PHYSICS 1302.300 – Introductory Physics for Science and Engineering II, 4 credits

Spring 2014

Instructor: James Kakalios
Office: Physics 344
Phone: 612-624-9856

Lectures: M, Tu, W, F (11:15 AM-12:05 PM) in Physics 150. Note that there is no permanent lecture on Friday. The date is reserved for quizzes and additional lectures as announced.

Instructor and TA Office Hours will be posted on class web site.

Due to the size of the class, the instructor cannot respond to individual e-mails. If you have an issue that needs to be resolved, please see the instructor after class or during office hours.

Course materials:

Required Text Book:


WebAssign subscription for homework:

Go to WebAssign.net
Below the ‘log-in’ button click on ‘I have a class key’
Provide this class key: umn 2105 7910
Create an account. You must use your UofM x500 ID as the user ID
Pay with a credit card. This will give you access to the homework and to a digital version of the textbook.

Should you purchase the paper copy of the textbook, since the digital copy is included with WebAssign? It’s up to you. It is not mandatory to have both versions. However, many people, myself included, find that learning from a digital copy is difficult and not as effective as a paper textbook.


Clickers: We will be using ‘iClicker2’ for in-class response system. These are the same clickers used by introductory chemistry and biology classes, and in Physics 1301 in fall
2103, so you only need one clicker for all of these classes. There should be only one ‘iClicker2’ available in the bookstore. The ISBN number is: 9781429280471

Optional Supplemental Material:

‘Calculus Made Easy’, Silvanus P. Thompson (St. Martin’s Press)

Course Overview:

Physics 1302 is the second semester of a calculus-based introduction to physics principles, with emphasis on electricity and magnetism. The course is intended for those students who will go on to study one of the physical sciences or an engineering discipline. We will learn how to think carefully and quantitatively about the world around us.

The beauty and attraction of physics (for those, like you, who are lucky enough to study it), is that the mastery and application of a few simple concepts provides a wealth of information about the physical universe. It is not sufficient, however, to merely memorize these principles – but rather, we will dig in and use these concepts to quantitatively solve problems about our world.

In fact, solving word problems will seem at times to be what this course is all about. But the problems are simply examples that illustrate the correct usage of the physics concepts we will discuss. In order to obtain the maximum benefit from this class, you should read each of the assigned chapters prior to the lectures. Each chapter contains a set of worked out problems. You should, when reading the chapter, cover up the solutions and attempt the problems first on your own. Compare your answer to that in the textbook, and if they differ – try it again right away! The more problems you work out, the better your performance of exams, and the more you will get out of the class.

Working on problems with other students in a study group can be very beneficial. However, consulting with your fellow students during a quiz or final exam is what is commonly referred to as Cheating. Therefore, it is also imperative that you master the skills necessary to solve problems on your own. Do not be frustrated or deterred if you struggle with certain problems. This is all part of the learning process, and the knowledge that results from hard struggle is dear indeed.

Class Webpage:
(go to http://www.physics.umn.edu/classes/ and choose 1302W.300):
Please visit the class webpage regularly for official announcements regarding lectures, lab, homework, quizzes, and the final exam. Solutions to the quizzes will be posted here after they are graded.

You must log in using your University X.500 Username and password.
Lab Reports:

This course satisfies University requirements as a laboratory science class and as a writing intensive course. Therefore you **must** pass the laboratory to receive a passing grade in the course. Passing the laboratory means receiving 60% of the possible score. The laboratory grade will be based on pre-lab problems, well thought out predictions, correctly written laboratory reports, and properly handled laboratory notebook. All laboratory reports must be submitted on time. Late lab reports will not be accepted, except in situations officially recognized by the University. Failure to participate in a lab will result in a grade of 0 for this lab. There are no make-up labs.

Quizzes and Final:

There are four quizzes throughout the semester. The dates for the quizzes are in the syllabus. There are no make-up quizzes. If you have a University approved reason to miss a quiz please talk with the instructor. “Cheat sheet” and calculator policy will be announced prior to the quizzes.

The final exam is common to all 1302 sections, and will be given on May 15 from 6:30 – 9:30 PM, in a room to be announced. If you have a University approved reason to miss this final, there will be a make-up exam. You must register with the physics office to take the make-up exam. The final exam covers the entire material of the semester. “Cheat sheet” and calculator policy will be announced prior to the exam.

As specified by University policy, make-ups for in-class quizzes will be given only in the event of conflicts with scheduled activities of official University organizations, religious holidays, and verifiable illnesses as prescribed by University regulations. A make-up final exam will be given for students with conflicts of these types, or for students that have three final examinations in a 16-hour period. Requests for make-ups for reasons other than those specified by University policy cannot be honored.

Grading:

The course grade will be determined from the various components of the course in the following way:

(a) The homeworks will count for 10%.
(b) The laboratory will count for 15%.
(c) In class response (Clickers) will count for 5%.
(d) Each quiz will count for 12% of the score.
(e) The total grade will then be determined as the maximum over the following 5 possibilities:
4. One quiz at 12% and the final at 58%.
5. Zero quizzes and the final at 70%.

We will automatically assign you the highest grade obtained from these possibilities. This grading scheme allows you to not count a quiz that you missed or a quiz on which you did not perform well toward your final grade. The scheme also allows you not to take any quizzes and base your final grade heavily on the final exam – however, you are strongly encouraged to take the quizzes regularly, as this is the best way to ensure your good progress in the class.

The letter grade for the course will be assigned according to the following approximate scale: A, A- (83 - 100), B+, B, B- (68 - 82), C+, C, C- (50 - 67), D+, D, D- (40 - 49), F (below 40 or a lab grade below 60%). The exact dividing lines will be determined later.

(Please note that part of the laboratory grade is given by the TAs for the level of participation in the lab and discussion sessions.)

Teaching Assistants

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<th>COURSE</th>
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Check onestop class schedule in first week of classes. Current rooms subject to change.
## CLASS SCHEDULE, QUIZZES AND FINAL (Subject to Change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject</th>
<th>Chapter</th>
<th>Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 21 - 24</td>
<td><strong>Electrical Charge</strong></td>
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<td><strong>Organizational</strong></td>
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<td>2</td>
<td>Jan. 27 - 31</td>
<td>Electric Charge, Electric Field</td>
<td>21/22</td>
<td>Lab I, Prob. 1, 2, 3</td>
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<td>3</td>
<td>Feb. 3 - 7</td>
<td>Electric Field, Gauss’ Law</td>
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<td>Lab I, Prob. 4, 5</td>
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<td>4</td>
<td>Feb. 10 – 14</td>
<td>Gauss’ Law, Electric Potential</td>
<td>22/23</td>
<td>Lab II, Prob. 1, 2</td>
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<td><strong>Feb. 14</strong></td>
<td><strong>Quiz 1</strong></td>
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<td>Feb. 17 - 21</td>
<td>Electric Potential</td>
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<td>Lab II, Prob. 3, 4</td>
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<td>Feb. 24 - 28</td>
<td>Capacitance</td>
<td>24</td>
<td>Lab III, Prob. 1, 2, 3</td>
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<td>March 3 – 7</td>
<td><strong>Electric Currents (DC)</strong></td>
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<td>Lab IV, Prob. 1, 2, 3</td>
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<td><strong>Mar. 7</strong></td>
<td><strong>Quiz 2</strong></td>
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<td>March 10 - 14</td>
<td>Electric Currents (DC)</td>
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<td>Lab IV, Prob. 8, 9, 11</td>
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<td>9</td>
<td>March 24 - 28</td>
<td>Magnetic Field and its Sources</td>
<td>26/27</td>
<td>Lab IV, Prob. 4, 5</td>
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<td>10</td>
<td>March 31 – Apr. 4</td>
<td>Magnetic Field and its Sources</td>
<td>26/27</td>
<td>Lab V, Prob. 1, 3</td>
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<td>11</td>
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<td>Magnetic Induction</td>
<td>27/28</td>
<td>Lab V, Prob. 2, 5</td>
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<td><strong>Quiz 3</strong></td>
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<td>April 14 - 18</td>
<td>Magnetic Induction/Magnetism in Matter</td>
<td>28</td>
<td>Lab V, Prob. 6, 7, 8</td>
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<td>Inductance</td>
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<td>Lab VI, Prob. 3, 4</td>
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<td>April 28 – May 2</td>
<td>Alternating Currents</td>
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<td>Lab VI, Prob. 5, 6</td>
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<td>Maxwell’s Equations</td>
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<td><strong>Final Exam</strong></td>
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Liberal Education Requirement

This class satisfies the University of Minnesota Liberal Education requirement of a physical science course with a laboratory component, as part of the Liberal Education Core. Discoveries and inventions that have profoundly altered the course of human history arose from the physical sciences. As citizens and voters (whether in the United States or in another country), today’s students will be called upon to make decisions on such topics as global climate change, alternative energy sources and resource management. A familiarity with the methods and findings of the physical sciences has never been more important and forms a crucial component of a common education.

This class will expose the student to physical principles and concepts, demonstrate how these principles can be applied to quantitatively describe natural phenomena, and provide the student with an opportunity to perform hands-on experiments and measurements that replicate how physical knowledge is obtained. The fundamental principles of electricity and magnetism are explored, and their application in electronic circuits will be emphasized. The basic physics that underlies wireless communication technology will be explored and elucidated, providing a necessary solid grounding for future engineering or physical science studies. The class will include discussions of electrostatics, dc and ac circuits, electrical energy and capacitors. Magnetism, electromagnetic induction and oscillations will also be described. Throughout the semester, the application of these physics concepts in modern technology will be emphasized.

All knowledge in the physical sciences is empirically acquired, and a proper exposure to the ways of knowing and thinking in the physical sciences requires a laboratory component to any formal coursework. The lab component of the class will give you experience in making predictions based upon hypotheses, which are then empirically tested by experiment or observation, through which scientific knowledge is developed. The language of the physical world is mathematical and students will be expected to employ mathematical reasoning in order to solve problems both qualitatively and quantitatively. Physics is a social endeavor, and the student will gain experience in cooperative problem solving, working in small groups with other students, in both the laboratory and Discussion sections of the course.

Mandatory Statement about academic integrity:

The University expects the highest standards of honesty and integrity in the academic performance of its students. Any act of scholastic dishonesty is regarded as a serious offense, which may result in expulsion. Scholastic dishonesty is defined as submission of false records of academic achievement; cheating on assignments or examinations; plagiarizing, altering, forging, or misusing an academic record; taking, acquiring, or using test materials without faculty permission; acting alone or in cooperation with another to obtain dishonestly grades, honors, submission of false records of academic achievement; cheating on assignments or examinations;
plagiarizing, altering, forging, or misusing an academic record; taking, acquiring, or using test materials without faculty permission; acting alone or in cooperation with another to obtain dishonestly grades, honors, awards, or professional endorsement. Aiding and abetting an act of scholastic dishonesty is also considered a serious offense with the same possible consequences. Students may not make commercial use of their notes of lectures or University-provided materials without the express written consent of the instructor. (See the Senate policy at http://www1.umn.edu/usenate/policies/classnotes.html.)

Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course. If you have any questions or uncertainties about what is permitted and what is not allowed, please discuss them with the instructor.

**Classroom Courtesy:**

If you enter the classroom you are signaling that you came to learn. No newspapers or crossword puzzles, please. No open laptops (not even for taking notes), no earphones, nor eating or drinking, please. But really, I don’t have to tell you this. You will be so spellbound by my brilliant lectures (FACT!) that you will not be tempted to do anything other than take notes and participate in the class.

We will make every effort to adhere to the University’s formal session times. But lectures end when the discussion of a particular topic comes to an end, regardless of the clock. Please collect your books only when the instructor indicates that the lecture has ended.

Using another students’ clickers constitutes academic cheating. The University has strict rules regarding cheating. Don’t do it. See below for the University policy.

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**DEPARTMENTAL POLICIES**

**ATHLETES** must provide their official University of Minnesota athletic letter containing the approved competition schedule to their instructor and the staff in office 148. Away exams will be arranged with the athletic adviser traveling with the team. Accommodations will be made for official university sports only (i.e. no accommodations will be made for intramurals, club sports, etc.)

**DISABILITY SERVICES:** If you have accommodations for this course, please provide the staff in office 148 with a copy of your accommodation letter for the current semester. Exams will be arranged according to accommodations and sent to the testing center for administration.
MANDATORY POLICY INFORMATION [REFERENCES/LINKS VERSION FOLLOWS]

- Student conduct code
  http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html

- Scholastic Dishonesty
  See student conduct code

- Disability Accommodations
  http://ds.umn.edu/student-services.html

- Use of Personal Electronic Devices in the Classroom
  http://policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html

- Makeup Work for Legitimate Absences
  http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html

- Appropriate Student Use of Class Notes and Course Materials
  http://policy.umn.edu/Policies/Education/Education/CLASSNOTESSTUDENTS.html

- Grading and Transcripts
  http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html

- Sexual Harassment
  http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html

- Equity, Diversity, Equal Opportunity, and Affirmative Action
  http://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html

- Mental Health and Stress Management
  http://www.mentalhealth.umn.edu

MANDATORY POLICY INFORMATION [FULL TEXT VERSION FOLLOWS]

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.
As a student at the University you are expected adhere to Board of Regents Policy: *Student Conduct Code*. To review the Student Conduct Code, please see: [http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html](http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html).

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

**Scholastic Dishonesty**

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code: [http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html](http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html)) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: [http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html](http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html).

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: [http://www1.umn.edu/oscai/integrity/student/index.html](http://www1.umn.edu/oscai/integrity/student/index.html). If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class—e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

**Disability Accommodations**

The University is committed to providing quality education to all students regardless of ability. Determining appropriate disability accommodations is a collaborative process. You as a student must register with Disability Services and provide documentation of your disability. The course instructor must provide information regarding a course's content, methods, and essential components. The combination of this information will be used by Disability Services to determine appropriate accommodations for a particular student in a particular course. For more information, please reference Disability Services: [http://ds.umn.edu/student-services.html](http://ds.umn.edu/student-services.html).
Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: http://policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html.

Makeup Work for Legitimate Absences

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/CLASSNOTESSTUDENTS.html.

Grading and Transcripts

The University utilizes plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following:

- A 4.000 - Represents achievement that is outstanding relative to the level necessary to meet course requirements
- A- 3.667
- B+ 3.333
- B 3.000 - Represents achievement that is significantly above the level necessary to meet course requirements
- B- 2.667
- C+ 2.333
- C 2.000 - Represents achievement that meets the course requirements in every respect
- C- 1.667
D+  1.333
D  1.000 - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements
S  Represents achievement that is satisfactory, which is equivalent to a C- or better.
For additional information, please refer to:
http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html.

Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy:
http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy:

Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: