**PHYS 121 Fundamentals of Physics I**

**Fall 2018**

**Mon-Wed- Fri 12:00pm - 12:50 pm**

**Instructor: Dr. Barbara Marchetti**

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Office Hours: By Appointment

**Course description**

The main aim of this course is to provide students with the understanding of the fundamental principles that govern physical systems and their interaction with the environment. Topics will include Motion, force and Newton’s laws of motion, circular motion, rotational motion, equilibrium and elasticity, momentum, energy and work and thermal properties of the matter.

There will be a **discussion session** and a **lab session** each week, except at the beginning of the semester. The discussion session is designed to help you explore and solidify the physics principles and their consequences, collaborating with your classmates and TA. The lab sessions present you with rather open-ended investigations that you must plan, carry out, evaluate and explain in teams. You must attend the specific discussion and lab sessions for the course section you registered for. If you miss your normal day for a valid reason (such as illness), contact your TA right away. At the end of the semester there will be an opportunity to make up *one* lab session if you missed one for a valid reason during the semester.

**Website**

http://elms.umd.edu

The class schedule and every class related activity (grades, assignments etc will be posted on ELMS).

Scores on all of your assignments will be recorded on ELMS soon after grading is complete.

* Notes from class will be the reference material for the course
* The textbook suggested for this course is “College Physics: A Strategic Approach” by Knight, Jones and Field, published by Addison-Wesley / Pearson. Third edition. PHYS 121 will cover material corresponding to the first 13 chapters.
* Students must attend lectures, where the course material will be presented, and homework assignments and exams will be announced and collected.
* The questions in the exams will be from the example made in class.

**Laboratory**

* Students are required to complete a total of **10 l**aboratory 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 through ELMS complete lab report and answers to the questions before the due date**
* Your lab grade will be based on these questions. The TA will deduct points if 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 and both TA’s**. Or you attend a scheduled makeup session. In general, it will only be possible to perform a single experiment during the makeup session.

Laboratory work will be carried out with the assistance of the **Expert TA software**, whose website is (theexpertta.com). This website is how you will access your lab manual and additional assignments. 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://www.theexpertta.com/registration/, 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.

Pre-lab questions are due before students come into lab. For pre-labs students only need to answer the questions on TheExpertTA website.

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| **Physics 121 Labs, Fall 2018****Mon, Tue, Wed, Thu****Instructors: Barbara Marchetti & Kishan Yerubandi kishany@umd.edu** |
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| **Week** | **Week of** | **Expt #** | **Experiment Name** |
|  |  |  |  |
| **1** | **Aug 27** | **~** | **1st Week of Classes – No Labs** |
| **2** | **\*Sep 3** | **~** | **2nd Week of Classes – No Labs** |
|  |  |  |  |
| **3** | **Sep 10** | **1** | **Introduction to Data Analysis Using Excel** |
| **4** | **Sep 17** | **2** | **Measurement and Uncertainty** |
| **5** | **Sep 24** | **3** | **Motion with Constant Velocity (Air Track)** |
| **6** | **Oct 1** | **4** | **Motion with Constant Acceleration (Air Track)** |
| **7** | **Oct 8** | **5** | **Forces and Equilibrium** |
|  |  |  |  |
| **8** | **Oct 15** | **1 - 5** | **Make-Up Week (Expts 1 - 5 only)** |
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| **9** | **Oct 22** | **6** | **Centripetal Acceleration** |
| **10** | **Oct 29** | **7** | **Equilibrium of Extended Objects** |
| **11** | **Nov 5** | **8** | **Conservation of Linear Momentum (Air Table)** |
| **12** | **Nov 12** | **9** | **Conservation of Energy (Air Track)** |
| **13** | **Nov 19** | **~** | **Thanksgiving Week – No Labs** |
| **14** | **Nov 26** | **10** | **Ideal Gas Law and Absolute Zero**  |
|  |  |  |  |
| **15** | **Dec 3** | **6 – 10** | **Make-Up Week (Expts 6-10 only)** |
|  |  |  |  |
| **16** | **Dec 10** | **- -** | **Last Day of Classes** |
| **16** | **Dec 11** | **- -** | **Reading Day** |
| **16, 17** | **Dec 12 - 18** | **- -** | **Final Exams** |
| **17** | **Dec 18** | **- -** | **Main Commencement Ceremony** |
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**Course TA’s and Lab assistants**

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**Discussion sessions**

Discussion sessions are a great place to clear any confusions about the material and questions about the homework problems.

During each session, we will solve and discuss problems.
These discussions sessions will be conducted by Teaching Assistants and where problems will be worked with student participation.

It is TAs responsibility to know what has been taught in the class.

**Homework**

* Homework will be posted on ELMS.
* Several problems will be assigned almost every week.
* Solution to these problems will be provided at the SAME time.
* Since the solutions are provided, you don't have to submit the HW. Instead you will be quizzed on every HW assignment.

**HW Quiz**

**During the discussion sections,** a one-problem quiz is taken during the session after the due date of each HW set. The quiz problem will be a problem very similar to one of problems in the corresponding HW set.

**TAs.** will write the quiz problem on the board.
**Students** are not allowed formula sheets but they can ask which formula they want and TA will provide it to the student.

• There will be three mid-term exams and **one** final exam. All exams are closed book

• You will need a regular calculator with standard trigonometry functions.
• You can bring your one 8x11in paper formula sheet.

* for midterms only one side of the sheet is allowed
* for the final exam you can use both sides of the sheet.
* No work problems are allowed

• Exams must be taken on the scheduled dates:

o There will be NO make-up for Midterms
o 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 so class, HW problems, and problems done during the discussion sessions.**

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| **Exam** | **Question** | **Points** |
| **Mid term I Monday Sept. 24** | **6** | **100 + 20** |
| **Mid term II Monday Oct. 29** | **6** | **100 + 20** |
| **Mid term III Monday Nov. 19** | **6** | **100 + 20** |
| **Final to be defined** | **9** | **120 + 40** |

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

**Course grade break-down:**

20% Homework
20% Labs
30% Midterm exams (10% each of three)

30% Final exam

The final grade will be set at the end of the semester after all work is completed. In assigning the final grade, I will be following the University of Maryland’s grading policy, quoted below:

* A denotes excellent mastery of the subject and outstanding scholarship. (90-100)
* B denotes good mastery of the subject and good scholarship. (80-89)
* C denotes acceptable mastery of the subject and the usual achievement expected. (70-79)
* D denotes borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree. (60-69)
* F denotes failure to understand the subject and unsatisfactory performance. ( < 60 )

**EXAM PREPARATION**

**Exams will cover the material discussed in the class, lecture notes, problems solved in class, HW problems, and problems done during the discussion sessions.**

Problem Solving Tips:

* Take your time to read, understand and visualize the problem.
* Make a sketch of the problem.
* Write down explicitly all the information given in the question statement and anything else you know from your general knowledge. (for example, you know the acceleration of freely falling body.)
* Write what is being asked to calculate.
* Now see what formula would be best for this problem
* Always carry your units along to avoid mistakes.
* Make sure the final units and numbers makes sense.
* Practice all HW problems and all the examples we have done in the class. Exam questions will be very similar to these problems.

For the midterms and the final exam just make sure that you understand all the problems we do in class, in the homework, and during the discussion sections.

If you understand these problems and know (not memorize) how to solve them, you will have no problem with the exam.

Each midterm will be 6 problems, worth 120 points (20 points is extra credit).

you can have one formula sheet that you will attach to the exam at the end you can’t have problem solved sheet.

You can have a calculator but you will get full credit even if you don't calculate the final number as long as:

1. you reduce the numbers to a simplified ratio and all the powers are reduced to single power.

2. you simplify the units to correct and general units used for the final quantity of interest.

**University Closure**

In the event of a University Closure the department will do its best to accommodate students by scheduling make-up sessions.

**Students with disabilities**

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.

**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.