

WELCOME TO PHYSICS 104

"The physics of everyday phenomena part 2"



Syllabus, Spring 2020

READ CAREFULLY, ASK QUESTIONS IF CONFUSED

Course meeting: *lecture:* Tuesday, Thursday 12:00 -1:15 PM, Innovation Hall 338
lab: Monday 1:30 PM – 4:10 PM, Planetary Hall 324

Note: there is a laboratory component to this class that is required. *Make sure that you are registered for both.*

Instructor: Ania Wyczalkowska

office: 327 Planetary Hall,
phone: × 34166
e-mail: awyczalk@gmu.edu
office hours: Monday 5:00 PM – 6:00 PM
 Wednesday 12:00 PM – 1:00 PM (or by appointment).

Note: my office hours may be subject to adjustment as my other obligations get scheduled at the start of the semester.

Office hours are generally conducted on a first come first serve basis. You are encouraged to come visit me if you are having any problems with the course, have questions about the material we cover or any questions about physics in general! If you need to see me and are not able to come during my regularly scheduled office hours, please make an appointment. I'm not able to accept walk-ins outside of my office hours. If, for an unexpected reason, I am not able to be there during any of the regularly scheduled office hours, I will post an announcement on Blackboard and/or leave a note on my office doors.

Note: I will not be available after lectures or after lab since I teach other classes. I can meet you later, after I'm done teaching those other class.

contacting me:

This is not the only class I teach this semester and one of my other classes is a very large one. So first of all, if you're mailing me please include the information that you are in my PHYS 104 class. Personal issues are best handled in person, so stop by during my office hours or make an appointment. Because of the very large volume of mails that I receive, I will not discuss individual grades, help you with your homework, discuss your test performance, or anything else that's lengthy, by e-mail. For that you'll need to come see me.

Please allow at least 72 hours for responses both to mail and the discussion board. Note that at times it is not possible for me to answer all emails, particularly if I receive a real large number of them within a short time span. Bottom line: while I'll do my best to be accessible to you, I need your cooperation to keep the amount of mail at a reasonable level. At the same time, if you do not get a reply from me within 72 hours, please assume that your mail got buried and re-send it. (Also, please do not use the Blackboard e-mail function. E-mails sent through Blackboard get bundled all together and sometimes do not show as new. You are more likely to get a timely answer if you do not use the Blackboard system.)

course website: Blackboard 9 (this is where all course materials from syllabi through homework assignments, lab manuals, lecture notes and slides will be posted. It is your responsibility to check the website regularly for possible changes and important announcements).

GMU email account: You must activate your GMU email accounts to receive important University information, including messages related to this class.

Computer support:

Computer and/or Web support is not my responsibility. You can find help as well as available workstations at the Johnson Center.

Prerequisite:

PHYS 103: all material (primarily mechanics) covered in PHYS 103. Thorough knowledge of high school algebra is assumed. If you are a transfer student, if you took physics in high school or if you took PHYS 103 more than a year ago you should contact me to make sure that you do have the necessary background.

Either way you'll likely need a refresher before the beginning of the semester. I can recommend the tutorials on the website: <http://www.physicsclassroom.com/Physics-Tutorial>. I copied the top of their list of the tutorials (on the right) and placed rounded rectangles around those I consider most important for your comprehension of the material covered in this class, but you should be familiar with the content of all the tutorials listed on the right.

If you never took physics before, then, I'm sorry, but this class is not for you. Please consider PHYS 103 in the fall.

Textbook: None required. Lecture notes and/or PPTX slides will be posted on Blackboard.

Purpose:

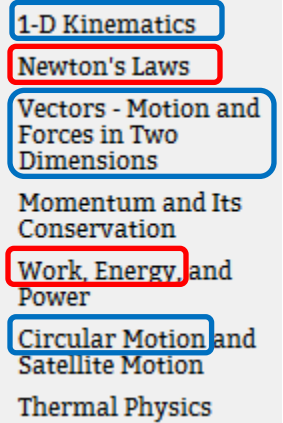
Physics 104 is part of the general education program at GMU. According to the GMU catalogue the purpose of general education courses is:

"...to educate, liberate, and broaden the mind, and to instill a lifelong love of learning. In conjunction with each student's major program of study and other electives, minors, or certificates, this program seeks to produce graduates with intellectual vision, creative abilities, and moral sensibility as well as skills to ensure a well-rounded and usable education.

General Education courses will ensure that all undergraduates develop skills in information gathering, written and oral communication, and analytical and quantitative reasoning; expose students to the development of knowledge by emphasizing major domains of thought and methods of inquiry; enable students to attain a breadth of knowledge that supports their specializations and contributes to their education in personal and professional ways; and encourage students to make important connections across boundaries—for example, among disciplines, between the university and the external world, and between the United States and other countries."

Overview:

This semester we will discuss simple harmonic motion and resonance, waves, electricity and magnetism, optics, relativity, atomic and nuclear and particle physics. The class will focus on concepts, and the expression of these concepts in colloquial, mathematical, graphical, and schematic descriptions. You will be asked to show



your understanding in all these ways on the exams. By the end of this term, you should have a strong conceptual understanding of the above primary topics, and be able to interpret data to support that understanding.

As the instructor in this course, I am the guide through the territory of physics. I will not be pouring facts into your head. You must do the learning: I can only assist and provide guidance and clarity. I will not be talking about everything in these sections only things I think are particularly important or confusing. Part of your task as a participant in this course is to help me identify the most difficult material, and to help interpret that material for your classmates.

General course policies:

In order to facilitate the optimum learning environment for your fellow students, the following behavior is expected:

- ✚ Class will start on time. Come on time, and be prepared to start working.
- ✚ This class requires active participation by you. You are expected to think, and write, and share, and ask questions, and in general be engaged while you are here.
- ✚ My class policy is: **NO LATE COMERS AND NO LEAVING IN THE MIDDLE OF THE CLASS.** Entering and leaving in the middle of the class is extremely distracting and discourteous to your fellow students as well as to me.
- ✚ Be respectful of yourself and others in the class. Don't talk during class about things that aren't class related; when working in groups, keep voices to a low level so all can communicate; don't denigrate others' work or ideas. Give everyone in your group a chance to speak and contribute.
- ✚ You must turn off your cell phones before you enter classroom (unless there is a potential emergency involved, in which case you should inform me that such disruption may occur and sit yourself in such location in the classroom where it will affect other students the least). Anyone whose electronics disturbs the class will be penalized 1% of the overall course grade each time it happens.
- ✚ With the exception of calculators no electronic devices are to be used in class. It has been my experience that laptops and notebooks are more often than not used for web surfing, e-mail or other class unrelated purposes. Not only is this detrimental to your own progress, it is also distracting to students sitting next or behind you. In addition, recent studies indicate that much better retention is achieved by students who take notes by hand rather than typing them. Thus unless you can demonstrate to me a need for such device, its use will not be allowed during our classes. Infractions to this policy will be penalized similarly to cellphone infractions. Instead, if you choose to keep notes, bring paper (or notebook) and pencils or pens. Whether or not you choose to keep notes or just listen is up to you, but you should bring some writing implements to practice solving problems in class.
- ✚ Throughout the semester **SAVE YOUR GRADED WORK.**

Class components:

Lectures

The lectures will follow the subjects as shown in the Course Schedule at the end of this document. **Attendance in this class is vital to your success.** As the instructor in this course, I am the guide through the territory of physics. I will not be pouring facts into your head. **You must do the thinking and the learning: I can only assist and provide guidance and clarity.** Part of your task as a participant in this course is to help me identify the most difficult material, and to help interpret that material for your classmates. The lecture notes will not cover everything that I discuss in class. Likewise, I will not be talking about everything covered in the lecture notes, only the things I think are particularly important or confusing. **You need to read the lecture notes**

and go over PowerPoint lecture slides. You are expected to spend at least twice as much time studying as you spend in class, that is if you study efficiently. If you don't, it can be a lot longer than that.

You are responsible for all the material covered in lecture and in the lecture notes as well as in any additional resources I may assign. There will be information about supplementary reading material, videos to watch, applets to practice with. No make-up work will be given after the fact. If you must miss a class for some scheduled activity (a field trip for another class, a team event in which you are a participant, etc.), see me at least one week in advance to arrange make up work. Also, be reasonable with this privilege, I reserve the right to deny make-ups if you have already missed more than two classes.

In addition, you are responsible for any announcements (including exam information and scheduling changes) made in class. Oral announcements made in class are binding and it is your responsibility to find out what has occurred in any class you might have missed.

Homework All homework assignments are to be turn in on time, late homework will not be accepted.

Homework is vital to reinforce the material you study, and to apply your new knowledge. Each week there will be one or two assignments composed of questions and problems designated as pivotal to the current material and/or investigations you'll perform using applets or visualizations. Homework assignments will be posted on Blackboard. Please submit the answers on printouts of homework assignments and use spaces provided in them for your answers and solutions. Whenever appropriate show your calculations or you'll be given no credit. Solutions for all the assigned problems and questions will be made available on Blackboard.

Note: No questions about how to do homework will be answered by e-mail but if there is something that requires clarification on my part or if you spot a typo, please do not hesitate to e-mail me.

Lab All reports are to be turn in on time, late assignments will not be accepted.

The main purpose of the lab is to provide you with hands on experience in experimental physics. See lab portion of the syllabus at the end for the schedule, requirements, policies and other information. Some lab sessions, at least in part, will be used to cover lecture material, to show you some demonstrations and to enhance your problem solving skills. Your knowledge of the material covered in lab will be tested during exams.

Exams All tests are to be turn in on time, late assignments will not be accepted.

Exams will include problems, questions, interpretations of data and graphs similar to homework assignments and practice examples done in class, lab and solved in lecture notes and handouts. Anything covered in class, lab, homework, the lecture notes, and assigned supplementary sources (including websites, applets, visualizations, and videos), may appear on the tests. In addition tests may contain short essay questions in which you'll need to demonstrate your comprehension of the material. You will be provided with a pdf template for the test similar to that of the homework assignments. Again, wherever appropriate, make sure to show your calculations or you'll receive no credit.

Exam Schedule: (for now, subject to change)

There will be four take home midterm exams. No exam grade will be dropped from your final score. There are no make-up exams. You are expected to adhere to the honor code (see below).

Test	Date
Midterm 1	February 28 th , 2020.
Midterm 2	April 2 nd , 2020.
Midterm 3	May 4 th , 2020.
Final	May 7 th , 2020

Class projects:

Throughout the semester you can gain extra credit worth up to 10% of your total grade by participating in extra credit projects.

✚ **Extra credit: Science in the news - tell us about it:** During the course of the semester there will be a number of opportunities to bring and share with us news about interesting developments in science. You can choose any scientific topic, not necessarily physics. What you'll do is you'll locate articles on recent discoveries in science (publications such as newspapers or magazines as sources including their electronic versions that are aimed at general public are OK, you don't need to go to overly technical peer reviewed papers which neither you, nor your classmates, nor I will understand. By recent I mean published within last year or so, so don't bother presenting e.g. Newton's laws). For each article, write a one paragraph **summary** and submit it to me **together with a copy of the summarized article**. The submission should be made at the time when you **present** this discovery in a short informal talk during one of the lab periods. Since the time available for this project is limited, sign up early. How much extra credit you'll gain will depend on quality of your presentation and your written summary as well as on how "hot" and original the subject matter is. In your presentation you should clearly state what made this particular subject interesting to you, what was discovered and by whom, and, if possible, what are the implications of this discovery. Keep the oral presentation to under 5 minutes in length. Your presentation may be followed by questions from other students or from me. This project can be done either individually or in a group of up to 3 students. In the latter case, all participants may be awarded the same credit, or, if, for example, just one person did the talk, the amount of credit may vary.

✚ There will be a **term project (required)** assigned during the semester. The topic is still under consideration but it will involve preparing a poster and giving a brief, but more formal presentation. Again, the project may be either done individually, or as part of an up to 2-person team effort.

Grades:

In this course, you will get exactly the grade you deserve by mathematically weighted average. It is **YOUR** responsibility, not mine, to make sure you study hard enough to get the grade you want. If you have any problems come to see me **EARLY**.

Letter grade based on percentage score:

Letter Grade	Percent
A+	97-100
A	93-96.99
A-	90-92.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	75-79.99
C	70-74.99
C-	67-69.99
D	60-66.99
F	below 60

Type of Assignment	Percent
Homework, class project, and in-class participation	30 %
Labs	20 %
Midterm tests each	Total 50% 16.7%
Final	last chance for redemption 😊

I will help you. I also recommend that you form/join a study group. If needed, get a tutor (free tutoring approved by our Department is available, and I will provide you with the information on when and where soon as I have it). Bottom line: do not wait until the last minute.

I will **NOT** answer questions about grading at any time in class. If you have a question about your grades, you need to come to my office hours individually.

Your grade in this class will be based on homework, quizzes and other in-class work and participation, labs, and 4 midterm exams. Throughout the semester you can gain extra credit worth up to 10% of your total score by participating in extra credit projects. Final grades will be assigned by me at the end of the semester. Your final grade in this class will not be changed under any circumstances at any time.

How to study – a strategy for success:

As a college student you may think that this part of the syllabus is not needed. After all, you have successfully completed twelve grades of school and, unless you are a freshman, some other college classes. Yet, the study practices you employed, while possibly adequate for many courses, may not be well tailored to the study of science. In this class, as in any science class, full comprehension of the new material relies on your good grasp of the material previously covered, so systematic study is vital. If a gap develops, it is hard, and soon impossible, to bridge it – it only grows wider and wider. It's sort of like trying to follow a plot in a mystery novel after skipping several chapters. So the first message is: don't let it happen, don't let the gaps develop and grow. Regularly scheduled assignments are designed to help you keep up, but, if for whatever reason, you are having hard time understanding the material and/or doing homework, you need to act right away to remedy this situation.

Below please find my suggestions for best study practices in order to succeed in this class:

- ✚ Attend the classes and participate. Pay attention and ask questions whenever anything is unclear - it is vital to your learning. There are no dumb questions, only ignorance as a result of failure to seek an answer.
- ✚ After each class read the pertinent lecture notes and review the slides. Do not wait till the weekend, do it the day of the class when things are still fresh in your memory. Use supplementary resources referenced in the lecture notes and the slides. Visit recommended websites, watch visualizations and videos, work with applets. Complete the sample examples, questions, and problems in lecture notes, slides and/or supplementary handouts. Try solving them on your own without looking at the answer first.
- ✚ If you have trouble following the material, do a “reboot”: go back to the last topic you feel comfortable with and start by re-reading it. Chances are the roots of your problem are somewhere there. If such additional review does not help, come see me, our LA, or a tutor. Similarly, if you miss a class, study the covered material as soon as possible and get help if needed.
- ✚ **Except for the work designated to be done individually, such as exams, work in groups.** It is always very productive to discuss things with your classmates and I encourage you to form study groups to work on practice problems, homework, and to quiz each other.
- ✚ Keep an updated equation sheet. This helps to summarize and distil the information and it is handy to have these equations readily available.
- ✚ Do the assigned homework and make sure you understand the solutions. The most important way to learn physics is to practice solving problems. These homework assignments are there to help you. Use them. Before submitting answers, think if they make sense. It is critical that you complete and understand the assignments in order to do well on the tests. Moreover, homework is worth 30% of your final grade. If you think that you can do well in this class without doing homework, check your algebra!
- ✚ **MOST IMPORTANTLY: study systematically;** go over presented material after each class, lab, etc.
- ✚ Write down questions and ask away! It is vital to your learning. Never hesitate to ask questions. There are no dumb questions, only ignorance as a result of failure to seek an answer. Your suggestions for improving the course are also requested. You have a valuable perspective on the class, and I want to hear it and learn from it.

Student resources:

For complete information and links to student support resources on campus, visit

<http://ctfe.gmu.edu/teaching/student-support-resources-on-campus/>

A few of the resources available are listed below.

- **Counseling and Psychological Services** offers psychological services, a variety of learning services, multicultural services, and educational programs that support students' educational goals.

- **The English Language Institute** holds workshops for students whose first language is not English.
- **Mathematics Tutoring Center** offers tutoring on a walk-in basis for all George Mason students enrolled in math courses up to MATH 290
- **Office of Alcohol, Drug, and Health Education Services** provide health-related information, education and training, and resources for the Mason community.
- **Office of Disability Services** implements and coordinates reasonable accommodations and disability-related services that afford students with special needs equal access to university programs and activities.
- **Office of Diversity Programs and Services** serves students, cultural organizations, and the Mason community by promoting an environment that fosters and values human understanding and diversity. The office seeks to provide services and programs that will instill university-wide appreciation for diverse perspectives and ensure equal levels of inclusion, participation, and retention of underrepresented student groups in their quest for a quality education.
- **Sexual Assault Services** provides direct services for survivors of sexual assault and sexual assault education and information to the university community. All services are available to survivors, and to their families, significant others, and friends at no cost.
- **Student Health Services** provides high quality health care, counseling, education and prevention services in support of student learning and retention.

Academic Advising Center – 703-993-2470

Office of Disability Services – 703-993-2474

Writing Center: A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

University Library: “Ask a Librarian” <http://library.gmu.edu/mudge/IM/IMRef.html>

Counseling and Psychological Services (CAPS): (703) 993-2380; <http://caps.gmu.edu>

University Policies: The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty and staff conduct in university affairs.

Math Tutoring Center – 703-993-1460

Getting help: In addition to your instructor, you have the following resources available to you for help:

- **Physics tutor:** Planetary Hall room 2A. See <http://mason.gmu.edu/~sfisher2> for hours.
- **Learning Assistant:** Information will be announced in class and posted on Blackboard.

If you have any problems, seek help right away. Do not wait until the last minute before the assignment is due.

Safety and security: The provost’s office has set up a system for notifying students and staff of emergencies. You can sign up for emergency messages to your cell phone by going to <https://alert.gmu.edu>. Call 911 in case of life-threatening emergencies in the classroom.

Withdrawal: If you need to withdraw from this course you must do it within the University established time.

Students with disabilities: Please contact The Office of Disability Services (SUB I, Room 222, Phone 703-993-2474) if you have a learning or physical disability that will require accommodation in this class. You must obtain the proper paperwork as soon as possible and contact me during the first week of classes so that I can accommodate your needs throughout the course.

Honor code:

You are expected to adhere to the George Mason University student honor code:

"George Mason University shares in the tradition of an honor system that has existed in Virginia since 1842. The Honor Code is an integral part of university life. On the application for admission, students sign a statement agreeing to conform to and uphold the Honor Code. Therefore, students are responsible for understanding the provisions of the code. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. Therefore, cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. To maintain an academic community according to these standards, students and faculty must report all alleged violations of the Honor Code to the Honor Committee. Any student who has knowledge of, but does not report, an Honor Code violation may be accused of lying under the Honor Code."

We expect you to hold to this standard by carefully citing sources used in your work and by doing your own work on tests and individual assignments. In an environment where group work is highly valued it can be difficult to sort out what policies apply. At a minimum follow these guidelines:

- ✚ During **all tests** you must work alone and that includes online resources **except class notes, slides, homework solutions and other materials posted by me on Blackboard** but excludes following any links to the outside. **If any violations of this rule arise, I will switch to tests delivered in the Testing Center under supervision and with limited time.**
- ✚ Work identified as individual should be strictly your own. Submitting work of another student as your work is considered cheating.
- ✚ Students are expected to actively collaborate on assignments identified as group, e.g. in the lab or during a group quiz. In these cases all members assume responsibility for group assignments. It is important that only students who actively participate are given credit.
- ✚ Students are also encouraged to form study groups to work on homework assignments and study the course material together. The group is responsible for ensuring that all members take part, learn the material, and understand how to do the assignments.
- ✚ Material that is drawn from written or electronic sources must be appropriately cited. Cut and paste from web sources without citation is considered plagiarism.

If you have questions about the meaning of any of these terms or if you are doubt about what the above policies mean in regard to a specific assignments, ask me for clarification. If you are caught cheating, you will be brought before the Academic Honor Council which may result in a failing grade in this course, a permanent mark on your transcript, suspension, or expulsion.

Tentative Course Schedule for Physics 104, Spring 2020

(subject to verification by real life)

Week	Lectures	Dates	Course Topic
1	1, 2	Jan 21, 23	Simple harmonic motion
2	3, 4	Jan 28, 30	Waves
3	5, 6	Feb 4, 6	Waves continued Sound
4	7, 8	Feb 11, 13	Sound continued
5	9, 10	Feb 18, 20	Electrostatics
6	11, 12	Feb 25, 27	Electric circuits
7	13, 14	March 3, 5	Electric circuits continued Magnetism
8		March 10, 12	Spring break, no classes
9	15, 16	March 17, 19	Magnetism continued
10	17, 18	March 24, 26	Magnetism continued Electromagnetic waves
11	19, 20	March 31, April 2	Optics
12	21, 22	April 7, 9	Optics continued
13	23, 24	April 14, 16	Optics continued Modern physics
14	25, 26	April 21, 23	Modern physics continued
15	27, 28	April 28, 30	Modern physics continued

Labs:

General information:

- ✚ Experiments will be performed according to the lab syllabus unless I introduce some changes. The manuals for the labs and pre-lab quizzes will be available on the Blackboard about a week in advance. Look to this web page for schedule changes and cancellations.
- ✚ The students are expected to come to the class prepared, i.e. familiar with the content of the lab manual. To encourage you to spend time preparing for the lab and familiarizing yourself with the manual, there will be pre-lab quizzes on Blackboard for each experiment beginning second week of classes. All pre-lab quizzes are due before class by Monday noon. Missing pre-lab quiz results in a zero score.
- ✚ In the beginning of each lab session I will quickly review problems encountered during the previous experiment and some, hopefully few, misconceptions. I will then review concepts pertinent to that particular experiment and show you how to work with the equipment to be used.
- ✚ The students then work in groups to perform the actual experiment, collect the data, do the required calculations, and compose and type the lab report.
- ✚ At any time I will be available to assist with any problems and answer any questions you may have. Please don't hesitate to ask for help or clarification. If you do you may run out of time to complete the experiment. Remember: there are no dumb questions, only ignorance as a result of failure to seek an answer. Discussions are encouraged in this class.
- ✚ Lab reports are due at the end of the lab session. If unforeseen circumstances, such as equipment failure, require additional time to complete a particular report, I may allow you additional time. Get the permission in writing and attach it to the submitted report. Otherwise **LATE REPORTS WILL NOT BE ACCEPTED.**

Computer use:

The computers in the lab room are to be used for class work only. Students using web or email services that are not class related may be asked to leave the lab after a warning and will not be able to complete the lab. Computers may not be used to work on assignments for other classes. Personal computers may be used only with instructor's permission and only for lab work. You may not disconnect lab equipment to plug in a personal electronic device.

Grades

The laboratory grade counts 20% of the grade in PHYS 104, however **YOU ARE REQUIRED TO AT LEAST PASS THE LAB PORTION OF THE COURSE IN ORDER TO RECEIVE A PASSING GRADE IN THE ENTIRE COURSE.**

There are 14 experiments this semester and you should attend them all. There will be **NO MAKEUP SESSIONS. IF YOU MISS A LAB YOU GET A ZERO. IF YOU MISS 4 LABS OR MORE YOU AUTOMATICALLY FAIL!**

Your grade for each lab report will be based on the correctness of the data taking, clarity of presentation and interpretation of your results, and the overall quality of your writing. The labs will be graded on a scale of 0-10 points.

You final grade will be based on your average from 13 lab reports (80% of the score) and your average from 13 quizzes (20% of the score). I will drop one lowest lab report score. Up to 5 % of the final lab grade may be awarded for participation, if merited.

Lab report format:

Your grade from each lab is largely (80%) based on your report. The lab report is your testimony that you attended the class, performed the experiment, and understood the underlying concepts. Lab report which does not contain the data is, therefore, worth zero points.

It is your responsibility to show to me in writing that you understand the concepts involved. You should try to be clear, precise, and concise in your writing. In general your lab report should include:

- **Introduction:** This section of the laboratory is mostly a brief 'purpose' statement. Write about what you expect to discover or achieve in a particular e. I strongly encourage you to write the introduction prior to coming to the lab to save actual lab time for the remaining activities. Otherwise if you run out of time for any reason other than unforeseen equipment failure you have only yourself to blame.
- **Data Presentation:** This is the main section of your report and should all the generated data including tables and graphs. All data must have the appropriate units and be presented in a neat and understandable form. This is also where you do the calculations: be sure to give one sample of each type of calculation performed. Main body of this section is your thorough discussion your results. Be skeptical and critical of them. If the experiment did not turn out as expected, this section allows for discussion about possible reasons for not obtaining the expected results. This should not be simply a list of what might have gone right or wrong, but a detailed analysis of the experiment at hand. Make sure to answer in full all questions posed in the manual since missing any will considerably lower your score. Use full sentences. Your report should be clearly typed or handwritten; remember: I cannot grade what I cannot read. Use the appropriate spaces provided in the report part of the manual for your responses and entries.
- **Conclusion:** Here you briefly summarize the outcome of the experiment and review how the original expectations you should have stated in your introduction were matched by your actual results. State the main concepts that you have learned or confirmed. You are also welcome to include any personal comments about what you learned, liked or disliked, what was confusing, and any other thoughts you may have about the experiment. Your suggestions for improving the course are also requested. You have a valuable perspective on the class, and I want to hear it and learn from it.

I encourage you to work on your report throughout the class and make entries as you go rather than wait till then end by which time you may have forgotten many important details. If you make entries on computer, **use different font type** from mine or **highlight** them so that they clearly stand out. Save your report as well as the data collected with any other applications often. Computers do fail on occasion and you are not likely to have the time to redo the experiment or retype the report. Once your report is completed and approved by all group members, print and submit it. **Do not print the entire manual**, just the report portion of the file.

Tentative Lab Schedule for Physics 104, Spring 2020

(subject to verification by real life)

Week	Date	Experiment
1	Jan 27 th	lab 1 The pendulum
2	Feb 3 rd	lab 2 Mass on a spring
3	Feb 10 th	lab 3 Standing waves
4	Feb 17 th	lab 4 Physics of sound part 1
5	Feb 24 th	lab 5 Physics of sound part 2
6	March 2 nd	lab 6 Electrostatics
	March 9 th	Spring break no lab
7	March 16 th	lab 7 Electric circuits part 1
8	March 23 rd	lab 8 Electric circuits part 2
9	March 30 th	lab 9 Electron charge to mass ratio
10	April 6 th	lab 10 Magnetic fields
11	April 13 th	lab 11 Optics part 1
12	April 20 th	lab 12 Optics part 2
13	April 27 th	lab 13 Optics part 3/catch-up
14	May 4 th	lab 14 Atomic spectra

Print this page, sign, date etc. and hand it to your instructor no later than the 2nd week of classes.

I read the syllabus statement

I

(print your name here)

have read the syllabus for PHYS 104 and familiarized myself with its content.

.....

(sign here)

.....

(date)

Safety and Conduct Rules for Physics Laboratory

1. No student is permitted in the laboratory without an instructor.
2. Students may not start an experiment until given permission by the instructor.
3. Students may not block the aisle in the laboratory with their bags, jackets, notebooks and other articles.
Laboratory aisles must be kept uncluttered.
4. Bare feet and sandals are not acceptable.
5. No student is permitted to change the configuration of any computer he/she is working on and will only use the computer for class related purposes.
6. Absolutely no eating or drinking in the laboratory at any time.
7. Every student will clean up his/her work area before leaving.
8. No student will write on or deface any lab desks, computers, or any equipment provided to them during the experiment. They will use all equipment only for the purpose intended.

I

(print your name here)

have read and understood these rules. I understand that any violation of these rules could lead to dismissal for the lab session and any other appropriate action by the instructor.

.....

(sign here)

.....

(date)