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PH2200 Website	http://www.phy.mtu.edu/~weidman/ph2200/
Blackboard	http://courses.mtu.edu
MasteringPhysics	http://www.masteringphysics.com

INTRODUCTION

The Fundamental Questions

Questions are crucial to learning. It's through the process of inquiry that we construct our knowledge of the natural world. We will address the following five fundamental questions in our study of electricity and magnetism:

1. What are the properties of electric charge?
2. How are electric fields created by electric charges, and how do electric charges respond to electric fields?
3. What are the fundamental physical principles by which electric circuits operate?
4. How are magnetic fields created by electric charges, and how do electric charges respond to magnetic fields?
5. How do electric and magnetic fields change with time?

The Goals

The goals of this course are for you to become familiar with the phenomena of electricity and magnetism and to develop a theory to explain those phenomena. We will continue to develop the robust problem-solving skills required by professional engineers and scientists. Our study of physics will emphasize thinking and reasoning. We will stress the use of qualitative reasoning, pictorial and graphical reasoning, and reasoning by analogy; we will also make use of mathematics to help us understand and describe patterns and relationships that exist in nature.

The Methodology

The basic methodology of Physics 2200 can be summarized as follows:

1. Read about it (textbook)
2. Untangle it (interactive lectures)
3. Practice with it (end-of-chapter homework)
4. Challenge yourself (web-based graded exercises and problems)

The order of the above items is very important. Your first exposure to any material will be when you read about it in the textbook (1) prior to lecture. The purpose of the textbook is to provide background for lectures, to be a resource for detailed explanations, to be a reference and a study guide, to offer practice problems, and to teach a robust problem-solving strategy.

The interactive lectures (2) will not simply regurgitate what you have read; rather, the purpose of the lectures is to be inspiring and stimulating, to clarify the textbook, to explain confusing issues, to urge you to think critically, to give you lots to think about, and to spark further interest in the material. This is not a traditional approach. Your participation is needed both prior to and during *each* lecture!

Lots of practice is required to become a proficient problem-solver. Roughly two class sessions each week will be set aside to allow us to practice solving end-of-chapter exercises and problems (3). The problem-solving strategy used in class will be the same as that used in every example exercise in the textbook.

To cap things off, you will demonstrate what you have learned by completing web-based graded exercises and problems (4). These activities will include tutorial problems and end-of-chapter problems.

COURSE SUPPLIES

Textbook: *Physics for Scientists and Engineers: A Strategic Approach*, 2nd edition, Randall D. Knight (bundled with a Student Workbook and a Student Access Kit to MasteringPhysics)*

clicker classroom response transmitter (hanging on the wall near the entrance to the Course Books section of the campus bookstore)

scientific calculator (any type)

straight edge

*Some Textbook Options:

Option 1: Purchase the standard edition of the textbook from the Campus Bookstore. Both new and used copies are available. The new textbook comes bundled with a Student Workbook and a Student Access Kit to MasteringPhysics. The standard edition is used in both PH2100 and PH2200.

Option 2: Purchase Volume 4 of the textbook from the College Bookshelf. Both new and used copies are available. The new textbook comes bundled with a Student Workbook and a Student Access Kit to MasteringPhysics.

Option 3: Purchase the textbook online in electronic form (eBook) along with MasteringPhysics access. This can be done at <http://www.masteringphysics.com>. Note that the Student Workbook, which is recommended but not required in PH2100/PH2200, is not included in the eBook.

As you weigh the various textbook options, be aware that the campus bookstore will buy back used textbooks for up to one-half the purchase price. Also, a MasteringPhysics account (with or without the eBook option) lasts two years.

COURSE STRUCTURE

Your grade for Physics 2200 will be based on the total number of points that you accumulate on the various graded activities. The total possible score is 1054 points, broken down as follows:

Reading Quizzes	60
Participation	64
Graded Homework (MasteringPhysics)	200
Exam I	210
Exam II	210
Final Exam	300
MasteringPhysics Extra Credit	10

Letter grades for the course will be determined by total points earned in the following manner:

A	900-1054	C	700-749
AB	850-899	CD	650-699
B	800-849	D	600-649
BC	750-799	F	0-599

Reading Quizzes

Beginning on Tuesday, June 28th, each lecture session will begin with a single-question multiple-choice reading quiz. The classroom response system described below will be used to record your answer to the quiz question. The quiz is intended to encourage you to read the relevant assignment prior to attending lecture. The reading assignments are located on the Assignment Schedule, page 9 of this document. Twenty-three 3-point reading quizzes will be given for a total of 69 points; however, you can earn a maximum of 60 points. This allows you to miss three reading quizzes without penalty.

Reading technical material is a skill that can be developed with practice. Read actively with questions in mind. A passive approach to reading physics wastes your time. Read with a pencil and paper beside your book and jot down questions and notes. Read to learn, not merely to cover material. Be sure to answer the *Stop to Think* questions that are sprinkled throughout each chapter - the answers with full explanations are located at the very end of each chapter. Test your comprehension of a reading assignment by completing the related exercises in the Student Workbook. After completing the workbook exercises, you can approach the end-of-chapter exercises and problems with confidence.

Participation

During each interactive lecture and each problem-solving session, you will respond to several questions using the classroom response system. Questions will be cast in a multiple-choice format, and you will answer by pressing a letter on your pocket-size wireless transmitter. Your response will be collected by a receiver mounted on the front podium and routed to the presentation computer. You will receive 2 points for responding to the majority of the questions, independent of whether your answers are right or wrong.

Two points are available for each of 36 class sessions for a total of 72 points; however, you can earn a maximum of 64 points. This allows you to miss four classes without penalty. Grading will begin on Tuesday, June 28th.

Here are some details about the classroom response system: The portable radio frequency transmitter operates with three AAA batteries. The transmitter shuts off automatically when not in use; the lifetime of the batteries is about 200 hours. In addition to the On/Off button, the transmitter has 5 buttons for choices. When a question is asked, check the Power LED to ascertain that the transmitter is on, then press your choice of letter A through E. If the Vote Status LED flashes green, your answer has been registered by the receiver; if the Vote Status LED flashes red, resubmit your answer. You may change your answer as often as you like; the system records only your latest response.

Graded Homework (MasteringPhysics)

MasteringPhysics is a state-of-the-art online tutorial and homework system. We will use two types of exercises within MasteringPhysics: tutorial problems and end-of-chapter problems. The tutorial problems have extensive hints and subparts that you may request if you get stuck. The end-of-chapter problems are derived from problems in the textbook and typically have no hints. Your individual end-of-chapter problems will be unique due to the use of random numbers for some of the numerical parameters. For all types of problems, once you submit your answers, your work will be graded instantly. You will be permitted an unlimited number of submissions for each problem part, but there will be a deduction of 3% for each incorrect answer. You will receive a 2% bonus for each unopened

hint. Multiple-choice questions are graded specially: in order to discourage guessing on multiple-choice questions, if a question has n choices, each incorrect answer results in a percent loss of $100/(n-1)$ for that question. This information is summarized in MasteringPhysics by clicking on *View Grading Details* at the head of each assignment.

A total of 10 homework assignments from MasteringPhysics will be assigned for grading. Each assignment is worth 20 points, so the point total for all assignments is 200. Each assignment must be completed by 11:00 p.m. on its due date for full credit (see the Assignment Schedule on page 9 for the due dates). Partial credit will be awarded for late work as follows: A problem submitted between 0 and 24 hours after the deadline receives an amount of credit that decreases linearly from 100% to 50% depending on exactly when the problem was submitted. A problem submitted later than 24 hours after the deadline still receives 50% of possible credit. Please plan on submitting your answers well in advance of the deadline to avoid problems with the web.

The first (ungraded!) assignment is entitled *Introduction to MasteringPhysics*. This initial assignment takes about 45 minutes to complete and consists of simple exercises to help you become familiar with the use of MasteringPhysics. If you're new to MasteringPhysics, this first assignment should be completed prior to attempting the graded assignments. A description of the grading is located in Help > How Grading Works. The first graded homework is due on Sunday, July 3rd, at 11:00 p.m.

MASTERINGPHYSICS REGISTRATION INSTRUCTIONS: To use MasteringPhysics, please register at the MasteringPhysics website located at <http://www.masteringphysics.com>. Click on MasteringPhysics for Knight: *Physics for Scientists and Engineers, 2e*.

First time users: Click on First Time User: Register on the page that follows. Here you'll be prompted for the access code that came bundled with your textbook. As you continue with the registration process, you'll be prompted for our course ID, your MTU e-mail address, and your Student ID:

Course ID: MTUPH2200SUMMER2011
E-mail Address: please use your MTU e-mail address
Student ID: your M-number (without the dash, for example, M12345678)

Prior users: Log in as an established user as you did previously. Sign up for PH2200 by entering as the Course ID: MTUPH2200SUMMER2011

Occasional problems arise with MasteringPhysics that are browser-related. If the graphics or the hints to a problem are missing, turn off the popup blocker in your browser. If you continue to have problems, try a different browser – MasteringPhysics recommends the use of Firefox. If you experience problems with the ranking tasks, be sure that you have the latest version of the Flash player installed on your computer. If the problem persists, contact me or the technical support staff at MasteringPhysics. It has been my experience that MasteringPhysics responds very quickly to requests for help.

A feature new to MasteringPhysics this year is the ability to rework completed problems after the due date. This work will not be saved and will not affect your grade. The feature may be useful as you review and rework the MasteringPhysics problems as you study for the exams.

Exams and Final Exam

The two exams and final exam are scheduled as follows:

Exam I	Friday, July 15
Exam II	Friday, August 5
Final Exam	Friday, August 12, 3:00 p.m. G009 Rekhi

Exams I and II will be 90 minutes long and hence will extend beyond normal class time. Students with a conflict will be accommodated by starting the exam one-half hour prior to the normal start of class. The final exam will be a comprehensive two-hour examination.

All exams will be closed book and closed notes. You may use the PH2200 formula sheet that will be included with the exam booklet. You will need a scientific calculator for the exams; however, equations may not be stored in calculators, nor may calculators be exchanged.

The exams will consist of a total of 30 conceptual questions and traditional problems; the final exam will consist of a total of 50 conceptual questions and problems. Both the questions and problems will be multiple-choice. The questions and problems will be similar to the *Stop to Think* questions and worked examples found in the textbook, the assigned end-of-chapter exercises and problems, the graded homework problems (MasteringPhysics), and questions and problems posed and answered during lecture.

It is your responsibility to appear at the scheduled times to take the exams. No late exams will be given, and an unexcused absence from any exam will result in a grade of zero.

There will be no curving, scaling, redemption, or any other adjustment of exam scores.

MasteringPhysics Extra Credit

You may earn up to 10 additional course points of extra credit by completing all of the problems identified as Extra Credit in MasteringPhysics. There are ten Extra Credit collections of problems, one for each chapter. Each of the ten Extra Credit collections of problems is worth five MasteringPhysics points for a total of fifty MasteringPhysics points. Your extra credit score that contributes to your course grade will be computed by dividing your total MasteringPhysics extra credit points by five. For example, if you earn 40 MasteringPhysics points of extra credit, 8 points will be added to your course total.

Grade Tracking - Blackboard

Your reading quiz and participation scores will be updated at the end of each week and the results will be available to you in the grade book maintained in Blackboard. This is where your exam scores and ultimately your course grade may be found as well. In addition to grades, I will use Blackboard to release your M-number so you can make a note of it prior to the exams and to list your iclicker transmitter number so that you can verify that I have your correct number. It's your responsibility to examine the grade book periodically for accuracy and to report any discrepancies to me.

ACCESSING Blackboard: Blackboard is located at <https://courses.mtu.edu>. Your User ID is your campus email address without the @mtu.edu and, by default, your Password is the same as your user ID. If you previously used Blackboard and changed your password, your updated password is needed. If you have forgotten your password, take your ID to Customer Service in room B24 of the EERC and request a new password.

ADDITIONAL INFORMATION

Formula Sheet

The formula sheet appended to this document will be provided during all exams - no other formula sheet or table is allowed. Keep the formula sheet by your side as you solve problems.

Excused Absences

Events beyond your control may cause you to miss a homework due date or an exam. Whenever possible, contact me *prior* to your absence to arrange to make-up missed work. If you are unable to notify me concerning an absence or if you need to notify several instructors on short notice, contact the Office of Student Affairs for assistance. The Dean of Students will then inform all your instructors that you face a situation that requires that you miss class, and you will be granted an excused absence. It's then your responsibility to contact each of your instructors after you recover from your illness or return to campus.

An absence is excused under the following conditions:

- If you participate in off-campus University-sponsored activities, such as field trips, fine arts performances, intercollegiate athletics, job fairs, etc. you are granted an excused absence if your activity conflicts with an exam. Furthermore, I consider plant trips, job interviews requiring travel, and professional society meetings as excusable. It is imperative that for an absence of this type, for which a conflict with an exam is known well ahead of time, that you arrange with me to take the exam *earlier* than its normally scheduled time.
- If you encounter circumstances beyond your control such as illness, the funeral of any relative or close friend, or other personal emergency, you are granted an excused absence. You must provide verification of the special circumstances that led to your absence. In the event of a missed exam due to an excused absence, you are not required to make-up the exam. Instead, an excused absence from an exam will receive the score EX. At the end of the semester, exam EX scores will be replaced by a weighted average of all of your non-EX scores on exams (exams and final exam). If the final exam is missed as a result of an excused absence, you will be awarded the letter grade of I (incomplete) and must take the PH2200 final exam at the end of any one of the next three semesters that you're in residence. Two or more exams missed as a result of excused absences will be handled on an individual basis.

If a homework due date is missed as a result of an excused absence, you will be granted an extension after you notify me.

Getting Help

Office Hours

In order to encourage you to ask questions, I've set aside the following times for office hours: Monday through Friday 11:00 a.m. – noon and one-half hour following each class. If these times are inconvenient, please let me know so that we might find a mutually agreeable meeting time.

The Physics Learning Center

The Physics Learning Center will not be open for walk-ins during the summer. However, the following five coaches are available for one-on-one appointments:

Nigel Anton	nlanton@mtu.edu
Xin Xin Fan (Zoe)	xfan@mtu.edu

All coaches are experienced and have my complete confidence.

MasteringPhysics

Extra Credit is available using MasteringPhysics. The Extra Credit is so labeled by chapter and is located in the assignment list below the 10 graded assignments. Most of the Extra Credit consists of tutorial problems with their built-in hints.

Drop Dates

Drop date with no grade: July 6, 2011

Drop date with W grade: July 22, 2011

Late drop: If after the drop date circumstances beyond your control prevent you from completing the course, you may be a candidate for a late drop. The process does not begin with a course instructor but rather with the Dean of Students, to whom you confide the details of your situation.

MTU ADA Statement

MTU complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA). Michigan Tech is committed to a policy of educating individuals with physical or learning disabilities without discrimination. Students with documented disabilities should contact the Student Affairs Office for assistance and accommodations. It is the student's responsibility to inform the Office of Student Affairs of their class schedule for each semester in which accommodations are sought.

Academic Dishonesty

New technologies engender new forms of cheating. Some known types of cheating and the action that will result when cheating is identified are described below.

-Giving someone else your i>clicker transmitter is just like letting someone else take a quiz or exam for you. One of the things that students have liked most about the classroom response system is the immediate feedback it provides about their conceptual understanding of important topics. You lose this learning opportunity if you give your transmitter to someone else. Reading quiz and participation points represent a small part of your grade, so it's unwise to jeopardize your academic record by cheating with the classroom response system.

-Copying someone else's answers in MasteringPhysics is cheating. MasteringPhysics now includes tools to help instructors identify cheating. In addition, the support staff at MasteringPhysics, if requested, will assist instructors to identify cheating. MasteringPhysics will prohibit students identified as cheaters from using their website.

If cheating is suspected, the matter will be referred to the Office of Student Affairs. The penalty for cheating is not less than an academic integrity warning and not more than expulsion. In each case in my experience, students caught cheating have received an F in the course.

Summary of Important Activities

Participation in Physics 2200 requires that you perform the following activities, preferably as early in the semester as possible:

ACCESS Blackboard: Blackboard is located at <https://courses.mtu.edu> . Your User ID is your campus email address without the @mtu.edu and, by default, your Password is the same as your user ID. If you previously used Blackboard and changed your password, your updated password is needed. If you have forgotten your password,

take your ID to Customer Service in room B24 of the EERC and request a new password. In addition to grades, I will use Blackboard to list your iclicker transmitter number so that you can verify that I have your correct number.

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First time users: Click on First Time User: Register on the page that follows. Here you'll be prompted for the access code that came bundled with your textbook. As you continue with the registration process, you'll be prompted for our course ID, your MTU e-mail address, and your Student ID:

Course ID: MTUPH2200SUMMER2011
E-mail Address: please use your MTU e-mail address
Student ID: your M-number (without the dash, for example, M12345678)

Prior users: Log in as an established user as you did previously. Sign up for PH2200 by entering as the Course ID: MTUPH2200SUMMER2011

Assignments are taken from the textbook *Physics for Scientists and Engineers*, 2nd edition, by Randall D. Knight
CQ denotes end-of-chapter conceptual questions from the textbook
E&P denotes end-of-chapter exercises and problems from the textbook
SW denotes suggested practice exercises found in the Student Workbook
MP denotes tutorial problems using MasteringPhysics

Date	Assignment	Additional Practice and Extra Credit
Week 1		
June 27	Introduction and Orientation	
June 28	Read Chapter 26 Sections 1 - 4	SW Sections 26.1 – 26.4
June 29	Read Chapter 26 Sections 4 - 5 Read Chapter 27 Sections 1 - 2	SW Sections 26.4 – 26.5 SW Sections 27.1 – 27.2
June 30	Chapter 26 CQ 3, 6, 11, 14 E&P 1, 9, 18, 25, 27, 33, 39, 45, 67	MP Chapter 26: Extra Credit
July 1	Read Chapter 27 Sections 3 - 5	SW Sections 27.3 – 27.5
Week 2		
July 3	MasteringPhysics – Homework 1: Chapter 26	
July 4	Independence Day Recess – no class	
July 5	Chapter 27 CQ 2, 5, 6, 9 E&P 1, 7, 12, 15, 19, 30, 48	MP Chapter 27: Extra Credit
July 6	Read Chapter 27 Sections 6 - 7 Read Chapter 28 Sections 1 - 3	SW Sections 27.6 – 27.7 SW Sections 28.1 – 28.3
July 7	Chapter 27 CQ 14, 15 E&P 20, 22, 24, 27, 51, 53, 57	MP Chapter 27: Extra Credit
July 8	Chapter 28 CQ 2, 3, 4 E&P 1, 2, 3, 5, 8, 10, 12, 15, 16, 30, 31	MP Chapter 28: Extra Credit
Week 3		
July 10	MasteringPhysics – Homework 2: Chapter 27	
July 11	Read Chapter 28 Sections 4 - 6	SW Sections 28.4 – 28.6
July 12	Chapter 28 CQ 5, 7, 9, 10 E&P 18, 21, 23, 25, 37, 38, 39, 47, 51	MP Chapter 28: Extra Credit
July 13	Read Chapter 29 Sections 1 - 3 Read Chapter 29 Sections 4 - 7	SW Sections 29.1 – 29.3 SW Sections 29.4 – 29.7
July 14	Chapter 29 CQ 4, 5, 8, 11, 13 E&P 1, 7, 8, 14, 20, 26, 29, 35, 45, 54, 71 MasteringPhysics - Homework 3 : Chapter 28	MP Chapter 29: Extra Credit
July 15	Exam I Chapters 26 – 28	
Week 4		
July 17	MasteringPhysics – Homework 4: Chapter 29	
July 18	Read Chapter 30 Sections 1 - 3	SW Sections 30.1 – 30.3
July 19	Read Chapter 30 Sections 4 - 7	SW Sections 30.4 – 30.7
July 20	Chapter 30 CQ 1, 6, 9, 11, 13 E&P 1, 7, 11, 25, 32, 34, 47, 61, 67, 77 Read Chapter 31 Sections 1 - 5	MP Chapter 30: Extra Credit SW Sections 31.1 – 31.5
July 21	Chapter 31 CQ 8, 9, 10, 11, 14 E&P 5, 8, 12, 18, 25, 27, 30, 37, 42, 47, 59, 64 MasteringPhysics – Homework 5: Chapter 30	MP Chapter 31: Extra Credit
July 22	Read Chapter 32 Sections 1 - 3	SW Sections 32.1 – 32.3

Date	Assignment	Additional Practice and Extra Credit
Week 5		
July 24	MasteringPhysics – Homework 6: Chapter 31	
July 25	Read Chapter 32 Sections 4 - 6	SW Sections 32.4 – 32.6
July 26	Read Chapter 32 Sections 7 - 9	SW Sections 32.7 – 32.9
July 27	Chapter 32 CQ 5, 7, 10, 12, 13 E&P 1, 5, 9, 14, 18, 22, 27, 33, 46, 64, 74 Read Chapter 33 Sections 1 - 3	MP Chapter 32: Extra Credit SW Sections 33.1 – 33.3
July 28	Read Chapter 33 Sections 4 - 6 MasteringPhysics – Homework 7: Chapter 32	SW Sections 33.4 – 33.6
July 29	Chapter 33 CQ 4, 5 E&P 5, 12, 13, 15, 21, 24, 46, 49, 55	MP Chapter 33: Extra Credit
Week 6		
July 31	MasteringPhysics – Homework 8: Chapter 33 Sections 1-6	
August 1	Read Chapter 33 Sections 7	SW Sections 33.7
August 2	Read Chapter 33 Sections 8 - 10	SW Sections 33.8 – 33.10
August 3	Chapter 33 CQ 6, 8, 12, 13 E&P 26, 30, 35, 36, 39, 58, 67, 70 Read Chapter 34 Sections 1 - 4	MP Chapter 33: Extra Credit SW Sections 34.1 – 34.4
August 4	Read Chapter 34 Sections 5 - 7 MasteringPhysics – Homework 9: Chapter 33 Sections 7 - 10	SW Sections 34.5 – 34.7
August 5	Exam II Chapters 29 - 33	
Week 7		
August 8	Chapter 34 CQ 1, 3, 8, 9 E&P 2, 5, 7, 8, 9, 12, 14, 30, 39, 50, 54	MP Chapter 34: Extra Credit
August 9	Read Chapter 35 Sections 2 - 5	SW Sections 35.2 – 35.5
August 10	Read Chapter 35 Sections 6 - 7 Chapter 35 CQ 7, 8, 10 E&P 9, 13, 19, 21, 23, 27, 44, 48	SW Sections 35.6 – 35.7 MP Chapter 35: Extra Credit
August 11	no class - prepare for final exam MasteringPhysics – Homework 10: Chapter 34	
August 12	Final Exam Chapters 26 – 35, 3:00 p.m. G009 Rekhi	