PHYSICS 100 Exploring the Physical World Summer 2021

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Course Description:
The primary goal of this course is to learn about the natural world through studying the foundational principles of chemistry and physics. The topics studied are appropriate for persons of all backgrounds and experience. In addition to exposure to basic scientific principles in a real-world context, students will gain experience with the scientific process and problem-solving skills. Students will learn through reading the text and lecture slides, discussions, problem solving, and hands-on investigations. This course counts as both 'N' and 'Q' common curriculum credit.

Objectives: By the end of the course, students will be able to:

- Understand and use chemistry and physics terms to describe the world around them
- Apply foundational equations to explain chemistry and physics principles
- Solve real-world math problems using dimensional analysis (i.e., converting units), translating word problems into algebraic equations, and solving algebraic equations
- Represent data using graphs, including using graphing software such as Excel or Google Sheets
- Work in groups to problem solve and follow instructions to collect and analyze data in hands-on activities

Materials:

- Text: *EXPLORING THE PHYSICAL WORLD: INTRODUCTORY CHEMISTRY AND PHYSICS* by N.Gergel-Hackett. This is a free open-access text available: https://viva.pressbooks.pub/exploringthephysicalworld/ . If you would like to print a copy, the text is also available as a pdf.
- Scientific calculator with capabilities such as this model: scientific calculator on Amazon. Or, a *scientific calculator* phone app
- An additional list of materials required for completing the hands-on investigations (with links to suppliers) is included in the instructions for your first assignment. The estimated cost of these materials is around $50 total, depending what you have at home and where you purchase them.
- Access to a computer with internet, access to camera (e.g., phone camera) or scanner if you don't have a camera/phone that will take readable photos of hand-written work for submission
- Access to a Google account (free) to use Google Docs, Sheets, and Slides

Honor Code:
Mary Baldwin follows an honor code that all MBU students pledge to uphold and that you will be expected to adhere to in class. You can find the honor code and a link to file infraction reports here: **https://go.marybaldwin.edu/student/sga/honorcode/ .** Please always ask me if you are ever unsure about how the honor code applies to individual assignments.

Learning Accommodations:
If you believe that you may have circumstances that require course accommodations, please contact the disability services coordinator at Mary Baldwin University, Carey Usher (cusher@marybaldwin.edu). The coordinator will provide additional information regarding documentation requirements and the process for establishing course accommodations.

Student Accessibility Services:
The Academic Resource Center (ARC) is your one-stop-shop for the Writing Center, the Math Lab, and peer mentoring and tutoring (we can usually arrange for a physics tutor). The center is located in the Center for

Student Success on the first floor of Grafton Library. For more information or to schedule tutoring please visit **https://marybaldwin.edu/academic-resource-center**.

Course Structure:

Weekly Reading:
The reading assignment for each week is listed in the tentative schedule at the end of this syllabus.

Weekly Lecture Notes with video tutorials:
Courses assignments and materials are organized by week. Each week contains at least one set of slides summarizing the material and providing additional details and examples. These slides are the lecture notes for the course. Each week, you should first read the weekly reading assignment (listed in the table at the end of this syllabus) and then read through the lecture slides. Throughout the lecture slides are example problems. When you get to an example problem in the slides, please work the problem completely on paper prior to clicking to the following slide (which shows the answer for the problem worked out). Practicing problems through these examples is key to understanding the material, so please work each one carefully. The slides also have video tutorials linked throughout. These tutorials show me working through example problems, so please also watch all video tutorials. If you are having problems working an example, watch the video tutorial and try again (and then contact me if you still have questions).

Weekly Assignments:
Weekly assignments including their instructions are posted for each week. These assignments include: homework problems that are to be answered by hand carefully showing all work and submitted to Canvas in pdf format, hands-on investigations with results to be written out showing all work with photographs of setups as described in the instructions and submitted to Canvas in pdf format, and online quizzes/problems. Note that there will also be prompted discussions and tests, which are not included in the weekly assignment grade. All work that is to be written out (vs. an online quiz or discussion) *must* be combined into *one* pdf and uploaded to Canvas for submission (instructions for this will be provided).

All regular weekly assignments are due by 11:59 pm on the Monday following the week they are assigned (except for the assignment for the week of July 4th, which has its deadline extended until 11:59 pm on the following Monday, July 12th). No credit will be given for any late assignments unless there is an emergency.*

The keys to success on the assignments are to: start early in the week of when each homework set is due, allocate approximately 3-5 hrs every week for each week's assignments, work hard individually first on each assignment, seek help from other students and Prof G, and look over all of the comments and corrections on graded work shortly after it is posted to make sure you understand your errors.

Discussion Boards:
By clicking on the discussion linked on Canvas students can access the various discussion threads for the course. Participation in discussions will be required as "Discussion" is part of your final grade. See the table "Phys 100 Tentative Spring Schedule" below for the due dates for class discussions.

Tests: Test questions will be taken from what is covered in the lecture notes, discussions, and investigations, and will be similar in style to homework questions. Tests will be open notes, open book, and open internet (no interpersonal communication allowed!). All test questions that are not multiple choice are to be answered by hand carefully showing all work and submitted to Canvas in pdf format **No credit will be given for missed or late tests and there will be no makeup tests given without a substantiated medical or serious family emergency.**

End of Semester Project:

There will be a class project that is due the last day of class. The project consists of choosing a concept that was covered in the course (either physics or chemistry) and then describing a real-world application that exemplifies the physics/chemistry concept. The student will turn in a Powerpoint or Google Slides presentation explaining the concept from class and how it is relevant to the chosen real-world application (see instructions for more details).

Course Tips:
Keys for doing well in the course include: keep up with all material as we go, make sure that you understand all steps to all problems solved in class and in the homework as we go, review all class notes and investigations from the relevant topics prior to the test, and make sure that all definitions, relationships, procedures, and concepts that I have identified as important in the notes for the relevant topics are in your head by the day of the test.

Assessment: You can view your grade for each assignment on Canvas. Your overall grade will be determined according to the following:

Weekly Assignments*	30 points (2 pnts. ea. hand-written HW, 1 pnt ea. online HW, 6 points for the final project)	30 %	93-100 A	73-76 C
			90 – 92 A-	70-72 C-
3 Tests	30 points (10 pnts. ea. test)	30%	87 – 89 B+	67 – 69 D+
			83 – 86 B	63 – 66 D
Final Exam	20 points	20%		
Discussion	20 points (5 pnts. ea.)	20%	80 -82 B-	60 -62 D-
			77 – 79 C+	Below 60 F

* Because I expect everyone to deal with minor illness and/or other schedule conflicts at some point in the semester, at the end of the semester I will drop your one lowest weekly assignment score (note that this is worth 3 points and does not include tests, discussions, or project!). Because of the above policy, I will not be lenient about any late or missing assignments without a substantiated medical emergency or serious family emergency. But remember, if you turn in all assignments you can still drop your lowest grade, so try to plan on submitting them all

On the following page is the tentative course schedule. Please note that this schedule is tentative and students should expect changes. Those changes will be communicated to the class in a clear and timely manner. It is the responsibility of students to be aware of any changes and to adjust accordingly.

Assignments:

Week #	Topic/Reading/Slides	Assignments(due following Mon)*
Week 1 May 17-23	**Science as a Way of Knowing, Measurements** Read: (1) Text Chapter 1, (2) Intro Slides, (3) Main Slides	(1) Written HW #1, (2)Online HW #1, (3)Discussion: Preconceived notions about chemistry and/or physics
Week 2 May 24-30	**The Atom and Elements** Read (1) Text Chapter 2, (2) Week 2 slides	(1) Written HW #2 including a Hands-on investigation: How Tall is Bigfoot?, (2) Investigation Quiz #2
Week 3 May 31-June 6	**Atoms in Combination: The Chemical Bond** Read: (1) Text Chapter 3, (2) Week 3 slides	(1) Written HW #3 including a Hands-on investigation: Making a Model of an Atom, (2)Online HW #3
Week 4 June 7-13	**Test Week: Work on your tests.**	Take test #1 (covers weeks 1-3).
Week 5 Jun 14-20	**Material Properties, Chemical Reactions, Energy, and Heat** Read: (1) Text Chapter 4, (2) Week 5 slides	(1) Written HW #5, (2)Online HW #5, (3)Discussion: Chemical Reactions
Week 6 June 21-27	**Conservation of Energy and Conservation of Mass** Read: (1) Text Chapter 5, (2) Week 6 slides	(1) Written HW #6 including a Hands-on investigation: Glueball Chemistry, (2)Online HW #6

Week 7 June 28- July 4th	**Test Week: Work on your tests.**	Take test #2 (covers weeks 4-6) Because of the 4th of July, you may have until July 12th to turn this in (along with your next HW which is also due that day)
Week 8 July 5th- July 11th	**Physics! Conservation of mechanical energy** Read:(1) Text Chapter 6, (2) Week 8 slides	(1) Written HW #8, (2)Online HW #8, (3)Discussion: Conservation of mechanical energy
Week 9 July 12th- July 18	**Linear Motion** Read: (1) Text Chapter 7, (2) Week 9 slides	(1) Written HW #9 including a Hands-on investigation: Conservation of Mechanical Energy, (2)Investigation Quiz
Week 10 July 19- July 25	**Force, Work, and Simple Machines** Read: (1) Text Chapter 8, (2) Week 10 slides	No written HW or Hands-on investigation/discussion this week. Just: Online HW #10
Week 11 July 26- Aug 1	**Test Week: Work on your tests.**	Take test #3 (covers weeks 7-10)
Week 12 Aug 2-8	**Waves and electromagnetic radiation** Read: (1) Text Chapter 9 , (2) Week 12 Slides	(1) Written HW #12, (2)Discussion: Electromagnetic Radiation

Week 13 Aug 9-15	No reading. Work on Projects: Applications of Physical Science	Projects: Applications of Physical Science
Week 14 Aug 16-20	Comprehensive final exam - both (a) online multiple choice, and (b) written part. Both are due Friday, Aug 20th by 11:59 pm!	

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