

PH2100 University Physics I - Mechanics

Course Information

	Lecture 0A (CRN 13233) MWF 1:05 p.m. – 1:55 p.m.	Lecture 0B (CRN 13234) MWF 2:05 p.m – 2:55 p.m.
Instructor	Dr. John Jaszczak	Dr. Gary Agin
Office	102 Fisher	103 Fisher
Office Hours	MW 2:00 p.m. - 3:00 p.m. TR 10:00 a.m. - 12:00 p.m.	MW 3:00 p.m. – 4:00 p.m. TR 1:00 p.m. – 3:00 p.m.
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PH2100 Website	http://www.phy.mtu.edu/~jaszczak/Ph2100/sp06/	
On-line Grades and course materials	https://courses.mtu.edu	
SI Instructor	Madhusudan Savaikar (Fisher B025A) masavaik@mtu.edu	

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 three fundamental questions in our study of classical mechanics:

1. How do we describe motion?
2. What are the causes of changes in motion?
3. What properties of a system of particles do not change as the particles interact?

The Goals

The goals of this course are for you to become familiar with kinematics, dynamics, and conservation laws - the conceptual framework of classical mechanics - and 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 Instructional Philosophy

The basic instructional philosophy of Physics 2100 involves your active participation, and can be summarized as follows:

1. Read about it (textbook)
2. Untangle it (interactive lectures)

3. Practice with it (student workbook and end-of-chapter homework)
4. Challenge yourself (web-based graded exercises/problems and exams)

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 one day each week will be set aside to allow us to practice solving end-of-chapter 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) and ultimately exams. Web-based activities will include skill builders, self tutoring problems, and end-of-chapter problems.

BACKGROUND

We expect students to have a good grasp of trigonometry and to be able to differentiate and integrate simple functions such as polynomials, sines and cosines. This requires knowledge of calculus at the level of MA1150, MA1151, MA1160, or MA1161. The study of physics can help to solidify your understanding of calculus.

No prior study of physics is assumed, but students enter Physics 2100 with a broad array of backgrounds, many having studied physics in high school. The pace of our course will be sufficiently deliberate so as to allow the novice to learn the material. If this is your first course in physics, you may find that initially you need to devote more time to your studies than your more-experienced friends, but the workload tends to become more uniform as the semester progresses.

COURSE SUPPLIES

- Textbook: Physics for Scientists and Engineers, Volume 1, Randall D. Knight (bundled with a Student Workbook, a Student Access Kit to MasteringPhysics, and a \$20 mail-in rebate for the purchase of the PRS transmitter)
- InterWrite Personal Response System (PRS) transmitter (required; available in the bookstore)
- scientific calculator
- straight edge

COURSE STRUCTURE

Your grade for Physics 2100 will be based on the total number of points that you accumulate on the various graded activities. The total possible score (without bonuses) is 1060 points, broken down as follows:

Reading Quizzes	51
Participation	58
Graded Homework (MasteringPhysics)	216
Exam I	120
Exam II	150
Exam III	150
Final Exam	315

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

A	900-1060	C	700-749
AB	850-899	CD	650-699
B	800-849	D	600-649
BC	750-799	F	0-599

Since it's possible to earn more than 216 points on the graded homework, and there may be a bonus problem on some of the exams, the total number of *possible* points (available to earn) will actually exceed 1060.

Reading Quizzes

Beginning the second week of class, each lecture session will begin with a single-question multiple-choice reading quiz. It is important that you arrive in class on time in order to take the reading quiz. The personal 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. Twenty 3-point reading quizzes will be given for a total of 60 points; however, to accommodate unavoidable absences, you can earn a maximum of 51 points. If you have more than 3 excused absences, your score will be adjusted. Excused absences are not a license to miss additional classes.

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 in hand 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

There are two components of your participation grade: participation during lecture and attendance during problem-solving sessions.

During each interactive lecture, beginning January 18, you will respond to several questions using the Personal Response System (PRS). Questions will be cast in a multiple-choice format, and you will answer by pressing a number on your pocket-size wireless transmitter. Your response will be collected by an overhead receiver and routed to the presentation computer from which it will be sent to the central display. Your assigned cell in the class array will confirm receipt of your response by changing color. Your actual answer will be hidden from view. A random question will be selected for grading during each of the nineteen interactive lectures. You will receive 2 points for responding, independent of whether your answer is right or wrong.

Attendance also will be taken during each of the 14 problem-solving sessions with the PRS system. You will receive 2 points for each session that you attend, again independent of whether your answer is right or wrong.

Two participation points are available for each of 34 class sessions for a total of 68 available points; however, to accommodate unavoidable absences, you can earn a maximum of 58 participation points. If you have more than 5 excused absences, your score will be adjusted. Excused absences are not a license to miss additional classes.

Here are some details about the PRS system:

Powering the PRS Transmitter: Each transmitter requires two 1.5 V AAA alkaline-type batteries. Batteries should last at least a semester under normal usage. They need replacement if the LED light is dim or if it does not light up when clicked on.

Using the Transmitter: When the power button is depressed, the LED turns green and the unit is ready for use. Aim the narrow end of the transmitter at the nearest receiver to send an answer. A signal is sent when one of the numeric keys is pressed. This signal information includes the number pressed and your transmitter ID (located on the back of your transmitter). The red LED on the receiver will blink when it receives a signal. To prevent traffic jams at the receiver, the pushbuttons are deactivated for a brief duration following each send action, as indicated by the blinking LED. (Thus, there is no advantage to pressing your transmitter button in rapid-fire succession.) If your responses do not seem to be received by the system, try aiming your transmitter at a different receiver mounted in the lecture hall.

Attaching a Confidence Level to Your Answer: By first pressing H or L before pressing the numeric key, you can indicate your level of confidence in your answer: H for High confidence and L for Low confidence. The LED turns red after pressing H and yellow after pressing L. By default, pressing neither H nor L signals medium confidence and the LED remains green. The confidence level will revert to the default value of medium after a transmission or after 15 seconds without a transmission.

Confirming Receipt of Your Response: Using either your name or your transmitter number, you can identify your cell in the electronic "seating chart" that will be displayed on the central screen. Your cell is initially colored blue. Receipt of your response is confirmed when the cell color changes to pink. You may change your response one time, that is, you may send a total of two

responses. It is your final response that is recorded. The cell color turns to red after receipt of the second response, indicating that additional responses will be rejected. If you respond with a choice that is out of range (for example, you press number 7 for a 5-part multiple-choice question), your cell will turn yellow. *Your cell color gives no indication of either your answer or of the confidence level, if any, that you have attached to your answer.*

PRS REGISTRATION INSTRUCTIONS: In order to receive credit for both the reading quizzes and participation exercises, you must provide us with the six digit identification number located on the back of your transmitter. To do so, please take the PRS Registration quiz in WebCT (see ACCESSING WEBCT below), in which you will be asked to enter your six-digit transmitter number. Once you log on to WebCT, enter the PH2100 course and click on the "PRS Registration" icon and follow the instructions. If the PRS Registration quiz does not appear on your browser, turn off your browser's pop-up blocker and try again. Please complete the quiz by 5:00 p.m. on Monday January 16.

If you find that you entered the transmitter number incorrectly, or if later in the course you need to change your transmitter number, please send email to your instructor.

Graded Homework (MasteringPhysics)

MasteringPhysics is a state-of-the-art online tutorial and homework system. We will use three types of exercises within MasteringPhysics: skill builders, self-tutoring problems, and end-of-chapter problems. The skill builders and self-tutoring 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 offer 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.

A total of 12 homework assignments from MasteringPhysics will be assigned for grading. Each assignment is worth 18 points for a graded homework point total of 216. Each assignment must be completed each Thursday by 9:00 a.m. for full credit. Partial credit will be awarded for late work as follows: A problem submitted between 0 and 12 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 12 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. No partial credit will be awarded for any assignment after noon on April 22.

The first (ungraded!) assignment is entitled *Introduction to MasteringPhysics*. This initial assignment takes about 35 minutes to complete and consists of simple exercises to help you become familiar with the use of MasteringPhysics. This first assignment should be completed prior to attempting the graded assignments. A description of the grading algorithm will be posted to the class email list after you have some experience using MasteringPhysics. The first graded homework is due on Thursday, January 19th, at 9:00 a.m.

MASTERINGPHYSICS REGISTRATION INSTRUCTIONS: To use MasteringPhysics, you must register at the MasteringPhysics website located at <http://www.masteringphysics.com>. Click on *MasteringPhysics for Knight Physics for Scientists and Engineers 1e*, and, as a first time user, click 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 your Student ID and the course ID:

Student ID: your Social Security number (without the dashes) or your M-number

Course ID: MTUPH2100SP06

Exams and Final Exam

The three exams and final exam are scheduled as follows:

Exam I Tuesday, January 31, 2006
Exam II Tuesday, February 28, 2006
Exam III Tuesday, April 4, 2006
Final Exam: To be announced after the 3rd week of classes.

The exams will be 90 minutes long, beginning at 6:00 p.m. The final exam will be a comprehensive two-hour examination.

All exams will be closed book and closed notes. You may use the PH2100 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.

Cell phones may not be used during the exams. Please turn them off before entering the examination rooms.

The doors to the exam rooms will open at 5:55 p.m. and everyone should be seated in an assigned seat and ready to begin work by 6:00 p.m. Exam answer sheets will be collected 90 minutes later.

The exams will consist of a total of approximately 30 conceptual questions and traditional problems; the final exam will consist of a total of 45 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.

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

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

Grade Tracking

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 gradebook maintained in WebCT. This is where your exam scores and ultimately your course grade may be found as well. In addition to grades, I will use WebCT to list your PRS transmitter number so that you can verify that I have your correct number. It's your responsibility to examine the gradebook periodically for accuracy and to report any discrepancies to me.

ACCESSING WebCT:

WebCT 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 WebCT 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, found at <http://www.phy.mtu.edu/~jaszczak/Ph2100/sp06/formulasheet.pdf>, 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 your instructor 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 are 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. Ask your advisor/instructor/coach to provide documentation prior to your absence. Furthermore, we consider plant trips, job interviews requiring travel, and professional society meetings as excusable with proof of your attendance. 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- this should be done through the Dean of Students office to preserve your privacy. In the event of a missed exam due to an excused absence, it is not possible 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 PH2100 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, the due date will be extended after you notify your instructor.

GETTING HELP

Office Hours

In order to encourage you to ask questions, we've set aside office hours as shown in the instructor information table above. If these times are inconvenient, please let us know so that we might find a mutually agreeable meeting time.

Supplemental Instruction

Supplemental Instruction (SI) is a learning tool that utilizes peer-assisted study sessions. SI sessions are regularly-scheduled, informal review sessions in which you can compare notes with other students, discuss readings, develop organizational tools, practice problem-solving skills, and predict test items. You can learn how to integrate course content and study skills while working together. Each SI session is conducted by a leader who attends all classes, takes notes, reads all assigned materials, and solves all homework problems. The SI leader is the "model student," a facilitator who will help you to integrate course content and learning/study strategies.

We are fortunate to have Madhusudan Savaikar as our SI leader this semester. The SI sessions are scheduled for: Mondays 7:00 – 8:00 p.m. in 101 Fisher.

If you wish to contact Madhusudan, his office is located in 025A Fisher and his email address is masavaik@mtu.edu .

These sessions are entirely optional. You may attend as many or as few of these sessions as you like. You are especially encouraged to attend the SI sessions if you have struggled with calculus, or if you have difficulties with the exercises in the Student Workbook.

The first SI session will be held on Monday, January 23 from 7:00 – 8:00 p.m. in 101 Fisher.

The Physics Learning Center

If approaching me for help seems intimidating and supplemental instruction doesn't mesh with your schedule, you may wish to visit the Physics Learning Center which is staffed by trained undergraduate coaches. The Physics Learning Center, located in 228 Fisher, provides team learning, one-on-one appointments, and walk-in help. Walk-in help is available at the following times:

Sunday 7:00 – 9:00 p.m.

Monday	3:00 – 5:00 p.m.	6:00 – 9:00 p.m.
Tuesday through Thursday	3:00 – 9:00 p.m.	

The coaches may provide help with the graded homework assignments, but don't expect them to work the problems for you. The coaches will provide hints in the form of questions that should enable you to work the problems yourself.

MasteringPhysics

Additional practice is available using MasteringPhysics. The additional practice is so labeled by chapter and is located in the assignment list below the 13 graded assignments. Most the additional practice consists of skill builders and self-tutoring problems with their built-in hints.

Drop Dates

Drop date with no grade: January 27, 2006

Drop date with W grade: March 3, 2006

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 begins with the Dean of Students, to whom you confide the details of your situation.

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 PRS transmitter is just like letting someone else take a quiz or exam for you. Last semester, one of the things students liked most about the PRS system was the immediate feedback it provided 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 PRS system.

-Copying someone else's answers in MasteringPhysics is cheating. MasteringPhysics 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.

MTU ADA Statement

MTU complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services at MTU, please call Dr. Gloria Melton, Dean of Students, at 2212. For other concerns about discrimination, you may contact your advisor, department head/chair, or the Affirmative Action Office.