Welcome to 1102W.
This is the second term of a course sequence designed to prepare you for work in your field by: having solid conceptual understanding of the way the real world works based on a few fundamental principles of physics; being able to solve realistic problems using logical reasoning and quantitative problem solving skills; applying those physics concepts and problem solving skills to new situations; and learning to effectively communicate technical information. To achieve these goals, this course requires an in-depth understanding of the material. This course will emphasize the application of the principles and skills learned in Physics 1101W to more complex, abstract, and realistic situations involving topics from fluids, waves, electricity, magnetism, optics, and atomic physics. A laboratory requires you to apply both the concepts and problem solving skills taught in this course to the real world. It will also emphasize technical communications skills. A discussion section gives you the opportunity to discuss your conceptual understanding and your problem solving skills by practicing working problems with other students. The laboratory and discussions sections emphasize collaborative problem solving as a powerful learning tool and as a preparation for work in your profession.

Warning: The pace of the 1102 course is significantly faster than 1101. We will not have time to develop all the concepts in lecture that are described in the book and that you will need to know for exams. You will also find that you may need to work with a concept in laboratory or discussion before it is developed in lecture. For these reasons it is important for you do the assigned reading and homework problems.

Instructor: Paul Haines
Email: haines@physics.umn.edu include subject “Phys 1102”
Office Hours: Tuesdays & Thursdays 3:35PM, Humphrey 30
Lectures: Tuesdays & Thursdays 5:45 – 7:15PM in Willey 125
First lecture: Tuesday, January 19th

SUMMARY
Before each lecture:
- Read the assigned readings announced in lecture.
- Work through textbook examples and read the homework assignment.
Before each lab:
- Read the lab problem in the lab manual for the problems your instructor has assigned for that week. Complete the Warm-Up Questions and turn in to TA.
- Complete any suggested text reading given in the Preparation and Warm-up sections.
On-going:
- Complete the assigned homework problems (and self-grade; you don’t have to turn them in).
- If you have questions on homework problems, etc., please attend TA tutor hours, Williamson Hall.
- Lab reports will be due approximately every two weeks. Your TA will assign them.
Quizzes and final exam:
- There will be 4 quizzes given in lecture.
- There will be 4 group problems as part of each quiz which will be given in discussion section.
- The final exam is on Tuesday, May 10, from 5:45 PM to 8:45 PM.

Class Webpage URL: https://www.physics.umn.edu/, select Courses, select Phys 1102W.100. You must log in using your University X.500 username and password. The lecture notes will be posted after the class. Please refer to the class web page for official announcements regarding lectures, lab, quizzes, and the final exam. Solutions to quizzes and homework will be posted there.

Course materials
The bookstore has a special U of M edition (2016) – the regular College Physics text has 30 chapters.
The custom volume 1 contains chapters 1-10 (Phys 1101)
The custom volume 2 contains chapters 11-30 (Phys 1102) – this is the one for Spring 2016
(If you already own the custom Volume 1, you might find it useful to keep until you have competed 1102. We will be referring back to material that you learned in 1101.)

Lab Manual (required): College Physics Laboratory: this will be available as free downloadable PDFs from the “syllabus” section of the class website
Lab Journal (required): Univ. of Minnesota 2077-S
iClicker 2, also available at the Bookstore. CES preferred student response device.
Ti-30xa Calculator or other simple scientific calculator. These are the only type of calculator that will be permitted during quizzes and the final exam. NO GRAPHING CALCULATORS ARE PERMITTED.

Optional course materials: The Competent Problem Solver for Introductory Physics, by Heller and Heller.
We strongly recommend : a bound notebook for all the homework problems. Bring this with you to office hours and the TA help room.

TA office hours
Office hours held by the 1102 TAs will be included on our web page office hour link. These will be held in Williamson Hall 140. Williamson is the TA office hour room for all Physics TAs, and each TA, whether they are assigned to our course or other introductory courses, are available for consultation about all introductory courses. Feel free to consult any physics TA holding office hours in that room. In addition to the assigned TAs for this class, there are peer-tutors available to help you for Phys1102 through the Walter Smart Learning Commons on a drop-in basis. More information and the tutor schedules will be posted at: http://www.tc.umn.edu/~walt0217/sc/ .

Prerequisites
Physics 1102 requires that you have successfully completed Phys 1101. The math skills required are the same as for 1101, you will need a solid working knowledge of algebra and trigonometry. Appendix A in your text provides an overview of the tools you will need. If you did not take Physics 1101 and have satisfied your prerequisite in some other way, you should meet with the instructor or a TA to discuss any special needs or concerns.

Work load
This is a demanding course. There is a lot to learn. The course moves at a fast pace with more diversity in content than Phys 1101. You should expect and plan for a workload consistent with University policy (three hours per week per credit for a total of twelve hours per week for an average student to receive an average grade).

The class In lecture we will motivate and introduce new material, analyze example problems, and generally work to organize and interpret the knowledge accumulated in your reading, in lab, and in other course activities. Our task will be to elaborate on important and difficult ideas, and to clarify points that may be confusing. We will utilize a variety of tools and devices to assist in clarifying concepts and methods. Lecture demonstrations will be used to illustrate new concepts, and we will attempt to recognize and address misconceptions that arise. In-class questions (ICQ) will be posed for class response using the iClicker 2. We will develop strategies for solving problems that will be applied and reinforced in discussion sessions and labs. ICQs and other problem solving will be often done in groups. It is impossible to cover all of the details in lecture, and while we will stick fairly closely to the text, it is not our intention to duplicate the text. You should complete assigned reading (see below) before attending class. By preparing in advance and asking informed questions you can help ensure that class time is used to maximum advantage. Throughout the course, we will learn strategies for solving physics problems. We will do examples with these strategies, and you will be required to apply them explicitly in solving homework, discussion session and test problems.

Reading and Problem Assignments
Your primary learning tool in this course is the working of physics problems from your text and provided by us. This includes homework problems and in-class problems. Any of these problems can and will appear in the class quizzes. There will also be a grade associated with some In-class questions (see below). It is important to solve physics problems, whether they are simple exercises or context rich problems, as best as you can before examining the solution provided by an “expert.” As the first step in this, it may be most beneficial to your reading if you treat the examples given in the text as problems, solving them yourself before you read the authors’ solutions. You do not understand how to solve a problem, and the underlying physical principles or their application to the problem, until you can find the solution without looking at someone else’s solution. Working problems is the only reliable way to test your understanding of a topic. Try as many of the problems as you have time for. If your answer agrees with the solution manual, great! If not, or if you can’t come up with any answer, seek help from the 1102 instructional team, including the TAs in the Physics Tutoring Room. Some of your fellow students are also potentially good resources.
Done physics problems is hard work, but you will be rewarded by a deeper understanding and sense of accomplishment. The test problems will be of the same type and general level of difficulty as the problems that you will be assigned, or presented in lecture, or worked on by your group in your discussion section.

As mentioned above, we will develop strategies for solving problems. In practice, we will adhere to the strategies articulated in the required text. However, you may choose to supplement your problem-solving strategies by reading “The Competent Problem Solver”. The University of Minnesota Physics Education Research Group has long been at the forefront of the study of how skilled problem solvers actually solve problems, particularly those that are more complex than the simpler exercises and examples, and more like real world situations. Much of this is detailed in “The Competent Problem Solver” which is optional for this course. In order to illustrate a common strategy of expert problem solvers, the book first applies it to simple problems, so simple that most of you could solve them much faster than an application of this method. While the discipline of using this method on simple problems may at first seem frustrating, it generally pays off when the problems become more difficult.

Homework
Homework assignments for each book chapter will be posted in class, in the class notes and on the class website. While homework will not be graded, it forms the core of your learning experience and you are urged to do as many problems as you can. As there are no grades given for homework, the due dates given for an assignment are for guidance only and are typically the day before a quiz on the material in the homework.

In Class Questions
Ordinarily during class there will be several In-class questions (ICQ), which will be graded for class participation points (5% of your total grade). For graded ICQ questions, we will use the iClicker 2, the personal response system now used by the Chemistry, Biology, and Physics departments. We will automatically drop the worst two scores out of the total to allow for unforeseen class absences.

Discussion Sessions
In discussion sessions you work with classmates to solve a challenging problem in small groups. Some analysis of the solution will be presented at the end of the session and/or the solutions will be posted on the class website. On quiz week, there will be a group problem in the discussion section, which will count for 25% of the total quiz grade. Your group will solve that problem collaboratively with all group members receiving the same score for that problem. Only those participating in all discussion sessions during the preceding weeks will be allowed to take the group part of the quiz (except if you have a University approved excused absence – you must inform your TA as soon as possible that you will be absent for any discussions). For every discussion session missed 50% off of the group quiz that follows the absenteeism. If you are more than 10 minutes late to the quiz, you will take the quiz on your own. The TA will assign the groups and new groups will be assigned after each quiz.

Laboratories
You have the same TA and work in the same group as in your discussion session. Labs are roughly coordinated with lectures, however at times you may be asked to do a lab BEFORE concepts are introduced in lecture. To get the most out of lab, you will need to keep up on your assigned reading. The labs are designed to give you an opportunity to test, expand and refine your understanding of basic physics concepts. Careful recording of observations in your lab journal and preparation of formal lab reports are important parts of this experience. Since you carry out the lab exercises in a group and the equipment for each lab is available for only a limited time, make-ups are not possible. You will need to consult as soon as possible with your lab instructor (TA) if an officially excused absence from lab proves unavoidable. For every lab missed 50% off of the next assigned lab report.

Because this course satisfies University requirements as a laboratory science class and as a writing intensive course, you must receive a minimum laboratory grade of 60% to receive a passing grade in the course. The laboratory grade will be based on the demonstration of a well organized and correct written technical communication of the physics concepts of this course in your laboratory journal and laboratory reports, well thought out predictions and answers to the questions in the laboratory manual brought to class, and collaborative skills as evidenced by effective group work. Failure to participate in the laboratory will result in a laboratory grade of 0 for that topic. As a rule, there are no make-up laboratories. No laboratory makeup will be allowed except in situations officially recognized by the University. In that case, the laboratory work must be made up by arrangement with your instructor before your next scheduled laboratory period. Grades for the laboratory work will be determined in part by laboratory reports (about one for each laboratory topic), in part by your work in the laboratory and in part by your work in answering the prediction and other questions turned in before lab. The predictions and questions assigned by your TA must be turned in no later than 24 hours before the laboratory time each week. The specific part of the laboratory for which you will write a report will be assigned to you by your TA at the end of each laboratory topic (about every three weeks). Reports should be about 4 but no shorter than 3 typed double-spaced pages (using a word processor is required and such facilities are supplied by the University) including all necessary predictions, graphs, data tables, and calculations. Reports must be delivered to your laboratory instructor.
for grading no more than one week after they are assigned. Late reports will not be accepted. Graded reports will be returned to you not later than your next laboratory meeting. Your first report (and only the first one) may be revised based on instructor comments to achieve a higher grade. The revised report must be given to your laboratory instructor within two days. More details of the laboratory grading will be given to you before your first report is assigned. There is also general information about grading in the introduction to your laboratory manual however this syllabus, and information given to you by your TA supersedes any due date or other grading information. Remember this is a writing intensive course so your grade will depend on your communication skills. The manual will be posted online.

Important: you may not use data collected by another person as part of your lab report. You must attend each lab and it will be considered plagiarism if you turn in a lab report that utilizes someone else’s data. Even within your group, you must copy down in your own lab manual the data obtained in the experiment. You may not split tasks and send each other data for a given task. If the data is recorded digitally, each student in the group must take the time to inspect the data before it is printed and/or emailed to the group. These are habits that will be very important in your future careers if you plan to work in any data-related field.

LIST OF SECTIONS AND TEACHING ASSISTANTS

<table>
<thead>
<tr>
<th></th>
<th>Discussion</th>
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<th>Laboratory</th>
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<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>Sec</td>
<td>Time</td>
<td>Room</td>
<td>Sec</td>
<td>Time</td>
<td>Room</td>
</tr>
<tr>
<td>101</td>
<td>Th 1325-1415</td>
<td>Civil Engineering Bldg 213</td>
<td>102</td>
<td>We 2:30PM - 4:25PM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>103</td>
<td>Th 1325-1415</td>
<td>Vincent Hall 2</td>
<td>104</td>
<td>We 4:40PM - 6:35PM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>109</td>
<td>Th 1325-1415</td>
<td>Cooke Hall 215</td>
<td>110</td>
<td>We 6:50PM - 8:45PM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>111</td>
<td>Th 1325-1415</td>
<td>Amundson Hall 116</td>
<td>112</td>
<td>Th 8:00AM - 9:55AM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>120</td>
<td>Th 1430-1520</td>
<td>Folwell Hall 4</td>
<td>121</td>
<td>Th 10:10AM - 12:05PM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>122</td>
<td>Th 1430-1520</td>
<td>Amundson Hall 116</td>
<td>123</td>
<td>Th 12:20PM - 2:15PM</td>
<td>150 Lab-E</td>
</tr>
<tr>
<td>124</td>
<td>Th 1430-1520</td>
<td>Vincent Hall 207</td>
<td>125</td>
<td>Fr 8:00AM - 9:55AM</td>
<td>150 Lab-E</td>
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Quizzes and Final Exam
There will be four quizzes, each in two parts. The first part of each quiz will be a group quiz during the discussion section on the following Thursdays: Feb. 4, Mar. 3, Mar. 31 and Apr. 21. The second part will be a lecture hour quiz and will occur on the same Thursdays during lecture time. The lecture hour part of the quiz is 75% of the quiz grade (25% for problem 1, 25% for problem 2, 25% for multiple choices), while the discussion section part of the quiz is the remaining 25%.

The three-hour final exam is Tuesday, May 10, 5:45PM-8:45PM. The location will be announced in class.

Below is a link for the make-up final request form. Students must log in and fill out the form by 4p May 6th in order to take the make up final. If you have any question contact Kristina at info@physics.umn.edu.

http://goo.gl/forms/Yts4LpTtxR0

• The quizzes and final exam will consist of a mixture of multiple choice questions and longer worked problems. You should prepare one handwritten 8½ inch by 11 inch (double-sided) sheet of equations. No books or notes will be allowed. Only a TI-30xa or equivalent simple scientific pre-approved calculator will be allowed. No graphing or programmable calculators will be permitted. The use of any communication devices (cell phones, messaging devices, etc.) during examinations is not allowed. If you must have a translation device, you must bring a paper dictionary and you must sit in the front row for the exams.

• To be successful in problem solving you must get the physics right and communicate your understanding clearly and effectively. To receive full credit on any problem, your solution must be complete and understandable to the grader, with clear algebraic formulation of the physics, explicit definitions of all the symbols used, and proper handling of units and significant figures. In general, problems must be solved algebraically before numbers are substituted (one exception is that plugging in zero should be done when appropriate to simplify the algebra).

• A valid photo ID is required on exam days. Examples of a valid ID are a University ID or Driver’s License.

No make-up ID is required on exam days. Examples of a valid ID are a University ID or Driver’s License.

Tentative Plan

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Topics</th>
<th>Chapters (custom)</th>
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</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Oscillations, Waves, Superposition</td>
<td>4, 5, 6</td>
</tr>
<tr>
<td>4-7</td>
<td>Electric Fields, Forces and Potential, Current</td>
<td>10, 11, 12, 13</td>
</tr>
<tr>
<td>8-9</td>
<td>Magnetism, Induction</td>
<td>14, 15</td>
</tr>
<tr>
<td>10-12</td>
<td>Electromagnetic Waves, Wave Optics, Relativity</td>
<td>15, 7, 17</td>
</tr>
<tr>
<td>13-15</td>
<td>Quantum Mechanics, Atoms, Nuclei</td>
<td>18, 19, 20</td>
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</table>

Grades

The University policy on grades defines the level of achievement for the different grades as follows:

A - Represents achievement that is outstanding relative to the level necessary to meet course requirements.
B - Represents achievement that is significantly above the level necessary to meet course requirements.
C - Represents achievement that meets the course requirements in every respect.
D - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements.

We compute a final score using two methods, and your grade will be based on the greater of these two scores.

Method 1:
5% for In Class Questions
30% for the laboratory. Completion of all labs, and a lab grade of at least 60% will be required to pass the course.
30% for best 3 out of 4 quizzes (10% per quiz, including both the lecture and discussion section parts of the quiz).
The lowest quiz score is dropped.
35% for the three-hour final examination.

Method 2:
5% for In Class Questions
30% for the laboratory. Completion of all labs, and a lab grade of at least 60% will be required to pass the course.
40% for the 4 quizzes (10% per quiz, including both the lecture and discussion section parts of the quiz).
25% for the three-hour final examination.

As a reflection of this your course grade will be calculated on a scale, as follows:
A: 100 - 90%, A-: 90 - 85%,
B+: 85 - 80%, B: 80 - 75%, B-: 75 - 70%,
C+: 70 - 65%, C: 65 - 60%, C-: 60 - 55%,
D+: 55 - 50%, D: 50 - 40%,
F: <40%.

(At the boundaries, the higher letter grade prevails. E.g., 85% is an A-, not a B+. Percentages are rounded to the nearest integer percent.)

Make-ups As specified by University policy, missed quizzes will result in a grade of zero except in the event of conflicts with scheduled activities of official University organizations, religious holidays, and verifiable illnesses as prescribed by University regulations. The course instructor must be notified at the beginning of the semester or as soon thereafter as possible (not fewer than three weeks in advance) about conflicts due to scheduled, official University activities or religious holidays. Disputes concerning the validity of an excused absence will be settled in consultation with the Director of Undergraduate Studies in Physics. A make-up final exam will be given only for students with valid, verifiable conflicts of these types, or students with three final examinations in a 16-hour period if our exam is the middle of the three exams. Requests for make-ups for reasons other than those specified by University policy cannot be honored.

Other information
Minnesota privacy laws require that tests and other materials are returned in a manner that ensures that no one else can see your grades. Papers will be handed out by your TA at the first discussion or lab after grading is completed.

Academic Integrity
All work that you turn in for a grade must be your own. The following behaviors are considered to be cheating.
  a. Copying all or part of an answer to an in-class question
  b. Copying all or part of a lab report, data table or fabrication of data (see Intro, pg. 3 of Lab Manual)
  c. Copying all or part of a homework assignment or exam
  d. Any other matter covered by the University statement below.

Your TAs are observant. They notice duplication in lab reports and quiz problems. If you have any questions or uncertainties about what is permitted and what is not allowed, please discuss them with the instructor.

The use of cell phones or the sending of text messages during a quiz or an exam will be understood to be an act of academic dishonesty and shall be grounds for awarding a grade of F or N for the course.

Mandatory Statements Section

Statement addressing Liberal Education Components
The class exposes the student to physical principles and concepts, demonstrates how these principles can be applied to quantitatively describe natural phenomena, and provides the student with an opportunity to perform hands-on experiments and measurements that model how physical knowledge is obtained. The fundamental principles of thermal physics, electricity and magnetism, optics, and atomic physics are considered. The course emphasizes conceptual understanding of the way the real world works based on fundamental principles of physics, using mathematical analysis at the algebra level. The development of conceptual understanding of physical principles and their quantitative application are further deepened in the discussion section, where students practice problem solving skills. In addition, familiarity with the methods and findings of the physical sciences not only forms a crucial component of a common education, but also prepares students to be scientifically literate citizens. Because all knowledge in the physical sciences is empirically acquired, the laboratory component of the course is essential to properly expose students to the scientific method and the ways of knowing and thinking in the physical sciences. The lab component involves the formulation of scientifically sound predictions by the student, followed by empirical testing of the hypotheses through hands-on experimentation. Since the language of the physical world is mathematical, quantitative analysis of experimental data is an essential aspect of the lab experience. Physics, like all sciences, is a social endeavor, and students are exposed to cooperative problem solving, working in small groups with other students, in both the laboratory and discussion sections of the course.

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. 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

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. 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. 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.

Links to other required policies:
- 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
- Mental Health and Stress Management http://www.mentalhealth.umn.edu

**Classroom courtesy**

*Lectures end when the idea or technique under discussion has been concluded and the lecturer has indicated that the students are free to leave.* For this reason lectures are rarely expected to end exactly at the end of class time. 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 the educational process. Those who must leave early should sit near the end of a row to minimize the disturbance they will inflict on the other students. Cell phones, MP3 players and similar devices must not be used and must be turned off during the lecture period. Computers may only be used for taking class notes, and keyboarding must not be a disturbance to other members of the class. Note that food and drinks are not allowed in lecture halls.

**Physics 1102 has an interactive lecture.** Remember, 5% of your grade depends on your participation in class. Please do your Facebooking, web browsing, newspaper reading, crossword puzzles, online poker, tweets, etc. some other time. You may be asked to leave the classroom if the instructor considers that your behavior is interfering with the learning process of the other students.
## Weekly Schedule

<table>
<thead>
<tr>
<th>week</th>
<th>topic</th>
<th>chapter (KJF)</th>
<th>lab</th>
<th>notes</th>
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<tbody>
<tr>
<td>1 (1/18)</td>
<td>Oscillations</td>
<td>4 (14)</td>
<td>none</td>
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<tr>
<td>2 (1/25)</td>
<td>Waves</td>
<td>5</td>
<td>Lab II: 3,4,5 oscillations</td>
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<tr>
<td>3 (2/1)</td>
<td>Superposition</td>
<td>6</td>
<td>Lab III: 1,2,3,4 waves</td>
<td>Quiz 1 (Th Feb 4)</td>
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<tr>
<td>4 (2/8)</td>
<td>Electric Fields &amp; Forces</td>
<td>10</td>
<td>Lab IV - 1, 2, 3 E-field</td>
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<tr>
<td>5 (2/15)</td>
<td>Electric Potential</td>
<td>11</td>
<td>Lab IV - 5,6 E-field</td>
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<tr>
<td>6 (2/22)</td>
<td>Current and Resistance</td>
<td>12</td>
<td>Lab V - 1,2,3 current, resistance</td>
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<tr>
<td>7 (2/29)</td>
<td>Circuits</td>
<td>13</td>
<td>Lab V - 4,5 circuits</td>
<td>Quiz 2 (Th Mar 3)</td>
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<td>8 (3/7)</td>
<td>Magnetic Fields</td>
<td>14</td>
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<tr>
<td>9 (3/21)</td>
<td>Induction</td>
<td>15</td>
<td>Lab VI - 1,2 B-field</td>
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<td>10 (3/28)</td>
<td>EM radiation</td>
<td>15</td>
<td>Lab VI- 3,4 B-field</td>
<td>Quiz 3 (Th Mar 31)</td>
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<td>11 (4/4)</td>
<td>Wave Optics</td>
<td>7</td>
<td>Lab VI - 5 +generator</td>
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<td>12 (4/11)</td>
<td>Relativity</td>
<td>17</td>
<td>Wave Optics 1,2</td>
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<td>13 (4/18)</td>
<td>QM</td>
<td>18</td>
<td>nuclear shield and radioactive decay</td>
<td>Quiz 4 (Th Apr 21)</td>
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<tr>
<td>14 (4/25)</td>
<td>Atoms</td>
<td>19</td>
<td>photoelectric + gas spectra</td>
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<td>15 (5/2)</td>
<td>Nuclei</td>
<td>20</td>
<td>no lab</td>
<td></td>
</tr>
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Last Update: January 25, 2016