Physics 1302W.100 - Introductory Physics for Science and Engineering II - Summer 2010

(Lectures from 10:10 to 11:00 on MTWF in room 133 of the Physics Building)

Texts: REQUIRED

Fishbane, Gasiorowicz, Thornton: Physics for Scientists and Engineers 3rd Edition (Volumes 1 & 2)
Physics Laboratory Manual for Physics 1302W (Bookstore)
Laboratory journal –University of Minnesota 2077-S (Bookstore)
Simple Scientific Calculator

In addition you may want to get a brief calculus reference such as:
Ayres/Mendelson: Schaum's easy outlines Calculus
Morgan: Calculus Lite
Thompson: Calculus Made Easy

Tutorial Room (Physics room 230):

Beginning June 1st, TAs will be available every weekday to answer your physics-related problems. Times will be posted outside room 230.

Class Web Page:

URL: http://www.physics.umn.edu/courses/index.html and select 1302W.100. You must log in using your University X.500 username and password. The class web page will be the location for announcements regarding lectures, lab, homework, quizzes, and the final exam. Solutions to the homework and quizzes will be posted here. You can download, as a .pdf file, any material appearing on the class web page, including this syllabus. It is extremely important for you to regularly check the class web page over the course of the semester, at least once per day. Correspondingly, it is extremely important for you to learn how to navigate the course web page and download pdf files from it.
**ASSUMED KNOWLEDGE:**

The only knowledge of physics that you are going to need will be that which has allowed you to survive in this world long enough to have made it to this course plus the material from 1301W. A quality high school physics course would probably help but is not necessary. It is expected that the student has a working knowledge of algebra, geometry, trigonometry, and calculus. As the course proceeds, the student may encounter mathematical techniques that they have not seen in their mathematics classes. Don't panic! The mathematics will be introduced as it is needed. The calculus review books will help quite a bit. They are strongly recommended.

**COURSE STRUCTURE:**

**Lectures:** Individual learning in a large class. The primary goal of the lecture is to show you what is expected of you. At best, a lecture can alert you to aspects of the material that you do not understand. Then you can target those areas in other parts of the course. To make lectures meaningful, you must add your experiences to the material presented. Just sitting, listening, and taking notes are not good uses of your time. You must constantly reflect on how the material either fits into or contradicts your experience and other knowledge. While listening to the lecture you should always try to anticipate what will happen next. To make lectures useful you must read the assigned text material and attempt the assigned problems before coming to class. This will allow you to focus on the important concepts and procedures for you. During the lecture you should be able to:

- Answer the following questions about the lecture material: Why should I care about this? How is it related to other things I know? How can it be used? How is it related to my questions about the text reading? How is it related to what we happened previously? How is it related to the lab? What help do I need to get after the class?

- Follow the application of a logical and organized technique using the basic principles of physics to solve problems. How does this technique differ from what you do? How is it similar?

- Ask questions of the lecturer so that the concepts and techniques make sense to you while they are being presented. If they don’t, make sure you get help outside of class as soon as possible.

- Answer questions embedded in the lectures to ensure that you follow the concepts and techniques being presented.

**Laboratories:** Small-group learning in a small class. Each group’s experience is generated by the needs and interests of its members. When the laboratory precedes the lecture material on that subject it allows you to determine what you need to attend to in the lecture. When it follows the lecture material it helps you determine your level of understanding of that material. To make the laboratory meaningful, before coming you must read the assigned sections of the textbook, read the assigned problems in the laboratory manual and have an idea of what you will do. Make your best attempt to solve the warm-up questions in the laboratory manual, and arrive at the prediction needed to begin the lab problem. In the lab you will test your physics knowledge and
reasoning by comparing your predictions to those of your fellow students and then to reality. The laboratory is the place where you can receive necessary feedback from the other students in your group and your instructor about your understanding of the course material. If you don’t see the connection between the laboratory and the rest of the course, get help immediately from your TA, or another student. The laboratory allows you to:

- Predict the behavior of objects to determine whether your ideas of physics agree with reality.
- Apply the physics concepts you have learned to real situations. The laboratory situations will give you the concrete images that help abstract problem solving.
- Practice using problem-solving techniques with feedback from other students, your instructor, and reality.
- Develop your technical communication skills by discussing physics concepts and laboratory techniques with your group and other groups.
- Develop your technical communication skills by keeping a detailed written record of your work and thoughts in a laboratory journal.
- Develop your formal technical communication skills by writing laboratory reports.
- Improve your ability to work effectively in a collaboration to accomplish a technical goal.
- Improve your leadership skills when working in a technical collaboration.
- Receive coaching to improve your knowledge of physics concepts and problem solving techniques from your fellow students and the instructor.
- Find out the concepts or techniques you don’t understand so you can get help outside of class.

Warm-Up Questions

You need to submit warm-up questions and predictions for each laboratory 48 hours before lab class or two days before lab (one day if Lab is on Tuesday) by lecture time, whichever is later. These are part of the laboratory preparation and also part of the grade. It is important to make physically reasonable predictions and to write them in clear English.

Lab Participation

If you are late for lab your TA may subtract a proportionate fraction of your lab score for that lab section report. If you can't come to a lab, please notify your section instructor well in advance of the lab. There are no make-up laboratories as equipment can only be put out during the defined lab period.

Lab Reports

The specific topics from the laboratory for which you will write reports will be assigned to you by your TA. Reports should be no longer than 5 nor shorter than 3
typed pages (using a word processor is required and such facilities are supplied by the University) including all necessary predictions, graphs, data tables, and calculations. Your TA will set the deadline for submission of reports. Late reports will not be graded at all (see grading policy below). Graded reports will be returned to you by your next laboratory meeting and the first lab report may be revised, based on your TA’s comments and resubmitted after one week, to achieve a higher grade. Remember this is a writing intensive course so your grade will depend on your communication skills. Your use of English and your grammar and spelling are important and will be graded.

Laboratory Grades

<table>
<thead>
<tr>
<th>Grading Checklist</th>
<th>Points</th>
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<tbody>
<tr>
<td>Laboratory Journal</td>
<td></td>
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<tr>
<td>Predictions</td>
<td>5</td>
</tr>
<tr>
<td>Lab Procedure</td>
<td>3</td>
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<tr>
<td>Problem Report</td>
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<td>Organization</td>
<td>4</td>
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<td>Data and Data Tables</td>
<td>3</td>
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<tr>
<td>Results</td>
<td>5</td>
</tr>
<tr>
<td>Conclusions</td>
<td>5</td>
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<tr>
<td>Total</td>
<td>25</td>
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Discussion sections: Small-group learning in a small class. Each group’s experience is generated by the needs and interests of its members. The discussion section is the place where you can receive necessary feedback from the other students in your group and your instructor about your understanding of the course material. To make the discussion section meaningful, before coming you must read the assigned sections of the textbook, read the preceding week’s lecture notes, and make your best attempt to solve the assigned problems. In the discussion section you will explore your physics knowledge, quantitative reasoning skills, and ability to apply mathematics to physics by discussing your ideas and those of your fellow students to arrive at a problem solution. For the discussion section to be useful you must discuss you ideas with your group and listen to the ideas of other group members. In this environment you should be able to:

- Practice problem solving techniques with feedback from fellow students.
- Apply physics concepts to new situations with feedback from fellow students.
- Get help from other students in recognizing where your ideas differ from reality.
- Improve your ability to work in a collaboration to accomplish a technical goal.
- Improve your leadership skills when working in a technical collaboration.
- Receive coaching to improve your knowledge of physics concepts and problem solving techniques from your fellow students and instructor.
- Find out the concepts or techniques you don’t understand so you can get help outside of class.
Office visits: Individual or small-group learning tailored to individual needs. Teaching assistants are available in the tutorial room during most hours of every day. Any teaching assistant in the room is available to help you even if they do not teach this course. For maximum effectiveness, try out several different TAs and return to the ones who are most in tune with your needs. To make the visits meaningful, before coming you must read the assigned sections of the textbook, read the current lecture notes, and make your best attempt to solve the assigned problems. Have a specific problem that you have partially solved that illustrates your difficulty. When getting help, always ask the instructor to observe your way of solving a specific problem and then comment on your reasoning or procedures. It is usually not helpful if the instructor shows you how they solve the problem. In this environment you should be able to:

- Receive coaching to improve your knowledge of physics concepts and problem solving techniques.

Homework: Individual and group learning. Attempt the assigned problems before the lectures on that material to allow you to focus on your needs during the lecture. To make homework meaningful, read the assigned sections of the textbook before attempting it, and review the appropriate lecture notes. Always work assigned problems as if you were taking a test without looking at the textbook, the lecture notes, or solution outlines. Write as much detail as if you were taking a quiz. If you get stuck, stop the problem and read the relevant sections of the text and lecture notes. If you are still stuck, get help from friends or the instructor’s office hours. If you have difficulty with the assigned problems, do other similar problems in the textbook until the solutions flow smoothly. Success within the time limits of the quizzes requires that you practice enough to be able to work through a new problem rapidly. In this environment you should be able to:

- Practice solving problems to determine if you learned the physics concepts and the techniques taught in this course. Remember, only practice using the techniques you will use on the quizzes is beneficial.

- Find out the concepts or techniques you don’t understand so you can get help.

Quizzes and tests: Individual and group learning. The quizzes give you an opportunity to determine what you don’t know and get help immediately. In this environment you should be able to:

- Communicate your knowledge of physics concepts and problem-solving techniques.

GRADING:

Your course grade will be based on your performance on quizzes, the final exam, and your laboratory grade. The break down of the grades is:

12 Lecture quizzes:
There will be a lecture quiz each Friday over the summer session with the exception of July 2nd and August 20th. There will be 1 additional lecture quiz on Thursday, August 19th. This adds up to 12 lecture quizzes. You will be allowed to drop 4 lecture quizzes, i.e., 8 of the 12 lecture quizzes will count towards your final course grade. Each of the 8 lecture quizzes will count as 1 quiz of your
course grade. **THERE ARE NO MAKE-UP QUIZZES UNDER ANY CIRCUMSTANCES!**

**Laboratory grade:**
The laboratory portion of the course is worth 2 lecture quiz units, i.e., will be worth the equivalent of 3 lecture quizzes, and will be based on 4 laboratory reports, with a rewrite of the first report, and attendance.

Because the laboratory involves team work, no laboratory session make-ups will be allowed. Furthermore, students who miss more than three laboratory sessions will receive a failing laboratory grade and thus fail the class, independent of whether or not these absences are excused in a University-recognized manner. The rationale behind this policy is by no means punitive, but instead reflects the group nature of the work conducted in the lab. You MUST work with your team in order to receive full credit for the work.

A student’s laboratory grade is the product of the percentage of points he or she earns on the four assigned laboratory reports multiplied by the fraction of times he or she attends a full laboratory session (i.e., arrives to lab no more than 5 minutes late and completes as fully as time permits the laboratory assignment, along with their lab group) over the course of the semester. **This assumes that the student has missed no more than 3 lab sessions.** For example, suppose a student receives 90% of the total points on the four assigned lab reports, but has missed three of the semester’s ten laboratory sessions. The student’s resultant laboratory grade is thus $90\% \times \frac{7}{10} = 63\%$, a significant reduction.

*Late reports will not be accepted.*

**4 Discussion quizzes:**
There will be a total of the 4 group quizzes will be worth 1/2 of a lecture quiz unit that will be administered in the discussion sections and will be completed by the assigned groups. Given the group nature of discussion session practice problems and quizzes, **students missing even a single practice discussion session will not be allowed to take the subsequent discussion session quiz for credit** (They may take the quiz on their own, for practice, which is highly recommended). **In the event that a student has a single University-recognized excused absence in the weeks between discussion quizzes, they WILL be allowed to take the discussion quiz with their group. However, if the student misses more than one discussion meeting between discussion quizzes, THEY WILL NOT BE ALLOWED TO TAKE THE DISCUSSION QUIZ, EVEN IF THE ABSENCES WERE FOR A UNIVERSITY RECOGNIZED REASON!** The rationale behind this policy is by no means punitive, but instead reflects the group nature of the discussion session quizzes and students’ preparation for taking these quizzes. Only those students who fully participate in the group preparation for the group discussion session quizzes will be permitted to take these quizzes for credit. **ANY STUDENT MISSING MORE THAN 3 DISCUSSION MEETINGS, EVEN WITH A UNIVERSITY RECOGNIZED EXCUSE, WILL NOT PASS THE COURSE.**
Final Exam:
The final exam will count as 2 lecture quiz units! Only under extraordinary, University-recognized circumstances will a student be allowed to make up the final exam.

QUIZ AND FINAL EXAM DATES:

Discussion session quizzes: June 3rd, June 24th, July 22nd and August 12th

In-lecture quizzes: Every Friday during the summer session with the exceptions of July 1nd and August 20th. There will be a lecture quiz on Thursday, August 19th!

Final Exam: Friday, August 20th, during the regularly scheduled lecture period.

**THERE WILL BE NO MAKE-UP QUIZZES. ANY MISSED QUIZZES WILL COUNT AS ONE OF THE 4 DROPPED QUIZZES. THIS INCLUDES QUIZZES MISSED DUE TO UNIVERSITY APPROVED EXCUSES.**

CALCULATION OF FINAL COURSE GRADE:

8 of 12 Lecture quizzes, each worth 50 points (1 lecture quiz unit) 400 Points

4 Discussion quizzes, each worth 25 points (1/2 lecture quiz unit) 100 Points

Laboratory grade, worth 100 points (2 lecture quiz units) 100 Points

Final Exam, worth 100 points (2 lecture quiz units) 100 Points

| Total | 700 Points |

You course grade will be based on the percentage of the 700 points that you receive. The grade ranges are as indicated below.

GRADING SCALE:

All grades will be assigned on a scale of 100%. The numerical score will be weighted in accordance with the distribution given above on a scale of 0 to 100%. The final letter grade for the course will then be determined as follows:

- A 90% and above
- B+ 80% to 84.9%
- B 75% to 79.9%
- C+ 65% to 69.9%
- C 60% to 64.9%
- C- 55% to 59.9%
- D+ 50% to 54.9%
- D 45% to 49.9%
- F Less than 45% or a laboratory grade of less than 60%

**NOTE:** YOU MUST PASS THE LABORATORY PORTION OF THE COURSE WITH A SCORE OF 60% OR HIGHER OR YOU WILL RECEIVE A GRADE OF “F” FOR THE ENTIRE COURSE! IF YOU MISS MORE THAN 3 DISCUSSION SECTION MEETINGS OR 3 LABORATORY MEETINGS, YOU WILL FAIL THE COURSE!
RESOLVING GRADING DISPUTES:
If you feel you have been graded unfairly or incorrectly and would like to contest your grade or score or would like to request a re-grade, you need to submit your request for re-grade to me within ONE WEEK after the grade/score has been returned to you. The only exception to this rule will be in regards to any revisions made to the first assigned or completed lab report – the details/requirements regarding that particular re-grade will be at the discretion of your TA. **Photocopy any quiz submitted for regrade before you submit it!**

RESPONSIBILITIES AND POLICIES:

**Cheating:**
The University of Minnesota assumes that all students enroll in its programs with a serious learning purpose and expects them to be responsible individuals who demand of themselves high standards of honesty and personal conduct.

> All students are expected to behave at all times with the utmost respect and courtesy toward all of their fellow students, their instructors, and are expected to have the highest standards of honesty and integrity in their academic performance. Any behavior which disrupts the classroom learning environment or any attempt to present work that the student has not actually prepared as their own work or to pass an examination by improper means, is regarded as a serious offense which may result in the expulsion of the student from the University. The minimum penalty for such an offense is a failing grade for this course. Aiding and abetting the above behavior is also considered a serious offense resulting in equally severe penalties.

**Announcements:**
In addition, students are responsible for ALL announcements made during the lecture periods, discussion periods & laboratory periods. As it is occasionally necessary to make changes in the lecture, recitation, or laboratory schedules, including the dates of quizzes, it is extremely important that students attend EVERY lecture, recitation and laboratory meeting. Missing an announcement is not an acceptable excuse for missing a quiz or a coursework deadline. It is the sole responsibility of any student missing a lecture to determine what course material or announcements were missed. It would be a good idea to trade contact information, e-mail addresses and/or phone numbers, with other students in the class so that it is possible to obtain missed information that was given out in lecture, discussion, or lab.

**Use of e-mail:**
Generally, e-mail does not work as a means of communication with the professor. Therefore, I will not answer any questions by email. **I will not reply to any email.** Please contact your TAs or come by in person, during the office hours, or before of **after** class to ask your question. Your first point of contact for problems should be your TA. Problems they cannot address, they will pass along to me.
Classroom Courtesy:

Lectures end when the idea or technique under discussion has been concluded and the lecturer has clearly indicated that the students are free to leave. For this reason lectures are rarely expected to end exactly at the end of class time. Every student is expected to respect fellow students and the lecturer by being attentive until the class is dismissed. Packing up books, putting on coats, or standing up while the lecture is in progress interferes with the learning of other students and shows disrespect for all members of the class and for the educational process. Those few students who know they must leave the class before the lecture ends should have the courtesy and respect to sit in the rear of the class and near an aisle so that they can exit the classroom without disturbing the other students. Students who do not have a crucial appointment before the end of the lecture, should not sit in these seats but have the courtesy to sit toward the front and center of the class. Only students sitting at the ends of rows should leave class before it is dismissed by the instructor.

The use of cell phones, PDA’s, mp3 players, recording devices, wireless connections, and other personal electronic devices during lecture, discussion or the laboratory meetings is strictly prohibited. All such devices MUST be switched off and put away unless a student has been given explicit, written permission from the instructor allowing the use of the device.

Laptop computers are allowed in class but only for the taking of lecture/discussion notes or as otherwise deemed acceptable in a laboratory meeting. The wireless connection MUST be switched off. Using a laptop computer to take notes during lecture requires that you sit in the back row of the lecture hall in order to avoid distracting other students.

Any student failing to follow the rules as described under COURSE COURTESY will be asked to leave and will not be allowed to make up any missed work.

Diversity and Collegiality:

This course draws students from a variety of disciplines. This diversity of academic experience, assumptions regarding learning, and ways of approaching problems is one of the most enriching aspects of the course. In addition, every class is influenced by the fact that students come from widely diverse ethnic and cultural backgrounds and hold different values. Because a key to optimal learning and successful teaching is to hear, analyze, and draw from a diversity of views, the instructors expect collegial and respectful dialogue across disciplinary, cultural, and personal boundaries.

Sexual Harassment:

University policy prohibits sexual harassment as defined in the University Policy Statement (http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html) adopted on December 11, 1998. Complaints about sexual harassment should be reported to the University Office of Equal Opportunity, 419 Morrill.

Mental Health:

Learning is, by its nature, stressful. A course that is well matched to your needs will push you to achieve goals that are beyond your current capabilities. Sometimes this educational stress can combine with other sources of stress in your life to lead to an unhealthy situation. That situation can impede your learning and even become dangerous if you have certain biochemical imbalances that require treatment. Typical student issues that can cause barriers to learning include strained relationships, increased anxiety,
alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. The University of Minnesota encourages you to use its services which are designed to assist with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available at the Student Mental Health Website at http://www.mentalhealth.umn.edu. The on-line anonymous self screening can be particularly useful. It is available at http://www.mentalhealth.umn.edu/screening/.

**Quiz/Final Accommodation for Students with Disabilities**

You must bring your accommodation letter to the Undergraduate Office, Physics 148, at least one week in advance of the first test. You do not need to contact the instructor, as arrangements are made only through the Undergraduate Office. Tests taken at the Disability Services Testing Center may be started at any time; however, you must remain at the Testing Center until 15 minutes after the regularly scheduled lecture exam begins. **If you leave the Testing Center before this time, you will not receive credit for the test, nor will you be permitted to drop the test, which may result in an 'F' for the entire course.**

**Open-Door Policy:**

If any difficulties or problems arise in this course that interfere in any way with your learning or optimum performance, we would very much like to hear about it. Please stop by to see any of the instructors in this course with any matter that you would like to discuss. We will do our best to deal with problems promptly and effectively. We also appreciate hearing about the course from students and we encourage you to keep us informed. **Our doors are open and we appreciate feedback!**

**OPPOSING VIEWPOINT:**

I will work hard to convince you that this course is useful and that it can be enlightening and even fun. However, I feel that I am obligated, in the name of fair play, to provide an opposing opinion. The following is a quote, author unknown, that I ran across many years back.

**PHYSICS** -

*Physics is the most grueling kind of work imaginable. You will have to work like crazy just to keep up and, in the end, you won’t have anything to show for it. If you’d rather have something nice to take home at the end of six weeks, like a broom holder or a doorstop, then perhaps you would be better off taking shop.*

---Author unknown

You will have to decide who is correct!
I acknowledge that I have read and understood the entire syllabus for the course 1302.100, for the summer semester of 2010. Furthermore, I agree to abide by any and all rules, policies, and conditions set forth in the abovementioned syllabus. I understand that failure to abide by the syllabus may result in the grade on an assignment, quiz, or exam being lowered and that this may result in my course grade being lowered, potentially resulting in failing the course.

I understand that if I miss more than 3 discussion meetings or 3 laboratory meetings, FOR ANY REASON, I will not be allowed to pass the course. I will either drop the course (subject to the University’s policy on dropping courses) or receive a course grade of “F.”

I understand that if I receive a laboratory grade of less that 60%, I will receive a course grade of “F.”

I understand that I will not be allowed to take any quiz or exam for the course until such time as I have signed this document and submitted it to my Physics 1302.100 TA.

NAME (PRINTED): ________________________________

STUDENT ID NUMBER: ________________________________

SIGNATURE: ________________________________________