

# Physics 121 – Fundamentals of Physics II

## Spring 2020

Sections	Lecture Hours
<b>401-402-403-405-SEF1</b>	M 7:00pm - 8:50pm W 7:00pm - 7:50pm PHY 1410

Lecturer: **Dr. Heidarian**

Email: **nheidari@umd.edu**

Office: 3109 John S. Toll Physics Building

TEL: 301.405.6088

- **Office Hours:** Mondays 5-6 pm, Wednesdays 3-4 pm. Any other day/time only by appointment. Please read the syllabus carefully and if you have any questions regarding the course, send me an email and make sure you include your course number and section number in your email. Any question regarding the Lab should be directed to your Lab TA.
- **Recommended Textbook:** “College Physics: A Strategic Approach” by Knight, Jones and Field, published by Addison-Wesley / Pearson. This textbook is recommended for the course. You can also use other editions of the book or any other General Physics book you can find in the library.
- **Website:** The class schedule and any class related activity (grades, assignments etc.) will be posted on ELMS. <http://elms.umd.edu>
- It is your responsibility to check ELMS, and all announcements, due dates, exam dates carefully. Also, please don't forget that showing up in class is part of your commitment when you sign up for the course and your presence in class is expected. I will randomly check your presence in class and more than three unexcused absences will be reported to the university.

## Course Description:

PHYS 121 is the first of a two-semester series in general physics. This course, together with PHYS 122, generally satisfies the minimum requirement of medical and dental schools. Below is an overview of the main topics we will discuss in class:

<p>Motion</p> <ul style="list-style-type: none"><li>• <b>Motion is One dimension</b></li><li>• <b>Vectors, Motion in two Dimension</b></li><li>• <b>Forces, Laws of Motion</b></li><li>• <b>Circular, Rotational motion</b></li></ul> <p>Momentum, Energy, Work</p> <ul style="list-style-type: none"><li>• <b>Momentum</b></li><li>• <b>Energy and Work</b></li></ul>	<ul style="list-style-type: none"><li>• Thermal Properties of Matters</li><li>• Fluids</li></ul>
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## ESSENTIAL INFORMATION ABOUT THE COURSE

### PLEASE READ CAREFULLY!

#### Lectures

- Students are required to attend lectures, where the course material will be presented. Selected practice problems will be discussed in class without prior announcement. **Your presence makes a difference!**
  - If you miss a class, make sure you get the notes from others.
  - Please note that we cover many topics during the semester, therefore, there is not enough time to work on many example problems in class. Make sure you solve as many problems as possible and ask your TA for help. Problem solving is the only way you can learn these concepts. Always show up in your discussion classes with your questions!
- Note that NOT all material will be directly covered in lectures. The combination of all activities during Lecture hours, Labs, and discussion sessions will help you learn the concepts. **Remember, you can Not learn physics by reading the textbook only. Physics is Problem Solving!** You will learn the concepts through practicing and working on problems. I will upload practice problems on ELMS with a key before the exams. The complete solution to practice problems will Not be provided. I usually discuss some of them in class. Working in groups and making sure you can solve as many practice problems as possible is highly recommended.

## Labs

- Laboratory work will be carried out with the assistance of the **Expert TA** software, whose website is (<https://theexpertta.com/>). This website is how you will access your lab manual and additional assignments. You can purchase access directly from the Expert Ta web site instead of through the bookstore for an additional fee. The table below displays the class codes that you will use to purchase access to your section of the lab. In order to purchase your code, you should visit

<https://login.theexpertta.com/registration/classregistration.aspx>

at which point you will be prompted to enter a class code. When you enter your class code, you will be prompted to register and pay. **(If you encountered any errors, try to enter the code manually).**

Section	Class Registration URL
0401	<a href="http://goeta.link/USH22MD-80DF56-1Y5">http://goeta.link/USH22MD-80DF56-1Y5</a>
0402	<a href="http://goeta.link/USH22MD-E7C395-1Y4">http://goeta.link/USH22MD-E7C395-1Y4</a>
0403	<a href="http://goeta.link/USH22MD-509601-1Y3">http://goeta.link/USH22MD-509601-1Y3</a>
0405	<a href="http://goeta.link/USH22MD-30EA94-1Y2">http://goeta.link/USH22MD-30EA94-1Y2</a>
SEF1	<a href="http://goeta.link/USH22MD-6B0F12-1Y1">http://goeta.link/USH22MD-6B0F12-1Y1</a>

- Students are required to complete a total of **10** laboratory assignments.
- Each week you will do the designated laboratory exercise, coordinated by your Teaching Assistant, and complete the assigned experiment.
- You should read the lab description beforehand. **For each lab, you must submit to ELMS complete lab report and answers to the questions before the due date.**
- **Please check the guidelines and ask your TA as how to prepare your lab report to avoid missing points.**
- **Late lab reports will not be accepted unless there is a valid excuse and it is communicated beforehand.**
- Your lab grade will be based on your presence and lab report. The TA will deduct points if your handwriting is illegible, or if your answer is hard to understand.
- If you cannot attend a session for an excusable reason, you may attend another section given the same week **with the permission of the Instructor**. Or you may attend a scheduled makeup session. In general, it will only be possible to perform a single experiment during the makeup session.
- **Lab reports** are due one week after the day the experiment is done.
- Submission of lab reports is through ELMS.
- The format expected for the lab reports is the one given in the TOC and Introduction part of the lab manual.
- **Pre-lab** questions are also going to have the same due date as the lab reports.
- Students only need to answer the questions on the ExpertTA website.

	<ul style="list-style-type: none"> <li>• Pre-lab questions for each experiment will have <b>4 points</b> out of the total 20 points of that experiment.</li> <li>• Students are not required to submit pre-lab questions for the first 2 experiments.</li> </ul>
<h2>Discussions</h2>	<ul style="list-style-type: none"> <li>• Discussion sessions are a great place to clear any confusions about the material and ask questions about the homework problems.</li> <li>• <b>You will have a quiz during your discussion class (%10 of total grade).</b></li> <li>• Your presence makes all the difference. Please show up and ask questions! This is your chance to make sure you understand the concept and that you can solve a problem with the formula you have learned in the lecture!</li> <li>• These discussions sessions will be conducted by Teaching Assistants, where problems will be worked with student participation.</li> <li>• It is TAs responsibility to know what has been taught in the class.</li> </ul>
<h2>Homework</h2>	<ul style="list-style-type: none"> <li>• Homework will be carried out with the assistance of the <b>Expert TA</b> software. Please notice that Expert TA for Homework is separate from Expert TA for labs and you need to purchase both in order to complete your HW and your lab work.</li> <li>• Homework problems from the textbook will be assigned throughout the term. More information on how you need to submit your work will be announced soon. (we will be using either Expert TA or the old-fashioned paper homework!)</li> <li>• <b>Turning in late homework is not allowed under any circumstances.</b></li> <li>• It is <b>your</b> responsibility to check the deadline frequently to make sure you do not miss due dates.</li> <li>• Homework will be %20 of your total grade.</li> </ul>
<h2>Quiz</h2>	<ul style="list-style-type: none"> <li>• During the discussion session, every week you will be given an open book, open notes quiz based on the topics discussed in class.</li> <li>• The TA will decide whether they want to take the quiz in the beginning or at the end of the discussion session.</li> <li>• <b>TAs</b> will write the quiz problem on the board.</li> <li>• During midterm/exam weeks, there will be no quiz.</li> </ul>
<h2>Exams</h2>	<ul style="list-style-type: none"> <li>• There will be <b>three</b> mid-term exams and <b>one</b> final exam. All exams are closed book.</li> <li>• Midterm exams are 55 minutes long. There will be no lecture after the exam.</li> <li>• You will need a regular calculator with standard trigonometry functions.</li> <li>• The exam sheets will contain any numerical constants that you will need.</li> <li>• You can bring <b>ONE</b> 8x11in paper formula sheet (No Problem Solutions allowed!).</li> </ul>

- For midterms only **one side** of the sheet is allowed
- For the final exam you can use **both sides** of the sheet.
- You are **required** to bring a formula sheet and turn it with your exam paper! Make a copy of your formula sheet for your record as it may not be returned to you.
- **Write your name and section on your formula sheets.**
- **Formula sheet should not have any examples, drawings, interpretation or explanation. These will be considered as cheating. (See the example below)**
- You can label the parameters.
- Exams must be taken on the scheduled dates. Unless it is discussed otherwise.
- There will be **NO make-up for Midterms.**
- The lowest of three scores in the midterm exams will be dropped so **if you miss a midterm, that will automatically be your lowest midterm.**
- There will be an extra credit question on each exam.
- For the final exam, make-up exams will be given only under extraordinary circumstances if arrangements are made with the instructor ahead of time.
- **Exams will cover the material discussed in the class, lecture notes, problems solved in class, HW problems, and problems done during the discussion sessions.**
- A problem set will be uploaded before each exam for practice.
- **The following is an example of what is and is not allowed on the formula sheet.**

acceleration

$F = ma$

Force                      mass

Allowed on the formula sheet  
(Equations with Labels)

✓

Ramps

If we now **include friction**, Newton's 2nd law gives:

$$\Sigma F_{//} = P - mg \sin(\theta) - F_f = ma_{//}$$

$$\Sigma F_{\perp} = F_c - mg \cos(\theta) = ma_{\perp} = 0$$

NOT allowed on the formula sheet  
(Free body diagrams, solutions to specific problems etc.)

✗

## Course Grade break-down

- The final grade will be based on the components below.

Homework	% 20
Quiz	% 10
Lab	% 20

<b>Mid-term exams</b>	<b>% 30 (%15 each)</b>
<b>Final exam</b>	<b>% 20</b>

- **Best two out of three midterms will be used for the final grade.**
- **There will be no makeup exams.**
- **Each midterm and the final exam will have multiple choice and comprehensive questions.**
- You can have one formula sheet that you will attach to the exam at the end.
- You can have a calculator (**you cannot use anybody else's calculator. Please be prepared and check your calculators before the exam**). You will get most credits even if you don't calculate the final number as long as:
  - you reduce the numbers to a simplified ratio and all the powers are reduced to single power.
  - You simplify the units to correct and general units used for the final quantity of interest.
- The final grade will be set at the end of the semester after all work is completed.
- The final grade will be determined by the University of Maryland grading policy, quoted below:
  - A excellent mastery of the subject and outstanding scholarship.
  - B good mastery of the subject and good scholarship.
  - C acceptable mastery of the subject and the usual achievement expected.
  - D borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree.

## Grading Scheme

A+	100 %	to 98.0%
A	< 98.0	to 95.0%
A-	< 95.0	to 90.0%
B+	< 90.0	to 88.0%
B	< 88.0	to 85.0%
B-	< 85.0 %	to 80.0%
C+	< 80.0 %	to 78.0%
C	<78.0 %	to 75.0%
C-	< 75.0 %	70.0%
D+	<70.0 %	to 68.0%

**Please note, there will be NO extra points/activities available beyond the extra credit questions on each exam so plan ahead. If you are struggling with the**

	<p><b>material, reach out before it's too late. The last day of classes is NOT a good time to reach out and ask for help!</b></p>
<p><b>Tutoring and Help</b></p>	<ul style="list-style-type: none"> <li>• You have access to various resources including my office hours, your TAs for the course, discussion sessions, and Tutoring in the department.</li> <li>• Your instructor and TA have office hours, both scheduled and by appointment, and are happy to help you outside of class.</li> <li>• We are here to help you learn, so please don't hesitate to reach out and make sure you understand the course material before it's too late.</li> <li>• The Physics Department has a free tutoring service, at The Slawsky Clinic, which is located in Room 1214 in the Physics building.</li> <li>• You can get help at any time they are open, from 10 am until 3 pm, M-F. More information can be found at:</li> </ul> <p><a href="http://umdp.physics.umd.edu/academics/tutoring-a-academic-support/93-slawskyclinic.html">http://umdp.physics.umd.edu/academics/tutoring-a-academic-support/93-slawskyclinic.html</a></p>
<p><b>Course Evaluation</b></p>	<ul style="list-style-type: none"> <li>• Your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community.</li> <li>• Your feedback is confidential and important to the improvement of teaching and learning at the University.</li> <li>• You can go to the CourseEvalUM website (<a href="https://courseevalum.umd.edu/">https://courseevalum.umd.edu/</a>) to evaluate the course.</li> </ul>
<p><b>Weather and emergency closures</b></p>	<ul style="list-style-type: none"> <li>• In the event of a University Closure the department will do its best to accommodate students by scheduling make-up sessions.</li> </ul>
<p><b>Students with disabilities</b></p>	<p>Students with disabilities should meet with the instructor at the beginning of the semester so that appropriate arrangements can be made to accommodate the student's needs. Accommodations will be provided to enable students with documented disabilities to participate fully in the course. Students who are registered with DSS, and who are planning to take examinations at DSS facilities, are required to let me have the pertinent authorization forms in editable electronic format at least one week prior to each exam date.</p>

## Academic Integrity

- You must work by **yourself** on exams.
- You must work on the homework by **yourself**.
- Discussions with other students are strongly encouraged. But you should **not** just directly copy from anyone. Doing so is not only dishonest but will hurt your ability to do the problems on the exams.

## Course Related Policies

### **Know Your Rights** **Know the University of Maryland Policies for Undergraduate Students**

For more information please visit this webpage:

<http://www.ugst.umd.edu/courserelatedpolicies.html>

## Discussion and lab schedules: Check Testudo

Section	Teaching Assistant	Time and Place	email
<b>Discussion 401</b>	Yancey, Colin	W 2000-2050 Check Testudo	<a href="mailto:cyance18@umd.edu">cyance18@umd.edu</a>
<b>Lab 401</b>	Yancey, Colin	M 1700-1850 Check Testudo	
<b>Discussion 402</b>	Sanderson, Joshua	M 2100-2150 Check Testudo	<a href="mailto:jdsander@terpmail.umd.edu">jdsander@terpmail.umd.edu</a>
<b>Lab 402</b>	Sanderson, Joshua	W 2000-2150 Check Testudo	
<b>Discussion 403</b>	Dev, Abhish	W 1600-1650 Check Testudo	<a href="mailto:adev@umd.edu">adev@umd.edu</a>
<b>Lab 403</b>	Dr.Heidarian	Check Testudo	nheidari@umd.edu
<b>Discussion 405</b>	Minker, Katherine	Th 1700-1750 Check Testudo	<a href="mailto:kminker@umd.edu">kminker@umd.edu</a>
<b>Lab 405</b>	Minker, Katherine	Th 1800-1950 Check Testudo	



## Lecture/Exam Schedule

The content of the mid-term exams may change depending on how the course develops and based on the need of the students

Week Beginning	Chapters covered during the week
Jan 27	Chapter 1 Representing Motion
Feb 3	Chapters 2 Motion in One Dimension
Feb 10	Chapters 3 Vectors and Motions in Two Dimensions
Feb 17	Chapter 4 Forces and Newton's Laws of Motion
<b>Midterm 1, Wednesday Feb 19th</b>	<b>Chapters 1-2-3-4</b>
Feb 24	Chapter 5 Applying Newton's Laws
March 2	Chapter 6 Circular Motion, Orbits, Gravity
March 9	Chapter 7 Rotational Motion
<b>SPRING BREAK- No Classes</b>	<b>March 15th-22<sup>nd</sup> (Sunday-Sunday)</b>
March 23	Chapter 8 Equilibrium and Elasticity
March 30	Chapter 8 Equilibrium and Elasticity
<b>Midterm 2, Wednesday April 1st</b>	<b>Chapters 5-6-7-8</b>
April 6	Chapter 9 Momentum
April 13	Chapter 10 Energy and Work
April 20	Chapter 11 Using Energy
April 27	Chapter 12 Thermal Properties of Matter
<b>Midterm 3, Wednesday April 29th</b>	Chapters 9-10-11-12
May 4	Chapter 13 Fluids- Review
May 11	Review
<b>Final Exam – May 14-20 (Thursday-Wednesday)</b>	TBA-Please check Testudo

# Physics 121 Labs, Spring 2020

Monday - Thursday

Instructors: Negar Heidarian Boroujeni ([nheidari@umd.edu](mailto:nheidari@umd.edu)) &  
Wendell Hill ([wth@umd.edu](mailto:wth@umd.edu))

Week	Week of	Expt #	Experiment Name
1	Jan 27	--	1st Week of Classes – No Labs
2	Feb 3	1	Introduction to Data Analysis Using Excel
3	Feb 10	2	Measurement and Uncertainty
4	Feb 17	3	Motion with Constant Velocity (Air Track)
5	Feb 24	4	Motion with Constant Acceleration (Air Track)
6	Mar 2	5	Projectile Motion
7	Mar 9	(1 – 5)	Make-Up Week (Expts 1-5 only)
8	Mar 16	--	Spring Break– No Labs
9	Mar 23	6	Forces and Equilibrium
10	Mar 30	7	Centripetal Acceleration
11	Apr 6	8	Conservation of Linear Momentum (Air Table)
12	Apr 13	9	Conservation of Energy (Air Track)
13	Apr 20	10	Ideal Gas Law and Absolute Zero
14	Apr 27	(6 - 10)	Make-Up Week (Expts 6-10 only)

<b>15</b>	<b>May 4</b>	--	<b>No Labs This Week, <i>unless there was an unexpected University closure</i></b>
<b>16</b>	<b>May 11</b>	--	<b>No Labs This Week</b>
<b>16</b>	<b>May 12</b>	--	<b>Last Day of Classes</b>
<b>16</b>	<b>May 13</b>	--	<b>Reading Day</b>
<b>16, 17</b>	<b>May 14-20</b>	--	<b>Final Exams</b>
<b>17</b>	<b>May 21</b>	--	<b>Main Commencement Ceremony</b>