **Cell Phones/Technology**: Be respectful. Use of electronic devices for academic work is fine but use of electronic devices for other purposes is not. Turn off your cell phones when we are not using them in quizzes. While on the computers social networking is not allowed. Repeated abuse will result in being dismissed from that class and asked to return next week. No credit will be given for such dismissal.
- **Avoid side conversations**: The noise is distracting to other students, and you will impact the learning environment, so avoid private conversations in the classroom.
- **Be respectful:** Act in a matured/polite manner and be respectful of the learning process, your instructor, classroom, and your fellow students. Respect to the learning environment is projected in many ways including your body language.
- **Raise your hand:** If you have a question or comment during the class, please raise your hand.
- **Share the air:** If you have been dominating the discussion or participating disproportionately, let others participate. Alternatively, if you haven't said much, you are encouraged to participate more.
- Please use **respectful and socially inclusive language.**

How to succeed and get a good grade in the class: The number of lecture hours in this class are not enough to cover all parts of the syllabus in detail. Hence reading assignments and home works are provided. A good portion of success in this class depends on coming class to prepared, actively participating during the class and completing home works as assigned.

- Please communicate with me on time if you have any questions so that we can work together for the success.
- Read the textbook ACTIVELY. Active reading means reading the book with a pen and paper nearby. You should try to re-derive equations as you go and be critical of your understanding of how the book gets from point A to point B. Note any questions that you have so you can ask them during lectures, via email, or during office hours.
- In the class, participate actively and respond to all the clicker questions so you can earn your quiz/participation credit.
- Follow the class rules and behavior etiquette while in the class.
- Complete all the assignments on time.

- Take advantage of all the help you can get, you will need it: Tutorial center, Instructor office hours, Lab TAs help etc.

Your Feedback/Suggestions on the course: You are encouraged to provide feedback on any aspect of the course all through the semester using any communication method you prefer. Your **grades will not be impacted by any feedback** you provide, they will be purely based on your coursework and lab work. However, your discretion in these matters is expected. You will also have an opportunity to give feedback at the end of the semester through the Course Evaluation System. Your feedback is critical in improving the course. Each year I take the information provided in feedback seriously so please take the time to fill out the feedback forms in a thoughtful manner.

Students with disabilities:

If you need course adaptations or accommodations because of a documented disability, please contact the Student Disability Services (SDS). This will ensure that you are properly registered for the services provided by ODS. *University Policy forbids me from making special accommodations without a letter from the Office of Student Disability Services.*

Disability Services Contact Information:

2227 Dunford Hall

Knoxville, TN 37996-4020

Phone: (865) 974-6087

Fax: (865) 974-9552

Email: sds@utk.edu

Website https://sds.utk.edu/

***For additional important information (Academic integrity, civility statement, UT alerts, COVID-19 procedures, …) please see the Campus Syllabus* (Click here to download the Campus Syllabus).**