

# PH2100 University Physics I - Mechanics

## Course Information

	<b>Lecture 0A</b> (CRN 12649) MWF 1:05 p.m. – 1:55 p.m.	<b>Lecture 0B</b> (CRN 12650) MWF 2:05 p.m – 2:55 p.m.
Instructor	<b>Dr. John Jaszczak</b>	
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PH2100 Website	<a href="http://www.phy.mtu.edu/~jaszczak/Ph2100/sp07/">http://www.phy.mtu.edu/~jaszczak/Ph2100/sp07/</a>	
On-line Grades and course materials	<a href="https://courses.mtu.edu">https://courses.mtu.edu</a>	
GTA		

## 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! It is important that you take notes in class.

Lots of practice is required to become a proficient problem-solver. Roughly one class in three 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 finally, exams. The 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, and a Student Access Kit to MasteringPhysics)
- i>clicker classroom response transmitter (available in the campus bookstore). If you have already purchased an i>clicker for another course you may also use it in this course.
- 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 extra credit) is 1038 points, broken down as follows:

Reading Quizzes	54
Participation	60
Graded Homework (MasteringPhysics)	204
Exam I	120
Exam II	150
Exam III	150
Final Exam	300

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

A	900-1038	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 204 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 1038.

### 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 i>clicker classroom response system 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-one 3-point reading quizzes will be given for a total of 63 points; however, you can earn a maximum of 54 points. Thus, you can miss three quizzes and still earn the maximum number of reading quiz points.

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

During each interactive lecture and each problem-solving session, you will respond to several questions using the i>clicker classroom response system. 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 a radio receiver and routed to the presentation computer from which it will be sent to the central display. Your transmitter will confirm receipt of your response. Your actual answer will be hidden from view. A random question or questions will be selected for grading during each of the 35 scored class sessions. You will receive 2 participation points for responding, independent of whether your answer is right or wrong.

Two participation points are available for each of 35 scored class sessions for a total of 70 points; however, you can earn a maximum of 60 participation points. This allows you to miss five classes without penalty.

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.

I>CLICKER REGISTRATION INSTRUCTIONS: In order to receive credit for both the reading quizzes and participation exercises, please provide me with the eight digit identification number located on the

back of your transmitter. To do so, please take the i>clicker registration quiz in WebCT in which you're asked to enter your eight digit transmitter number. Complete the quiz by 11:00 p.m. on Sunday, January 21<sup>st</sup>.

If the i>clicker registration quiz does not appear, turn off the popup blocker in your browser and try again.

If you're unable to complete the i>clicker registration quiz on time or if during the course of the semester you find it necessary to change your transmitter number, please send me an email with your new transmitter number.

I will show your registered clicker ID in WebCT so that you can be certain that you have entered, and the system has recorded, the correct clicker ID.

### 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 most do not offer 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. Note that problem subparts are distinct from hints, and are graded as a fraction of the total problem.

A total of 12 homework assignments from MasteringPhysics will be assigned for grading. Each assignment is worth 17 points for a graded homework point total of 204. Each assignment must be completed by its Thursday due date at 11:00 p.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 11:00 p.m. on April 29.

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. This first assignment should be completed prior to attempting the graded assignments. We also recommend that you carefully read the following links on MasteringPhysics' home page after completing the introductory assignment:

- 5 Ways to Improve Your Grade with MasteringPhysics
- Getting Started with MasteringPhysics
- FAQs

**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 1e*,

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 email address, and your Student ID:

Course ID: MTUPH2100SP07 (digits that look like zeros are all zeros)  
Email Address: please use your MTU email address  
Student ID: your MTU M-number

Prior users: Log in as an established user as you did previously. Sign up for PH2100 by entering as the Course ID: MTUPH2100SP07

Occasional problems arise with MasteringPhysics that are browser-related. If the graphics or the hints to a problem are missing, turnoff the popup blocker in your browser. If you continue to have problems, try a different browser – MasteringPhysics recommends the use of Firefox. Also, 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's been my experience that MasteringPhysics responds very quickly to requests for help.

### Exams and Final Exam

The three exams and final exam are scheduled as follows:

Exam I	Tuesday, February 13, 2007
Exam II	Tuesday, March 6, 2007
Exam III	Tuesday, April 10, 2007
Final Exam	determined after the 3 <sup>rd</sup> week of the semester

The three exams will be 90 minutes long, each beginning at 6:00 p.m. The final exam will be a comprehensive two-hour examination. The location of the exams will be announced in class and via the class email list about a week before each exam.

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 and any other communication devices may not be used during the exams. Please turn them off before entering the examination rooms and keep them put away.

Exam I will consist of 30 conceptual questions and traditional problems with each answer worth four points. Exams II and III will consist of 30 conceptual questions and traditional problems with each answer worth five points. The final exam will consist of 50 conceptual questions and problems with each question worth six points. 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. In addition to grades, I will use WebCT to obtain and list your i>clicker transmitter number so that you can verify that I have your correct number. This is where your exam scores and ultimately your course grade may be found as well. 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 the EERC basement and request a new password.

## **ADDITIONAL INFORMATION**

### Formula Sheet

The formula sheet, found at <http://www.phy.mtu.edu/~jaszczak/Ph2100/sp07/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 homework problems in order to be efficient in using it.

### Excused Absences

Events beyond your control may cause you to miss a homework deadline 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, I 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 me.

## GETTING HELP

### Office Hours

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

### The Physics Learning Center

If approaching me for help seems intimidating, you may also see the recitation instructor for help. You may also wish to visit the Physics Learning Center which is staffed by trained undergraduate coaches. The Physics Learning Center, which is 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 through Thursday	3:00 – 5:00 p.m. and 6:00 to 9:00 p.m.
Friday	2:00 – 4:00 p.m.

Times are subject to change. Please check the learning center door for current hours.

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 12 graded assignments. Most the additional practice consists of skill builders and self-tutoring problems with their built-in hints. Each additional practice assignment will be worth up to one extra credit point.

### Drop Dates

Last day to drop with no grade: February 2, 2007  
Last day to drop with W grade: March 9, 2007

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 i>clicker 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 i>clicker 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 i>clicker 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). 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 accommodation is being sought.