

Syllabus for College Physics II (PHY 203 – Section 203 – CRN 4402) - Spring 2021

Synchronous Lecture Times – (MWF: 3 - 3:50 pm)

Lectures, Office Hours, Herd Hours, Quizzes, Exams - ALL Use Zoom: <https://marshall.zoom.us/j/5808759031>

***** You must use the full name listed in Blackboard when logging on to Zoom, if you can, login 5-10 minutes early *****

Course Description: This is a 3-credit hour, lecture format, introductory physics course that requires the use of algebra, trigonometry, and vectors to solve real world problems and is required to be completed in one semester. This is a Virtual Course (VC) for spring 2021, no portion of this class will ever meet face-to-face. This course will mostly focus on Electricity and Magnetism and the interaction between these two phenomena called Electromagnetism. This course will serve as an introduction to Electronic Circuits, Geometric and Physical Optics, and Radiation & Nuclear Physics (this is the second half of a 2-part introductory series). From the 2020-2021 course catalog: PHY 203 is the “Second half of an introduction to physics for students natural (life) sciences, using algebra and vectors by triangles; E&M fields, circuits; ray optics; interference; atoms; nuclei.” No extra credit will be available for this class and there will be no dropped grades of any kind, everything counts. It is expected that you have a high school level background in algebra and trigonometry or geometry. The Physics Department is in the School of Physical Sciences within the College of Science.

Department Required Textbook: “College Physics: a strategic approach” by Pearson, 4th Ed., by Knight, Jones, and Field.

Check the below link for available formats for the above textbook: e-Text, paperback, hardcover, loose-leaf versions, etc. <https://www.pearson.com/store/p/college-physics-a-strategic-approach/P100000279782>. The format of the textbook will **NOT** matter for this course. MasteringPhysics will **NOT** be used in any capacity for this course, do **NOT** purchase MasteringPhysics for this course. The above book contains all the necessary physics topics that will parallel this course lectures. A schedule of the course lectures and topics is provided at the end of this syllabus with the corresponding chapters and sections **based on the above departmental required textbook**. That being said, any introductory algebra-based physics textbook will also likely have all the same exact topics, the physics does not change depending upon the book, so any algebra-based introductory physics textbook will likely suffice for this course. Lecture notes and homework are **NOT** specifically tied to a particular textbook. You will however be required to use the notation learned from the lecture notes for all homework, quizzes, and exams. A suggested **FREE** online textbook is found at: <https://openstax.org/details/college-physics>. If a student chooses to use any textbook other than the Department Required Textbook, the student is responsible for reading the correct sections of their chosen textbook that parallels the class lectures for the required readings.

Pre-requisite: PHY 201 - College Physics I.
PHY 202 - General Physics 1 Laboratory.

Co-requisite Courses: PHY 204 - General Physics 2 Laboratory.

Course Instructor Info: Dr. Sean P. McBride, Science Building 152/152A, (304)-696-2758/8852, mcbrides@marshall.edu
Virtual Office Hours: (M 11-12 pm, W 9-10 am & F 11-3 pm)
- The above times will be when I am logged on/checking Zoom, F 11-3 pm is ‘HERD Hours’
- Normally, I have an open-door policy for office hours as well, this will be replaced by students emailing me questions at any point they have questions.
Teaching Homepage: <http://www.science.marshall.edu/mcbrides/teaching/>
Research Homepage: <http://science.marshall.edu/mcbrides/>

Objectives: All material covered in this course is geared toward students pursuing a degree in natural (life) sciences. Specifically, for the Pre-Med and health science-oriented students, this course is aimed at showing you the basics of physical phenomena that you will later encounter in your entrance exams (MCATS etc.) and potentially use later on in your careers depending upon your specialty. We will just scratch the surface of some topics; however, entire courses may be taken later on to study some these phenomena in greater detail. For example, studying charges (the same ones that are in living cells), eye glasses and contact lenses (for solving complex eye abnormalities), and how radiation works and effects the human body, are all limited to several chapters; you may however spend entire semester long courses devoted to studying these individual topics in greater detail during your medical/health-oriented career. More specifically, this course for all students is designed to provide you with a basic understanding of: Electric Charge, Electric Forces and Fields, Magnetics, Magnetic Fields and Forces, Electric Potential, gain familiarity with Capacitors and Resistors, Electric Current, Resistance, Ohm’s Law, Series and Parallel Circuits, Inductors, how basic Motors work, basic understanding of Mirrors and Lenses, Microscopes, Telescopes, the Human Eye, Radioactivity, Nuclear Fission and Fusion, Radiation and its relevance to the human body; these are all key aspects of science that form some of the fundamental foundations of the physical world that surrounds us every day.

This is a very organized class. Under normal conditions, it is recommended that you get at least a 2-inch binder and a hole punch to keep all your materials for this class organized to study from. Under COVID19 conditions, with many of the materials now in MU Online and in electronic form, keep all your graded materials electronically organized to study from.

Learning Outcomes: In the process of learning the fundamentals of physics in this course as described, **the overarching goal**, independent of your major, is to help hone your critical thinking, analysis, problem solving, and quantitative reasoning skills. In order to accomplish this goal successfully, you will be given **practice** via written homework problem sets that will be due via submission on Blackboard weekly. Your individual success in achieving this goal will be **assessed** by your individual performance on weekly online proctored quizzes (9 of them), 4 online proctored examinations, and 1 mandatory comprehensive online proctored Final Exam. Homework, in which group work is encouraged, is your time to practice and is not necessarily used for assessment to determine if you know and understand the material; however, your efforts will count towards your overall grade. This is a fast-paced course, ~ 12 chapters in 14 weeks; don't fall behind, if you do fall behind, seek help immediately, plenty of options for help exist, see below and my [Teaching Homepage](#) for useful links.

Webcam: A 1080p webcam with at least a 6ft cord and/or wireless connection is required for this class. A suggested one is the following: brand - Aoozi, model Number - BENEWY, ASIN- B088D1C9JL. The webcam is expected to be connected to a desktop or laptop computer that is capable of connecting to reliable internet. If you doubt your internet's reliability on quizzes and exam days, you are encouraged, but not required, to sign-up for the university's virtual learning hubs, which are located all across campus: <https://marshall.libcal.com/reserve/vhub>. An integrated webcam in a laptop or desktop will not work, an external webcam is required for testing. If a student has a scanner that will be visible within the testing environment to scan quizzes and exams at the end, and if their phone is able to livestream video in 1080p, then their phone can be use as the video feed and the webcam is not needed. See 'Exams' section for more information on the testing environment.

Help for This Course: *If you are starting to experience difficulties in this class, there exist many resources available for you to obtain additional help (see the following bulleted list). Resolve these difficulties quickly, before they snowball out of control (12 chapters in 14 weeks). If you are lost in weeks three or four it may be very difficult to recover, ask for help as soon as something is not understood in the early weeks of class. I am your number one resource for help, so please reach out as soon as possible.*

- I will have **six 'office' hours per week** (2 virtual hours devoted to 1-on-1 individual or group help on Zoom and 4 virtual hours devoted to 1-on-1 individual or special group help called '[HERD Hours](#)' on Zoom, see below) or we can make an appointment to meet on Zoom individually if these virtually office hours do not work for you. Or, you can simply email me questions at any time, and if I have additional time at that moment to help you, I will. I will eventually respond to your email as soon as I can, responses on the weekend may be delayed until Monday.
- You are all encouraged and welcome to logon to what I call '[HERD Hours](#)'. This semester, this will be a 'virtual' place where students can come individually or work on homework together in virtual groups, in a non-classroom and/or non-typical-professor-office-hour setting. At '[HERD Hours](#)', I will check in online to help you at any time if you get stuck, but what I really want to see is students helping fellow students, leading each other through peer instruction, and taking charge of the virtual meeting. Struggling, discussing, conquering the problems, and celebrating with your friends and peers is better than being frustrated by yourself and not making progress on the homework. I encourage you to work together on your written homework. When working in groups there are more people around the table with different skill sets and different approaches and ideas to attack the problems. Working together in groups often results in getting the homework done faster with a better understanding and is overall a more memorable experience than spending long frustrated isolated hours struggling on your own. Simply copying the homework from your peers during '[HERD Hours](#)' or from other unauthorized resources will be of no benefit to you as 85% of your grade will come from what you know on individual exams and quizzes. Attendance will be taken during '[HERD Hours](#)' for recording keeping purposes only, **not for extra credit**. Logon to Herd Hours here: <https://marshall.zoom.us/j/5808759031>. It is suggested you use your video during Herd Hours so your classmates and I can associate a name with a face.
- There **are free university tutors available for almost all intro level physics classes**. See current tutoring schedule available at: <http://www.marshall.edu/uc/tutoring-services/>. If you seek an individual virtual tutor, submit a "[Request a Tutor](#)" form (available at: <http://www.marshall.edu/uc/tutoring-services/>). If you have not heard from the tutoring office staff within one week of submitting your form, please call 304-696-6622 or email tutoring@marshall.edu. I also provide a list of "[Dr. SPM Approved Tutors](#)" on my Teaching Homepage that I will vouch for. As you can see, there are many avenues and options for help. Don't be afraid to get help early or to come see me for help early.

- **PhET Simulations:** Remember, physics is some hard stuff when seeing it for the first time. I will try to introduce demos into the lecture to help assist in conveying the concepts; however, PhET Simulations are also another good tool to see concepts in action. PhET Simulations (<https://phet.colorado.edu/en/simulations/category/physics/index>) are interactive self-contained apps that highlight or demonstrate a physical concept. Outside of class time, go online anytime and play with the parameters in these simulations and see how changing the variables changes the results. Many of these are very enlightening. To run the PhET Simulations use the latest version of Mozilla Firefox as your browser (<https://www.mozilla.org/en-US/firefox/new/>) combined with the latest version of Java and Adobe Flash Player software found at <http://java.com/en/> and <https://get.adobe.com/flashplayer/>, respectively. If you run into difficulties running the PhET simulations and you are using a Mac, please see [here](#) for detailed instructions. Visit <https://phet.colorado.edu/en/troubleshooting>, if you experience any problems or cannot open/run the PhET simulations.

Computer Requirements: Access to MU Online (Blackboard) and a @marshall.edu email are both required. You are expected to check both frequently. I use Blackboard to distribute lecture notes, supplementary material, class performance information, etc.; sign in at www.marshall.edu in the upper right corner using your unique MU username and password. I also send notices to your Marshall e-mail account and I use Notifications in Blackboard. All electronic course communication must be through your Marshall email account (not gmail, yahoo, etc.).

Physics Is Not Easy: Physics is a subject where **memorization techniques will NOT work**; this is why it is often perceived as a difficult subject by many. To be successful in this class, understand the individual concepts and how they relate to your favorite example; then be able to apply that concept to many other different problems and situations (the circumstances and required math for each problem may be different, but for each, the concept and approach leading to the answer is the same). The homework is time consuming and challenging, but that is rightfully why it makes up 15% of your grade. To do well in this class, you will have to spend 10-15 quality hours per week dedicated to this class. Your understanding of the material is proven by your individual quiz and exam performance. You must be able to demonstrate/understand the concepts from homework or else you will fail the quizzes. If you fail the homework and quizzes, you will fail the exams, and thus the course. If you do any of the homework, quiz, or exam problems incorrectly, it is your responsibility to learn how to do them correctly, solutions will be posted on Blackboard, and I am mostly always available if you need help.

Grading*:	Written Homework:	15%
	Weekly ~ 25-30 Minute Virtual Quizzes:	20%
	Virtual Exams (4 total, 12% each)	48%
	Mandatory Comprehensive Virtual Final Exam	17%

Determination of Final Grade*:	90% or above:	A
	80% or above:	B
	70% or above:	C
	60% or above:	D
	59.9% or lower:	F

* I reserve the right to adjust these percentages and letter grade cutoffs based on the overall class performance; thus, stay above the average grade of the class to ensure an above average grade in the class. Any potential curve for the class will be based on only the students that participate in all parts of the class. Typically, but not in all semesters, the top student has a final grade close to 100% and the average and/or median final course grades end up near 75%. If you are below the average grade, you will receive a below average grade. If you are an average student, you will receive an average letter grade. If you are an above average student, you will receive an above average letter grade. An average letter grade is a 'C'. Grade distributions will be given frequently in Blackboard so you now exactly where you stand at any point in the class relative to your peers. Previous class distributions are located on my [Teaching Homepage](#).

The 1-Week Rule: Any grading dispute or grading mistakes needs to be brought to my attention within one week of when the assignment made available to the entire class. After 1-week from this date, regardless if you did not check your graded assignment until later, grades are permanent. Any attempt to alter a previously graded assignment in any way, such as adding information to it, removing information from it, or simply altering the previously presented work for a better grade is considered academic dishonesty and will be treated as such.

Calculators: No programmable/graphing calculators are allowed during quizzes or exams (No TI-83 through TI-Nspire CX for example). Get a simple TI-30 or TI-35 for example (model numbers and brands may vary, but you get the idea). Don't buy it the night before the exam, or do all the homework with a TI-89 or a TI-Nspire CX, and then try to switch to a TI-35 for the exam, neither of these will go well for you, guaranteed (I have seen this situation unfold for students in face-to-face classes in the past). My best advice is to learn how to use your simple calculator early and stick with the same one for the homework, the quizzes, and exams. **Cell Phones are ONLY allowed to be used for (1) the 1080p video feed when a scanner is available and shown in your video feed and (2) at the end of the exam to take pictures of your work if a scanner is not available. Cell Phones must NOT be used for any other purpose during exams; therefore, calculator cell phone apps are NOT allowed.**

Lectures: Ideally, lectures will contain exciting demonstrations where possible that will illustrate the physical concepts being taught. During COVID, this will likely be prerecorded videos or live video demonstrations. Lectures will also provide you with the background to solve real world problems (mathematical machinery will be given through examples in the notes). Ideally, all the aforementioned topics will be covered. Some topics might have to be omitted due to unexpected and unforeseen circumstances that may arise throughout the semester. A very detailed tentative course schedule is found at the end of this syllabus with exam, quiz, dues dates for written homework, an up-to-date list of topics covered with required reading assignments, etc. Dates may change on this printed tentative course schedule; thus, see the most up to date syllabus on MU Online. Lectures will happen at the same time each week (MWF: 3-4 pm) - logon to Zoom for lectures by clicking the following link: <https://marshall.zoom.us/j/5808759031>. When you login, mute your mic until you have a question. For those not asking a question, please keep your microphones muted. Remember to mute your mic after you ask your question. **It is suggested you turn your video on during lectures, so your classmates and I can associate a name with a face.** On quiz and exams days your microphones and video feed should be turned on.

Required Reading and Purpose of Lectures: It is required that you read the sections of your textbook that are outlined in the tentative course schedule at the end of this syllabus. You should certainly read the corresponding sections prior to attempting the homework, quizzes, and exams. The lectures are geared toward the average student and primarily meant to (1) spark an interest in the subject, (2) highlight key and often difficult concepts, (3) show exciting demonstrations of the concepts discussed in the text where possible and if available, and (4) work through some examples to give you the mathematical machinery to solve problems. Textbooks often provide wonderful examples, use them. It is recommended that before/after lectures you download any additional notes from MU Online and review them before the next class. Always study your book, your homework, provided solutions, your lecture notes, my posted lecture notes (which may have more details than the ones presented in the lecture), your previous exams & quizzes, and always ask questions in lecture (just unmute your mic first)! I will not be checking the chat window in Zoom during the lecture (or looking for 'raised hands' in Zoom), simply unmute your mic and ask a question during lecture (I will try to make intervals where you can ask questions, but don't feel you cannot speak up if I seem to be rolling ahead with new material).

Attendance: A new MU policy requires, or will require, keeping attendance records for freshmen; thus, to be fair, all student attendance records for each lecture will be recorded (this is done automatically through Zoom). That being said, I view all university level students as adults, who can or must do adult things, such as drive a car, vote, pay taxes, and who can also be sentenced to jail as an adult. Thus, as adults, I expect you to be responsible and be logged on at all scheduled meeting times; however, you will not be docked points if you have an emergency and have to miss a lecture. Simply get the missed lecture material from MU Online and or discuss virtually with a friend. Keep in mind there is a strong correlation between lecture attendance and quiz/exam performance. All exams/quizzes/homework are mandatory and must be turned in via Blackboard on the provided dates and times. Homework is due before the start of lecture on Monday (see schedule at the end of this document, you must be logged on to Zoom with the proper video and audio feed to receive a copy of your exam or quiz). **Notify me immediately when you realize a conflict exists with (1) when homework is due, (2) an exam, or (3) a quiz, so we can come up with an alternative plan ahead of time (check the tentative exam schedule at the end of this document for exam times now, including the final exam schedule).** All students are responsible for all lecture and demo material that occurs in lecture. Frequent absentees will be reported to the Dean of the College of Science and Student Affairs. All students involved in any official Marshall University sports team or official group that travels (including accompanying Band Members of any kind) must provide a schedule of when regular season meets/events occur within the first 2 weeks of class. **If you know well in advance when you will miss, notify me immediately.**

Homework Extensions: Homework extensions are only given in very rare circumstances, requiring documentation and must be a qualifying event, likely lasting much of the week (see Emergencies Section regarding excused absences at the end of this syllabus). **Late homework for unexcused absences is not accepted.**

Homework: Written homework will be due every week in blackboard via submission folders at the same time each week, Monday at 3 pm, plan accordingly. New problems will be posted in Blackboard every Monday. Solution to previous homework will be provided. More points will be awarded for more difficult problems, total points per assignment may vary, but each assignment will have the same weight. You can upload pictures of your work in many formats to Blackboard; however, if I cannot read it, I cannot grade it, this will result in a zero, so make sure it is in focus and legible. It is recommended for homework, quizzes, and exams, to upload a single pdf for these with a systematic name like homework 1, exam 2, quiz 3, etc.; this makes studying these documents easier later (instead of uploading 10 files for one assignment). It is the student's responsibility immediately after each upload to double check to make sure the file has uploaded correctly and is indeed the correct file with all parts. If the university is closed on Monday due to a holiday, assignments will be due on Wednesday of that same week; since the class is in a 100% virtual format due dates will be unaffected by inclement weather conditions experienced by the University.

Written homework will consist of approximately 15-20 problem per week, always try it yourself first; however, you are all encouraged (but not required) to discuss it with your peers for help. A great place to do this is at '[HERD Hours](#)' where students are all encouraged to login individually and work together in online groups on homework in a non-classroom and/or non-typical-professor-office-hour setting. Logon and meet some new friends in the class, who knows you might find a study buddy for quizzes and exams for the rest of the semester. If you think the answer you got is correct and you are confident in your solution, try and explain it to your fellow students, use whiteboards, share screens, write it out, see what others think. Maybe they solved the problem a different way, arriving at a different answer, encouraging you to review and rethink how you solved the problem. Hopefully this encourages discussion of physics among you and your fellow students and builds your confidence in problem solving and improves your ability to explain your work to others. '[HERD Hours](#)' will be led by the students. I will log on periodically from 11-3 pm every Friday to assist those that need help. If I am not logged in, and you or your group needs help, simply email me (mcbrides@marshall.edu) so I can log back in and assist. Your peers (N~20-60+) significantly outnumber the number of the professors for this course (N = 1) and they may be more available than your professor to help you outside of normal class and office hours times. I encourage students to discuss homework with each other if you arrive at different answers. If you cannot get the required help from your peers during Herd Hours, or simply have a question, logon to Zoom during normal office hours, or email me anytime, and/or apply for a tutor. Logon here for Herd Hours: <https://marshall.zoom.us/j/5808759031>. Anywhere from 1 to 3 of the problems each week may be randomly chosen out of the total number of problems to be graded in detail for correctness and thoroughness of work. Show all work for all problems to receive the most points on written homework. A small percentage of points may be given for completing all other problems if time for extended grading permits. **Note:** I very much dislike the fact that you don't get all your homework problems graded, but it is impossible to grade all the problems for each student each week with little-to-no support staff. After solutions are posted, make sure you understand all the problems and solutions regardless of your grade on the assignment. Understanding the solutions and learning from your mistakes is the key to success in this class. It is suggested you use your video during '[HERD Hours](#)' so your classmates and I can associate a name with a face.

The purpose of these written problems is to make sure you can clearly write out your thought process for someone to follow, showing all the details of your work and how you arrived at your final answer (you need to do this for quizzes and exams, so setting up a problem correctly and completely maybe worth 90% of the available points for a problem). Homework is your time to practice showing all your work and how you can clearly explain to someone how you solve a problem. In general, the best way to receive the most points on your written solution are to briefly explain in a few words what quantity/variable you are solving for, in a few words explain how and what principles you are applying and show **ALL** the algebraic steps and logic leading to a final equation that just contains symbols/variable at first, no numbers. Only plug numbers and units into the final expression. Keep the correct units with all numbers and use appropriate significant figures and box your final answer. See also the document "**How to write-up my physics solutions on homework and exams?**" and the "**Example Student Homework Solution**" on MU Online to get the most points on your written homework and exams. Solutions to written homework, quizzes, and exams will be posted shortly after they are due (if not posted promptly, email me immediately). Also, keep in mind that acing the homework with a 100%, though homework is a significant portion of your grade (15% of the total grade), this will not be enough to allow you to pass the class if you do poorly on quizzes and exams (85% of the total grade); thus, it is not beneficial to copy the homework each week from your peers or unauthorized resources without understanding it. Independent of whether you work in virtual groups on your homework outside of lecture or work individually and never collaborate with your fellow classmates virtually, **your performance and your performance alone is the determining factor that will allow you to pass course (exams and quizzes total 85% of the overall class grade).**

I expect everyone to put the time and effort in on the homework and to do well on it (this is your grade padding), what will separate out the A, B, C, D, F, and W students will be individual exam/quiz performance. It is ill advised to continually ask your peers for help on the homework and then simply copy what they say or show you without understanding the concepts or the detailed math behind the problem; you might get some partial credit on the written homework, but this is a surefire way to

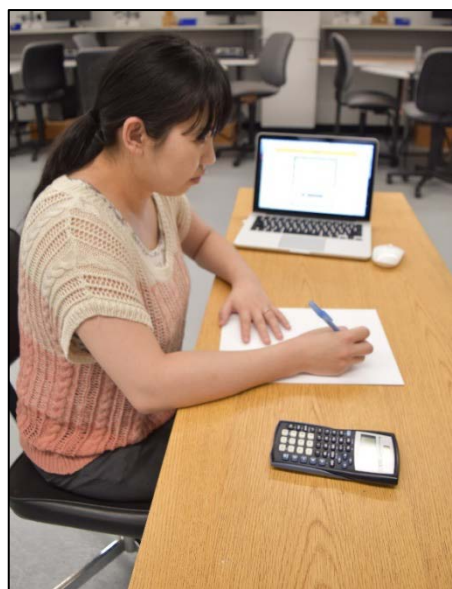
fail the quizzes and exams (85% of your total grade based on your knowledge on Quizzes and Exams). If you do not understand the concepts and math, continually ask questions to me or your peers until you understand the concepts and the math, this is how to pass the course. Do not try and answer all the problems on the homework sheet, these will not be graded, use separate sheets of paper (this will result in a 50% reduction of earned points for that assignment after you redo it; if your homework is returned more than two times for this, you will simply receive a zero for that homework).

Electronic Devices During Quizzes and Exams: All headphones, ear buds, air pods, pagers, I-pads, internet capable watches & other communication devices, etc., should be turned off/silenced and should not be used or present at any time during exam/quiz time; if out during an exam or quiz, you earn a zero for the exam or quiz and the proctoring video will be supplied to Academic Affairs. Cell Phones are to be used only for video feed collecting purposes during quizzes or exams if using a scanner to capture images of your work at the end. If a scanner is not available, cell phones may be used at the end of the exam to take pics so they can be uploaded to Blackboard, preferably as a single pdf, in this case a webcam is needed.

Required Live Video Feed: Quizzes and exams will be proctored live through the use of a live video/audio feed in Zoom, which will be monitored by several sets of human eyes during the quiz and exam times. **This live video and audio feed must be provided by you the student.** I will also record your audio and video feed from the instructor side and provide it to Academic Affairs as needed to resolve cases of academic dishonesty. **This required audio and video feed will be supplied by you in one of two ways:** (1) through an external 1080p webcam with a built in mic when logged on to Zoom, this is a simplest solution and the most common, simply set it up to show the required field of view for testing, (2) if you have a scanner that is visible in the video and will be used to scan your quizzes and exams instead of taking pics with your phone, you can also simply use your 1080p phone when logging into Zoom as the video feed, set up your phone at a far enough distance to show the required field of view for testing. Simply prop you phone up using whatever you need to capture your testing environment in the video (use a tripod, selfie stick, whatever is needed). **Make sure your phone video does not time out or go to sleep during the time period of the exam, if you cannot stop it from timing out, the webcam is still needed.** It is recommended that you only use your cell phone if you have an unlimited data plan and/or you know you will be on free wi-fi and not charged for any usage on your plan. The instructor for this course and Marshall University will not be held responsible for any charges incurred from using your cell phone in this set-up. This live video feed you provide must show your entire testing environment, **including your computer screen.** More details on what the video must show and how exams will be administered online is found under the **Exams** section of this syllabus.

If you have difficulties providing the means to provide this live video feed for quizzes and exams, please contact the IT Help Desk (for all university students). You can have a live chat with staff at the IT Help desk at <https://www.marshall.edu/it/departments/it-service-desk/>, or you can email them at: itservicedesk@marshall.edu, or you can call them at: [304-696-3200](tel:304-696-3200). As a secondary contact for help with providing a live video feed for quizzes and exams please contact Traci Curry curryt@marshall.edu (specifically for students in this class only). If you know you will have difficulty with the live video feed requirement before the semester starts, contact these resources as soon as possible. Note the live video feed has to be separate from the computer you will be using to view the quiz or exam, so an integrated webcam and mic on that same computer will NOT work as the entire testing environment in such a set-up cannot be seen. **Your video feed must stay on while you take pictures of your work and until your work is submitted. If the video feed dies before your work is submitted, you will earn a zero for the quiz or exam. Blackboard folders will disappear when the allotted time for assignments is over, so my suggestion is submitting your work early.**

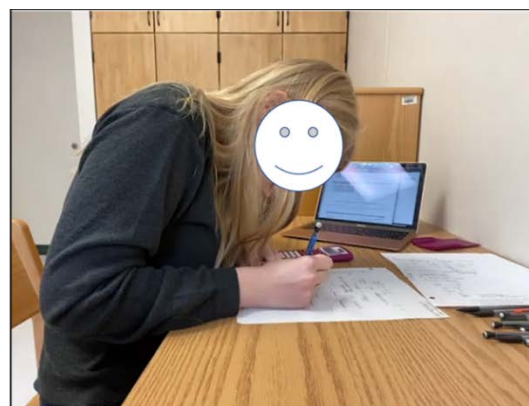
Exams: You must be in an area that has reliable internet on exam and quiz days. If you doubt your internet's reliability on quizzes and exam days, you are encouraged, but not required, to sign-up for the university's virtual learning hubs which are located all across campus: <https://marshall.libcal.com/reserve/vhub>. You will be required to logon to Zoom here <https://marshall.zoom.us/j/5808759031> with your video and audio feed on, showing your testing environment before being emailed your quiz or exam. Your testing environment must be the same one that is pre-approved prior to the first quiz on Wednesday January 27th. **Times when you can get your testing environment pre-approved will be W 9-10 am and F 11-3 pm during the first week of classes and M 11-12 pm, W 9-10 am, M 6-8 pm, and T 6-8 pm in the second week of classes.** Your testing environment must be like that shown in the image to the right for you to continue. You will only be emailed your quiz or exam once your work area and calculator are approved. Once approved you must maintain this work space during all future quizzes and exams. It is required that your hands remain visible at all



times to eliminate any suspicious activity. Your hands and body cannot be hidden under any blankets or baggy garments. Your video and audio must be on at all times. You are to remain seated and silent at your testing session for the entire duration of the quiz or exam. If you have a question raise your hand, once I acknowledge your question, you can type your question in the chat in Zoom then I will respond to your question in the chat. **If you get up and leave for any reason, your quiz or exam will be counted as a zero. Make sure you have scratch paper, your calculator, and have made a restroom break before the exam starts.** Only University excused absences count for exam make ups (see [Emergencies/Unexpectedly Missed an Exam or Unable to Turn in Homework section](#)). Make-up exams will be completely different exams and will be proctored the same way as the original exam. As it is often hard to ensure the same level of difficulty for make-up exams as original exams, students are strongly encouraged to participate in the original scheduled exam to ensure an as fair as possible experience. Make-up exams will not be returned, but can be reviewed during virtual appointments on Zoom. Make up exams will be completed only after the rest of the class completes the exams, not before.

It is recommended that for those that can, please log on early (10 minutes) on Quiz and Exam days so your testing area can be quickly re-examined in advance of the start time. I understand that some will have class beforehand and this is not possible; however, if everyone logs on at 10 am, your testing time will likely be cut short and receiving your exam will be delayed. Your testing area must be free of clutter and only contain writing utensils, paper, a non-graphing calculator, possibly a scanner, and the laptop/computer that you will use to open the quiz or exam from email. The video feed must capture your computer screen. If the computer is used during the exam for any purpose other than opening and scrolling through the Quiz or Exam and Equation Sheet, your grade will be an automatic zero. Once you have completed your exam, you must put your writing utensil down and then start scanning your work or taking pictures of your work to upload. It is recommended that any pics you take be combined into a single document prior to submission on Blackboard. If you do not have access to a scanner, you may take pics with your phone. Once this process of scanning or taking pictures starts, you may not write anything down on your exam. The video feed must stay on during the scanning process and pic taking process until your exam is uploaded to Blackboard. **If the video feed dies before your work is collected and turned in, you will earn a zero for the quiz or exam. Blackboard submission folders will disappear when the allotted time for assignments is over, so my suggestion is submit your work early.** Quizzes and Exams for everyone will be due at the same time regardless of what time you get sent your exam (again, logon early if possible). Logging on early does not mean you get your exam early; it simply ensures you can start on time. Below are two more examples of correct testing environments from previous semesters:

The exams are individual, closed-book, closed-note, and an equation sheet will be provided at the end of the pdf exam. All graded materials require the name that matches your course enrollment, no nicknames. Put your name on your work. There are 4 in-class exams during the semester, plus a final exam (all mandatory). Any exam conflicts need to be brought to



my attention at least 2 weeks before each exam (check the tentative schedule at the end of this document now for all exam dates, if you have known conflicts, report them early, check the final exam schedule as well). The final exam will be 'cumulative'. That being said, a lot of the discussed topics in the class will rely on the previous learned material; thus, it is best to treat **all material in this class as cumulative** in the sense that new material on exams can use concepts from the previous material (for example on the second exam, which focuses on Chapters 5-7, you most certainly will need to remember concepts from exam 1, which covers Chapters 1-4 and then some). I want you all to do well on the exams, thus I will volunteer myself on the Tuesday night before each regular exam and the Sunday before the final exam for a non-required review session (6-8pm on Zoom, this is your time to ask questions, not for me to re-lecture; if no one has questions, reviews will be most likely be very short, come with specific or general questions). Exams will typically contain a mix of longer written problems (3-5) similar (but not identical) to homework problems, lecture material, and/or lecture demos, and there will also be some conceptual problems (15-25). The conceptual questions could be a mix of multiple-choice, true & false format, fill in the blank, and/or require a small amount of written work/calculations, the (3-5) longer written problems, where indicated, will require you to show ALL your work for full and partial credit. Written problems will make up 60% of the exam score and the conceptual section will make up 40% of the exam score. **Late Exams will receive a zero, submit to blackboard early, Bb times out and the submission folder disappears when time is up.**

Remember, physics is some tough stuff. Regardless of the number that represents the course average, you always want to stay above this average course grade relative to your peers to achieve an above average grade in the class. Grade example: before the Final Exam is included, if you're getting 90% of all the homework correct and getting a 50% on the in-class exams and quizzes, you are only pulling a 61% for the course. The average for the course maybe a 75%, which means you are doing well below average relative to your peers, seek immediate help to get ahead of the class average with the aim to earn an above average grade. See "**How to write-up my physics solutions on homework and exams?**" or the "**Example Student Homework Solution**" on MU Online to get the most points on the written homework. An attempt will be made to post class averages, medians, and distribution plots before and after each exam to let you know exactly how you are doing relative to the rest of the class. See typical grade distributions from previous classes on my [Teaching Homepage](#).

Quizzes: The same rules for Exams apply to all Quizzes. You must be in an area that has reliable internet on quiz and exam days, which will occur every Wednesday starting the second Wednesday of class on January 27th. You will be required to logon to Zoom here <https://marshall.zoom.us/j/5808759031> with your video and audio feed on, showing your testing environment before being emailed your quiz or exam. If you doubt your internet's reliability on quizzes and exam days, you are encouraged, but not required, to sign-up for the university's virtual learning hubs which are located all across campus: <https://marshall.libcal.com/reserve/vhub>. Your testing environment must be pre-approved prior to the first quiz. **Times when you can get your testing environment pre-approved will be W 9-10 am and F 11-3 pm during the first week of classes and M 11-12 pm, W 9-10 am, M 6-8 pm, and T 6-8 pm in the second week of classes.** The first quiz in the second week will be a quiz on the syllabus (this document) and the first week's material. Normally quizzes will last no more than **12 minutes** and will be given first thing every Wednesday on non-exam days, logon early if possible. So, there is either a quiz or an exam every Wednesday. All quizzes are designed to test your understanding of the previous week's homework problems and concepts discussed in lecture up until that point (see schedule at the end of this syllabus). The quizzes may contain a mix of multiple-choice, true & false, require a small amount of written work/calculations, or to do a homework like problem in full detail showing all steps. Be prepared.

The Final Exam: Your Final Exam is Monday April 26th from 3-5 pm. If you miss the final exam, you fail the course. Your final **IS** comprehensive, mandatory, and makes up 17% of your final grade in the course. A summary of all the course topics is provided at the end of this syllabus. If a final exam conflict exists with the scheduled final exam time, follow the steps outlined on the Marshall University Spring 2021 Exam Schedule available at: <https://www.marshall.edu/registrar/exam-schedules/>. If the two-hour time allowance results in a conflict in exam times, it is the student's responsibility to notify the professor of the later course and to reschedule the later exam. Rescheduled exams must be concluded by Friday, April 30, at 6:00 p.m. Depending on the semester, the 1-week rule may not apply for the final exam simply due to lack of time between when you take the final exam and when final grades are due (so if there are questions on final exam grading, ask them during or before the end of final exam week, grades are due the following Tuesday). There will be a Final Exam review Sunday April 25th from 6-8pm on Zoom. Your final exam will be collected the same as a regular exam via submission folders in Blackboard. **Late Exams will receive a zero, submit to Bb early, Bb times out & the submission folder disappears when time is up.**

Campus Services: There are many [Campus Services & Resources](#) that you or someone you know throughout your college career may find useful or desperately need at some point. The above link provides contact information for the Counseling Center (304-696-3111) and Health Services, Services for Students in Financial Need, Tutoring Services, and a wide variety of other services and resources (there are many services within each of these categories - check them out now so you know what is available to students). Chances are a version of this syllabus will always be posted on my Teaching Homepage if you ever need this information, even after the class is over.

Emergencies/Unexpectedly Missed an Exam or Unable to Turn in Homework: Unexpected emergencies & accidents happen. Make email/phone contact with me as soon as possible; you must give your reason for missing the exam, homework, or quiz in the email/message. After homework solutions are posted, homework assignments cannot be made up. A missed exam, with no prior email/message & no legitimate supporting documentation before or immediately after an exam, counts as a zero and cannot be made up (same goes for quizzes and homework). **Makeup exams will be given after the missed event only in very rare circumstances, which require official legitimate documentation.** The Provost, Sr. VP, and/or Dean of Student Affairs determines what is defined as an "excused absence"- a qualified event for missing exams/quizzes and unexpectedly not being able to turn in homework on the provided due date. Examples include: extreme personal emergencies (house fires, serious crimes, and grave emergencies), university-sponsored activities, medical circumstances, death or critical illness of an immediate family member, short-term military obligations, jury duty, subpoenas for court appearance, etc. If an exam, quiz, or homework is missed, and one of the above is the reason, I will need immediate legitimate official documentation to verify the event in order to schedule a make-up exam/assignment, complete the following form: <https://www.marshall.edu/student-affairs/excused-absence-form/>. **Any missed assignments due to poor internet connectivity must also complete the form so that the situation can be investigated and documented.**

Statement Defining Expectations for Student Conduct: I will expect everyone in all portions of this class, including, but not limited to virtual lecture, exam times, quiz times, [‘HERD Hours’](#), and office hours to act in a professional and courteous manner. Students are expected to conduct themselves in a manner that creates a productive learning environment for all members of the class. To this end, disruptive, abusive, or offensive behavior directed at anyone involved in the class will not be tolerated, and offenders may be asked to leave the virtual classroom and forfeit any associated grades for that day. Disruptive behavior is any behavior that interferes with the normal conduct of lecture/quizzes/exams or behavior that inhibits a productive learning environment (this includes sleeping in lecture and using any non-approved electronic device). If you are experiencing, disruptive, abusive, or offensive behavior directed towards you from others in the class (this includes when working together in homework groups outside of class if desired and practicing social distancing), please make me aware of the problem as soon as possible. In addition to acting professional and courteous in class, I only respond to emails that are written with professionalism and courtesy.

University Policies: By having the privilege of being enrolled in higher education and thus this course, you agree to all the University Policies and codes listed below. It is the student’s responsibility to read the full text of each policy and code by going to <http://www.marshall.edu/academic-affairs/> and clicking on “Marshall University Policies” or, you can access the policies directly by going to <http://www.marshall.edu/academic-affairs/policies/>. The individual policies and codes are: Academic Dishonesty Policy, Academic Dismissal Policy, Academic Forgiveness Policy, Academic Probation and Suspension Policy, Affirmative Action Policy, Dead Week Policy, D/F Repeat Rule, Excused Absence Policy for Undergraduates, Inclement Weather Policy, Sexual Harassment Policy, Students with Disabilities (Policies and Procedures), University Computing Services Acceptable Use Policy, and the Code of Student Rights and Responsibilities - also referred to as the Student Code of Conduct (http://www.marshall.edu/student-conduct/files/2300_Student_Conduct.pdf).

Authorized vs Unauthorized Aid in Academic Work: In this course, you are permitted to talk with other students about your written homework problems and even encouraged to work together in groups on the homework during [‘HERD Hours’](#), but you may not copy solutions verbatim from each other or answers verbatim from any other source. You must work the problems out for yourself and understand them. **Remember, 85% of your final grade is based on how you, and only you, can answer questions on the individual exams and quizzes (Exams, 65% and individual quizzes, 20%).** Copying something and not understanding it does you no good now or later. If you have any questions about what constitutes authorized vs. unauthorized aid, contact me immediately. If you copied all your homework and understood nothing, but ace the homework with 100%, congratulations, you have a 15% as your total grade, certainly an ‘F’.

Statement Regarding Students Requiring Special Accommodations & Students with Disabilities: For University policies and the procedures for obtaining services, please go to MU Academic Affairs website (<http://www.marshall.edu/academic-affairs/policies/>) and see information under “Students with Disabilities”. In order to receive any academic accommodations, you must meet with the Coordinator of the [Office of Disability Services](#) (students are required to provide official documentation of the disability). For help with setting up accommodations, contact the Office of Disability Services (ODS) in Prichard Hall 117 (304-696-2467). For more information, access the website for the Office of Disabled Student Services: <http://www.marshall.edu/disabled>. If no official documentation from the Office of Disabilities Services is given to the instructor, no accommodations can be made by the instructor. Paperwork must come from the office of disabilities, not the student. Trying to get the process for accommodations started the week before an exam will likely not work out for you, more time is needed. Again, before any type of accommodations can be given by instructors, the instructor must receive official documentation from the Office of Disabilities Services; therefore, take care of this the first week of classes (this is true for the H.E.L.P Center and the WV Autism Training Center as well).

Statement for Copyright Notification: Copyright (2021) - Dr. Sean P. McBride, as to this syllabus and all lecture material. During this course, students are prohibited from selling notes to or being paid for taking notes by any person or commercial firm without the expressed written permission of the professor teaching this course. *“All materials used in this class (in any form, electronic, printed, or verbal), including, but not limited to, exams, quizzes, handouts, lectures, homework assignments, and all material on the university’s learning management system (currently Blackboard) and its peripherals, are copyright protected works under US Code Title 17. (1) Unauthorized copying, distribution, recording, selling, or posting of any portion of class materials, in any form, in any way, is a violation of federal law; this specifically includes posting any portion of the class materials to the World Wide Web through the Internet, and/or via any other means of electronic communication. (2) Unauthorized sharing of class materials in any form, specifically including, but not limited to, uploading class materials to websites for the purpose of seeking/providing solutions or sharing those materials with current or future students is a violation of the Academic Dishonesty Policy set forth in Marshall University’s Student Code of Conduct. ‘Unauthorized’ means without explicit permission from the instructor. Violation of (1) or (2) will result in all necessary disciplinary actions taken against the student.”* ~ Marshall University Copyright Statement, updated fall 2016.

Technology and Technical Skill Requirements:

- Students must be proficient in the use of computers, web cams, the Internet, browsers, possibly the ability to use a scanner, possibly the ability to take pictures with their phone or a digital camera, covering pictures from their phone into a single pdf, and other common applications.
- For computer and browser requirements for Blackboard, see “Get Connected” and “Internet Browser” at [Student Resources: First Steps](#). See also [IT: Recommended Hardware](#) (<https://www.marshall.edu/design-center/students/> and <http://www.marshall.edu/it/recommendations/>).
- To check your browsers, use the [Blackboard Browser Checker](#) and ensure that you set permissions properly and have all the necessary plug-ins:
(https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support/Browser_Checker)
- Students must be able to use Marshall email and check it regularly, as well as the basic tools in Blackboard, including the Notification option. Links to Blackboard Help and tutorials are available on the Start Here page and on the Tech Support tab in Blackboard. Blackboard recommends Google Chrome browser or Mozilla Firefox browser.
- This course requires a video feed and microphone and the use Zoom. You can download Zoom here: <https://zoom.us/>
- [Adobe Acrobat Reader](#) may be needed to read some files. This plug-in is available free (<https://get.adobe.com/reader/>). See the Tech Support tab in Blackboard for additional information and links.
- The Microsoft Office suite (Office 365) is available at no extra charge to students enrolled at MU. For information visit [Marshall IT: Office 365](#) (<http://www.marshall.edu/it/office365/>).
- See the Tech Support tab in Blackboard for additional information on browsers, technology, and apps.

Technology Assistance

If you have technical problems, please contact one or more of the following:

- [Blackboard Support](#) (www.marshall.edu/design-center/support-ticket/)
- Marshall [Information Technology \(IT\) Service Desk](#) (Help Desk) (<http://www.marshall.edu/it/departments/it-service-desk/>)
 - Huntington: (304) 696-3200
 - [Email the IT Service Desk](mailto:itservicedesk@marshall.edu) (itservicedesk@marshall.edu) or start a chat with a staff member in the browser. The chat will be saved and emailed to you for your records.

Academic Calendar: For beginning, ending, and add/drop dates, and other important semester dates, see the [Marshall University Academic Calendar](#) (<http://www.marshall.edu/academic-calendar/>).

Reminder of COVID-19 Related Information for All Students When on Campus or in F2F Classes

- All students must wear face coverings during class and in all academic buildings, hallways, stairwells, lobbies. Students who arrive in class without a face covering will be asked to leave the classroom. Report those that are not mask complaint: https://marshall-advocate.symplicity.com/public_report/index.php/pid371824. Remember, faculty must wear masks too, but if they are behind the Plexiglas shield when teaching, they can remove their mask to lecture.
- All students must abide by engineered social distancing protocols (one-way entrances/exits, one-way stairwells, etc.).
- All students will pick up a sanitizing wipe (which will be provided) and sanitize their workstations upon entering the classroom.
- All faculty office hours will be held virtually by appointment unless special face-to-face hours are approved by the department chair at the mutual agreement between faculty and students.
- For the safety of all class members, please DO NOT share physical/tangible course materials, share files virtually/electronically if needed.
- Please wash your hands with soap and water and/or use hand sanitizer regularly.
- Seating will be configured to maintain appropriate social distancing. Assigned seating can be helpful in maintaining social distancing and conducting contact tracing if necessary. Follow assigned seating for Spring 2021 when implemented by your instructor.
- Marshall University students must log onto [MarshallU Healthcheck](#)[®] and complete a brief COVID-19 health assessment. This tool — which requires students to monitor and input their body temperature and symptoms — is intended to help Marshall beat COVID-19 and offer students a safe campus. Students who are showing signs of illness are asked to stay home. This brief task is to be completed daily for any student who has face-to-face classes, lives in the residence halls, or plans to be on campus for other reasons. Completing the [MarshallU Healthcheck](#)[®] daily is a requirement for students, with University Conduct sanctions for students who do not comply.

The most recent information is always available at www.marshall.edu/coronavirus.

W #	Day	L #	Date	PHY 203 - Subjects	Chapter - (Sections) Required Reading
1	M	-	January, 18	Martin Luther King, Jr. Day	-
	M	1	January, 20	Introduction (Drop/Add Week)	-
	W	2	January, 22	Static Electricity, Electric Charge, Electric Induction (Drop/Add Week)	Ch. 20 - (1-2)
2	F	3	January, 25	Coulomb's Law (W1 Due)	Ch. 20 - (3)
	W	4	January, 27	Electric Field, Force, and Field Lines (Quiz 1)	Ch. 20 - (4-5, 7)
	F	5	January, 29	Conductors and Electric Fields, Gauss's Law	Ch. 20 - (6)
3	M	6	February, 1	Electric Potential, Potential Energy, Field in a Capacitor (W2 Due)	Ch. 21 - (1-2)
	W	7	February, 3	Electric Potential due to Point Charge (Quiz 2)	Ch. 21 - (4)
	F	8	February, 5	Equipot. Lines, Energy Cons., Unit of Energy (eV)	Ch. 21 - (3, 5)
4	M	9	February, 8	Capacitors in More Detail, Dielectrics, Energy Storage (W3 Due)	Ch. 21 - (7-8)
	W	10	February, 10	Electric Current, Resistance, Ohm's Law, Power (Quiz 3)	Ch. 22 - (1-6)
	M	11	February, 12	Series and Paralle Circuit, Kirchhoff's Rules	Ch. 23 - (1-4)
5	M	12	February, 15	Cont. Kirchhoff's Rules, Circuit Reduction, Caps in Ser. & Par. (W4 Due)	Ch. 22 - (6), Ch. 23 - (1-6)
	W	-	February, 17th	Exam 1 (Chapter 20, 21 - All above listed sections in those chapters)	
	F	13	February, 19	Charging and Discharging Capacitors in RC Circuits	Ch. 23 - (7)
6	M	14	February, 22	Magnetism, Magnetic Fields (W5 Due)	Ch. 24 - (1-3)
	W	15	February, 24	Mass Spectrometer, Magnetic Force on Current Carrying Wire (Quiz 4)	Ch. 24 - (5-6)
	F	16	February, 26	Continue with Forces on Moving Charges	Ch. 24 - (5-6)
7	M	17	March, 1	Mass Spec Revisited, Magnetic flux, Induced Voltage (W6 Due & Midterm Grades Due)	Ch. 24 - (6), Ch. 25 - (1,3)
	W	18	March, 3	Faraday's Law of Induction, Lenz's Law, Eddy Currents (Quiz 5)	Ch. 25 - (1,3,4)
	F	19	March, 5	EMF Inducted in a Moving Conductor, Transformer	Ch. 25 - (2)
8	M	20	March, 8	Generator and Motor, Introduction of AC Circuit (W7 Due)	Ch. 24 - (7,8), Ch. 26 - (1,2)
	W	-	March, 10th	Exam 2 (Chapter 22, 23, 24 - All above listed sections in those chapters, except 24 - (7,8))	
	F	21	March, 12	Inductance and Intro to RL circuits	Ch. 26 - (2, 6)
9	M	22	March, 15	RC, RL, RLC Circuits Using AC (W8 Due)	Ch. 26 - (5, 7)
	W	23	March, 17	Using AC (ELI the ICE man), Reflection, Plane Mirror (Quiz6)	Ch. 26 - (5, 7)
	F	24	March, 19	Spring Break (University Closed - No Classes)	
10	M	25	March, 22	PP Slides - Curved Mirros, Snell's law (Notes) (Last Day to Drop) (W9 Due)	Ch. 25 - (5), Ch. 18 - (1-6)
	W	26	March, 24	PP Slides -Thin Lenses, Ray Tracing, Mroscope, Telescope (Quiz 7)	Ch. 18 - (5,7), Ch. 19 - (4,5)
	F	27	March, 26	Refraction, Snell's Law, Multiple Lens Systems	Ch. 18 - (3-4)
11	M	28	March, 29	Thick Lenses (Notes) and PP Slides - Human Eye (W10 Due)	Ch. 18 - (5), Ch. 19. 2
	W	-	March, 31st	Exam 3 (Chapter 18, 25, 26 - All above listed sections in those chapters)	
	F	29	April, 2	Human Eye Examples , PP Slides -EM Waves, Single Slit Diffraction	Ch. 19 - (2), Ch. 17 - (1-2)
12	M	30	April, 5	PP Slides - Single slit & Double Slit Diffraction and Diff. Gratings (W11 Due)	Ch. 17 - (3,5,6)
	W	31	April, 7	PP Slides - Diff. From Circular App & Diff. Example Sheet (Quiz 8)	Ch. 17 - (6)
	F	32	April, 9	PP Slides - Bohr's Model of H-Atom/ Transistion Example Sheet	Ch. 29 - (1-4)
13	M	33	April, 12	PP Slides - Structure of Nucleus, Binding Energy (W12 Due)	Ch. 30 - (1-2)
	W	34	April, 14	PP Slides - Radioactivity, Alpha, Beta, Gamma Decay, Worksheet (Quiz 9)	Ch. 30 - (4)
	F	35	April, 16	PP Slides - Half-life, Decay Rates, Decay Series, Activity	Ch. 30 - (5)
14	M	36	April, 19	PP Slides - X-ray, Radiation Damage, and Dosage,Dosage Example Sheet (W13 Due)	Ch. 30 - (6)
	W	-	April, 21	Exam 4 (Chapter 17, 19, 29, 30 - All above listed sections in those chapters)	
	F	37	April, 23	Discussion to Improve the Course/In Class Final Exam Review	-
Monday April 26th Final Exam 3pm - 5pm					ALL

Version 1.0
1/14/2021

This is a tentative schedule and syllabus; guidelines, rules, policies, and due dates can be subject to change at any time throughout the semester. We will try to stick as close to the policies and schedule presented here. The most up to date schedule with up to date policies and topics can be found on MU Online.

Quiz #	Date	PHY 203 - Subjects
1	January, 27	Quiz: Up to and including Written Homework 1 and L3 and anything from the Syllabus
2	February, 3	Quiz: Up to and including Written Homework 2 and L6
3	February, 10	Quiz: Up to and including Written Homework 3 and L9
4	February, 24	Quiz: Up to and including Written Homework 5 and L14
5	March, 3	Quiz: Up to and including Written Homework 6 and L17
6	March, 17	Quiz: Up to and including Written Homework 8 and L22
7	March, 24	Quiz: Up to and including Written Homework 9 and L25
8	April, 7	Quiz: Up to and including Written Homework 11 and L30
9	April, 14	Quiz: Up to and including Written Homework 12 and L33

Final PHY 203/213 Topics for a 14 Week Semester (6-8-2019)

1. Electrostatics
 - a. Electric Charge
 - b. Electric induction
 - c. Coulomb's Law
 - d. Electric fields
 - e. Electric field lines
 - f. Conductors and insulators
 - g. Gauss's Law
 - h. Electric Potential
 - i. Equipotential Lines
 - j. Electric Potential Energy, Energy Conservation
 - k. Capacitors and Dielectrics, Energy Storage

2. DC Currents and Circuits
 - a. Electric Current
 - b. Batteries
 - c. Resistance in materials
 - d. Ohm's Law
 - e. Simple Circuits
 - f. Electric Power
 - g. Kirchhoff's Rules
 - h. RC Circuits

3. Magnetostatics
 - a. Permanent magnets
 - b. Magnetic fields
 - c. Magnetic field lines
 - d. Magnetic force on a moving charge
 - e. Motion of charged particle in magnetic field
 - f. Magnetic force on a current carrying wire
 - g. Magnetic force between two current carrying wires
 - h. Field of a solenoid
 - i. Torques in magnetic fields
 - j. Ferromagnetism

4. Induction
 - a. Induced emf, longitudinal and rotational
 - b. Faraday's Law, Lenz's Law
 - c. Mutual inductance and self-inductance
 - d. Motors and generators
 - e. Transformers
 - f. AC circuits, rms quantities
 - g. RL Circuit
 - h. RLC circuit

- i. EM waves
 - j. EM spectrum
5. Optics
- a. Reflection
 - b. Mirrors (plane+spherical)
 - c. Refraction, Snell's Law
 - d. Thin Lenses (converging+diverging)
 - e. Ray diagrams
 - f. Optical Instruments (Telescope, Microscope, Human eye)
 - g. Interference (not thin film interference)
 - h. Young's Double Slit
 - i. Diffraction
6. Atomic Physics
- a. Spectrum of Atomic Hydrogen
 - b. Bohr model of hydrogen atom
7. Nuclear Physics
- a. Nucleus
 - b. Radioactivity, Alpha, Beta, Gamma Decay
 - c. Half-life, decay rate
 - d. Nuclear fission and fusion
8. Radiation Physics
- a. Radiation Damage (dose and equivalent dose)

PHY 213 Only

9. Light and Matter
- a. Photoelectric effect
 - b. Thin film interference