Fall 2024 UNIVERSITY OF MARYLAND, College Park Prof. B. L. Hu
Physics 161 **General Physics: Mechanics and particle dynamics** Sec 201-204

Description: This course is the first semester of a three-semester sequence for engineering and physical sciences majors. Topics are listed in Contents and Schedule on p. 3.
Prerequisites: A good high school physics course, MATH140, MATH141 (can be concurrently enrolled) You are expected to know algebraic manipulations, trigonometric rules, differentiation and integration.

Lectures: Tu Th 11am-12:15pm in PHY 1410
Lecturer: Prof. B. L. Hu Office: PSC3153. Instead of leaving me a message in ELMS or calling my office number, 3014056029, write to me directly blhu@umd.edu you will get a much faster reply if there is a real need. Please note the rough division of duties: contact me if you have questions about the course organization, contents of my lectures, especially conceptual issues or any personal issues which need my special attention. Contact your TA for matters concerning discussion session, homework problems, grading of exams. Contact your graders and/or your TA for the grading of quizzes.
Any important hard copy documents you need my signature please do so before or after class. Do not hang anything on, or slip it under, my office door, it may easily get lost. You can contact our Maryland Center for Fundamental Physics Faculty Assistant: _____in PSC 3140 Phone 301-405-6016 ___@umd.edu and notify me by email. [to be announced]
Office hours: Tuedays and Thursdays after classes, I can stay on in the lecture hall to entertain any questions you may have. To make individual appointments please email me well ahead of time.

Teaching Assistants, Discussion Session Times & Locations

Section	Time	Room	TA Name	Email	Office	Phone
201	Th 800-850	PHY 1204	Zapata, Christopher	chriszap@umd.edu		
202	Tu 1400-1450	PHY 1204	Zapata, Christopher	chriszap@umd.edu		
203	W 1500-1550	PHY 1219	Kubina, Caitlin	ckubina@terpmail.umd.edu		
204	M 1600-1650	PHY 1402	Saha, Soumadeep	ssaha125@umd.edu		

Graders of your quizzes, whom you can also consult for problem solving:
Jacob Leonard jacobleonard1026@gmail.com
Abhinav Narayana Reddy abhitech@terpmail.umd.edu

Textbooks: Required: Openstax, open access (free) https://assets.openstax.org/oscms-prodcms/media/documents/UniversityPhysicsVol1-WEB.pdf?_gl=1*oozda0*_ga*MjkwNDU4MTY2LjE3MTI4OTU3NTk.*_ga_T746F8B0QC*MTcxMjkwNzI1Ny4yLjEuMTcxMjkwNzI1OS41OC4wLjA.
Errata https://assets.openstax.org/oscms-prodcms/media/documents/University_Physics_Volume_1_Errata_Release_Notes_2021.pdf?_gl=1*1tg6v7*_gcl_au*MTM1NDk4NzI5NC4xNzI0MTYwNDM0*_ga*MTEyODIzMzczMS4xNzI0MTYwNDM3*_ga_T746F8B0QC*MTcyNDM1MjEwNS40LjAuMTcyNDM1MjEwNS42MC4wLjA.

Recommended: Young and Freeman, *University Physics with Modern Physics, 15th ed* (Pearson 2020)
Douglas C. Giancoli, *Physics for Scientists and Engineers 5th ed* (Pearson 2022)

Reading: The approximate progression of subjects can be found in the Contents and Schedule for the planned topics of each lecture. The schedule may lag or advance by one lecture if some topics take up more or less time than expected. To enhance your comprehension of a particular subject to be covered, you *should try to read the material in the text before coming to the lecture*. This will enable you to ask questions about ideas you may not be able to grasp fully on the first reading and to gain a better overall perspective. Attend the lectures consistently, *take lecture notes yourself and study them closely.* Work out the examples in the book and review those worked out in the lectures, do the assigned problems. Keep this routine so you wouldn't fall behind. I encourage questions in class (to the extent time permitting) as they may enliven discussions and stimulate thoughts.

Course webpage: Please check for new announcements, adjustment of topics or due dates in the course website at ELMS/CANVAS system: www.elms.umd.edu/page/student-support where you will also be able to access your exam grades. For questions call the Help Desk at 301.405.1500 or email elms@umd.edu.

Lectures: My lectures will primarily be delivered with handwritings on the chalkboard. This is best for showing the reasonings and derivations. Slides will be used mainly for graphical illustrations. As I advised my students in all of my classes, *the value of attending a lecture is to allow yourself to be engaged in, immersed in, minute by minute, seeing and thinking through every tiny step of the reasonings and derivations, for both conceptual developments and technical renditions.* It is like an anatomy class, to see the actual inner workings in real time. If you skip the detailed procedures and just look at the end results, like taking a picture of the filled blackboard, or looking at my notes (that's why I prefer not to post my lecture notes) you will see little difference from what are nicely presented in a textbook: everything is sewed back and dressed up. To master a subject, you need to actively participate. Do attend the lectures!

Homework: We use the **online service *Expert TA*** for machine grading. ***Please register at*** https://theexpertta.com/physics/ Or, in ELMS you can click on HW1 under `Assignments'. You will then be taken there and prompted through the necessary steps to pay and register. A link has been set up so you can do your work in ELMS. The points you have earned in each problem set will also be recorded in ELMS. If you have difficulty navigating in Expert TA or ELMS, please ask your TA for help immediately.
[Below is written by Dr. Buehrle dbuehrle@umd.edu, who is very experienced in this matter]
There are several advantages to electronic homework submission:

1. You will know right away if your answer is right or wrong
2. If you give a wrong answer, you can go back and try again to see if you can get the correct solution. You will be allowed 5 attempts for each question, so don't waste them.
3. You are graded only on your final answers and get your score when you are done.
4. The site also has a tutorial capability that you may find helpful.

Note that the software may randomize the numbers each time you make a new attempt on a problem, so be careful and remember that other students working on exactly the same problems are likely to have different numbers. The best way to do physics problems is to first work out carefully a general analytical solution to the problem and then plug in the numbers at the end. This is especially true if the numbers are being randomized each time so everyone has different numbers.

Homework: 11 sets are planned, each set contains 5 problems, worth 15 points. The 10 best scored HWs count 150 points (out of a total 750 points) towards your course score. I encourage group discussions but stress strongly the importance of thinking through and working out all the assigned problems on your own. *Don't rely on others' help, don't copy from the web, or just passively read the solutions.* It makes a real difference in your grasp of the subject matter which shows clearly in your exam performance.

Quizzes and Discussions: A 20 minute quiz is given every week (except for the weeks which have an exam or with the thanksgiving holiday) in your discussion session, conducted by your TA. There are 11 quizzes, the lowest scored one will be dropped. The 10 best scored quizzes make up 150 points (out of a total of 750 points) towards your course score. The discussion sessions are important as they are devoted mainly to problem solving, as exam problems mostly are. Your TA will be asked to assign a score up to 30 points reflecting your participation. This number, though small compared to the total of 750 points, will make a difference should your total course score falls in the borderline region between two grades.

Mid-Term Exams: Two 75-minute closed book mid-term exams are scheduled on **Tuesday Oct 8 and Tuesday Nov 19 during the lecture periods**. Each exam is likely to contain one or more problems based on the assigned homework problems. Each exam counts 120 points out of a total of 750 points towards your course score. Please make all necessary preparations and arrangements to **ensure you can take these exams** because no make-up exams will be given. If you know in advance or if you unfortunately fall sick and absolutely cannot take an exam (excuses are only for certified medical, official university or legal duty-related reasons, as stipulated in the **University Rules**) please notify me with documentations ASAP.

Final Exam, held on **Friday Dec. 13, 1:30 -3:30pm**, is worth 180 points out of a total of 750 points of the course score. It is comprehensive. The same final exam is given for all sections of Phys. 161, which means

that the materials appearing in the final exam will be the common denominator of all sections. Chapters not taught in any section (for us here, Chapter 12 and 14) will not appear in the common final exam. University rule requires all students must take the final exam to receive a course grade, otherwise your course grade will be an F.

Exams are meant to test your understanding and ability to apply concepts covered in the course, not how well you can memorize the formulas or the course materials. You may bring one 4x6" formula card to each exam, totaling 3 for the final exam. The values of constants and useful integrals will be provided. Only a non-programmable calculator with standard trigonometry function is allowed, no smart phones, I-Pads etc. **Academic dishonesty is a serious violation** and will be dealt with strictly, according to **University Policy**.

Course Grade: Your total course score has 750 points maximum. It is made up in the composition of 150 points for homework, 150 for quizzes, 30 points for discussions, 120 points for each of the two mid-term exams, and 180 points from your final exam scores. Your course grade will be "curved" but where to set the mean grade will depend on the overall class performance. Doing your best will boost up the collective.

PHYSICS 161 Fall 2024 CONTENTS and SCHEDULE Prof. B. L. Hu

Lectures: **Week**/Dates	**Readings:** Chapters in *OpenStax, University Physics Vol 1*	**Topics:**	**Homework #** Due Tuesdays
1 8/27,29	Chap **1** (please read on your own)	Chap **2** Vectors	**#1** Ch **2** 9/4
2. 9/3,5	Chap **3**	Inertial Motion in One Dimension	**#2** Ch **3** 9/11
3 9/10,12	Chap **4**	Motion in 2 & 3 Dimensions	**#3** Ch **4** 9/18
4 9/17,19	Chap **5**	Newton's Laws of Motion	**#4** Ch **5** 9/25
5 9/24,26	Chap **6**	Applications. Friction. Centripedal Force	**#5** Ch **6** 10/2
6 10/1,3	Chap **7**	Work and Kinetic Energy	**#6** Ch **7** 10/16
7	**Oct 8 (Tuesday)**	**Exam 1 (Chapters 2-6)**	
10/10	Chap **8**	Potential Energy and Conservation of Energy	
8 10/15,17	Chap **8**	continued	**#7** Ch **8** 10/23
9 10/22,24	Chap **9**	Linear Momentum and Collisions	**#8** Ch **9** 10/30
10 10/29,31	Chap **10**	Fixed Axis Rotation	**#9** Ch **10** 11/6
11 11/5,7	Chap **11**	Angular Momentum	**#10** Ch **11** 11/13
12 11/12 *Review* 11/14	Chap **13**	Gravitation	
13	**Nov 19 (Tuesday)**	**Exam 2** (**Chapters 7-11**)	

11/ 21 Chap **13** Gravitation **#11** Ch **13** 12/4

14 11/26 Chap **15** Simple Harmonic Motion

Nov 28 *Wishing you a warm Thanksgiving!*

15 12/3, 5 Chap **15** continued *Review*

Friday, December 13 @ 1:30pm - 3:30pm Final Exam (Comprehensive)

*** *Happy Holidays*! ***