• **Instructor Information**

PHY 232 Lecture Sections 001, 002 & 003:

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**SECTION 001:**
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**SECTION 002:**
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**SECTION 003:**
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**Teaching Assistants**
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**Course Description**

This course is the second semester of a 2-semester sequence of introductory physics. Armed with the foundations of the basic concepts of kinematics, momentum, force, work, and energy, this semester investigates the topics of electricity and magnetism; geometric and wave optics of light and other electromagnetic waves; and themes of modern physics including special relativity, quantum mechanics, atomic and nuclear physics.
• **Prerequisites**

PHY 231 or PHY 231B or PHY 231C or PHY 183 or PHY 183B or PHY 193H or LBS 271.

• **Class Hours**

Section 001: 1:50-2:40pm MWF **BPS 1410**  
Section 002: 3:00-3:50pm MWF **BPS 1410**  
Section 003: 4:10-5:00pm MWF **BPS 1410**

• **Office Hours: TBA**

TA schedules for the Strosacker Helproom (BPS 1248) will appear during the first week of class in LON-CAPA under the “Contents” tab in "helproom_hours.pdf". Professors will hold their regular office hours in the helproom but meetings at other times are available by appointment.

• **Helproom Hours**

The Strosacker helproom is in 1248 BPS and is open from 9:00AM to 9:00PM Monday through Thursday and from 9:00AM to 6:00PM on Fridays. You are welcome to go to the helproom during any of its open hours but there will be appointed times when TAs specifically for PHY232 will be available.

• **Project Information**

There will be no honors option offered for PHY232 this semester.

• **Exam Information**

You will need a calculator, a #2 pencil and your student ID when taking the midterm and final exams. **Note that smart phones are not allowed during any exam.** If an instructor (or proctor) sees a student using a cell phone during an exam the student will receive a zero for that exam and an Academic Dishonesty Report will be filed as required by the University (see MSU's policy on Academic Integrity at [https://www.msu.edu/~ombud/academic-integrity/index.html](https://www.msu.edu/~ombud/academic-integrity/index.html)).

Assessment: Jan 14, Wednesday, during your lecture hour in BPS 1410  
**Midterm Exam #1:** Feb 13, Friday, during your lecture hour in BPS 1410  
**Midterm Exam #2:** Mar 20, Friday, during your lecture hour in BPS 1410  
**Midterm Exam #3:** Apr 10, Friday, during your lecture hour in BPS 1410  
Assessment: Apr 29, Wednesday, during your lecture hour in BPS 1410  
**Final Exam:** May 4, Monday, 8:00 - 10:00 pm, location TBA

Makeups:
For midterm exams you must tell us 1 week in advance or have a legitimate verifiable excuse (such as a doctor’s note for illness) to be granted a make-up exam. Make-up exams will likely not be the same as the exam given during the regular test time.

Make-ups for the final will only be allowed for University approved reasons (such as overlap with another exam or 3 finals on May 4th) and must be scheduled prior to April 15th. The alternate final exam will be on May 5, location and time to be determined (TBD). If you don’t take the final exam you will receive a 0.0 for the course.

**Deadlines**

The homework sets will be due at 11:59 PM on Thursdays using the LON-CAPA online system. Note that the homework deadline is very strict. You are responsible for submitting the homework before the deadline, regardless of circumstances. If you are not able to finish a homework set for legitimate reasons, contact your instructor before the due date so that the deadline can be extended.

Correction exam sets, following each midterm exam, are due on the Thursday after the exam at 11:59 PM. There is no correction set for the final exam.

**Grading Information**

Percent weights for PHY232:
- Assessment exercises: 2%
- Clicker questions: 6%
- Homework: 16%
- Three midterm exams: 3 x 16% = 48%
- Final exam: 32%

Note the weights add up to 104%. This is equivalent to having 4% worth of extra credit points.

**Assessment exercises:** Two assessment exams will be given in class. These help the teaching staff judge if they are doing an effective job and give an independent gauge to assess any future changes to the course. Here is the main point: you will receive 1% credit for each assessment in which you participate; as there are two such exams, you can receive 2% towards your grade simply by participating. In other words, how well you do on these assessments has NO IMPACT ON YOUR GRADE. To receive the 1% credit you must take the exam seriously. We will apply simple algorithms to check for random answers and non-random shortcuts like choosing "A" for each question. The first assessment will be Wednesday, January 14, and the second one will be Wednesday, April 29.

**Clicker questions:** Correct answer: 2 points. Incorrect answer: 1 point. Not present: 0 points.
Absolutely no make-ups for missed clicker questions (i.e. absence, did not bring clicker to class, dead batteries, lost clicker, etc.). You will receive full credit (6%) for the clicker questions if you have at least 2/3 of the total clicker points at the end of the semester. Therefore, it is possible to miss a few lectures and still get full credit for the clicker questions. To receive credit for clicker questions, you must submit your responses in the section in which you are enrolled. **We strongly urge you to register your iclicker as soon as possible to be periodically updated with your clicker scores.** Go to [http://iclicker.com](http://iclicker.com).

**Homework:** Every homework question is worth 1 point and is submitted through the LON-CAPA online system at [http://msu.loncapa.org](http://msu.loncapa.org).

**Midterm exams:** Maximum score on each midterm: 50 points. **Each midterm exam will have a corrections exam that will be done as the homework assignment directly after the exam.** The corrections exam is also worth 50 points. Thirty percent (30%) of the positive difference between the correction exam and the in-class exam will be added to your in-class exam score as a bonus, with a maximum of 50 points possible. For example, if you get 30 points on the in-class exam and then complete the corrections exam for 50 points you will receive 6 bonus points, (50-30)*.3 = 6, for a total of 36 points on that midterm. Your corrections exam score must be greater than your in-class exam score. Do not do just the problems you got wrong on the in-class exam. **The correction set is not available to students who did not take the midterm exam.** One double-sided, US letter-sized (8.5"x11"), original help sheet is allowed for each midterm exam (you may write on both sides).

**Final Exam:** Maximum score on the final: 100 points. The final exam will not have a correction set. Four double-sided, US letter-sized (8.5"x11"), original help sheets are allowed on the final exam: three from the midterms and one from the last block of the class.

**Grading scale:**
4.0 >= 94%,
3.5 >= 86%,
3.0 >= 78%,
2.5 >= 70%,
2.0 >= 62%,
1.5 >= 54%,
1.0 >= 46%,
0.0 < 46%.
This grading scale might be lowered a little (in your favor), but it will not be raised.
Please read and abide by the MSU Academic Integrity Policy: https://www.msu.edu/unit/ombud/academic-integrity/index.html.

The FAQ under the Ombudsperson page is also help: https://www.msu.edu/~ombud/full-faq/index.html

**Students with Disabilities:** Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at https://www.rcpd.msu.edu/. Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (VISA) form. Only MSU VISA forms will be accommodated. Please present this form to the instructor at the start of the term and no later than the end of the second week of class (January 23). Requests received after this date may not be honored.

**Instructor Evaluations:** Michigan State University takes seriously the opinion of students in the evaluation of the effectiveness of instruction, and has implemented the SIRS (Student Instructional Rating System) process to gather student feedback. This course utilizes the “online SIRS” system. You will receive an e-mail sometime during the last two weeks of class asking you to fill out the SIRS online form at your convenience. Please note the final grade for this course will not be accessible on STUINFO for seven days following the University grade submission deadline published by the Office of the Registrar unless the SIRS online form has been filled out. You will have the option in the online SIRS form to decline to participate in the evaluation of the course – we hope, however, that you will be willing to give us your frank and constructive feedback so that we may instruct students even better in the future.

- **Readings**

  Preliminary lecture notes for the week will be posted Monday mornings on LON-CAPA. Copies of the material actually presented in class (including clicker questions with their answers) will be re-posted after each class. The lectures notes are not a replacement for reading the textbook. Studies have shown that reading the text before coming to class generally improves your grade. You should read the chapters provided in the schedule below before coming to class. To help motivate you each lecture will begin with a few clicker questions (~3-5) covering the material from the chapter listed in the schedule. Note that a significant amount of time during the lectures will involve problem solving and not everything covered in the textbook or lecture notes will be discussed in class, but the material could appear on the homework or exams.

<table>
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<tr>
<th>Week</th>
<th>Chapter, Topic</th>
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(1) 01/12 -- Monday | Intro, Ch 15 Electric Charges
    01/14 – Wednes | Assessment exercise, Ch 15 Charges and Forces
    01/16 -- Friday | Ch 15 Electric Forces and Fields

(2) 01/19 -- Monday | Martin Luther King, Jr. Day (no classes)
    01/21 -- 01/23 | Ch 16 Electric Potential and Capacitors

(3) 01/26 -- Monday | Ch 16 Electric Potential and Capacitors
    01/28 --- 01/30 | Ch 17 Electric Current, Resistance and Circuits

(4) 02/02 -- 02/06 | Ch 17 Electric Current, Resistance and Circuits

(5) 02/09 -- Monday | Ch 17 Electric Current, Resistance and Circuits
    02/11 -- Wednes | Midterm Review
    02/13 -- Friday | Exam #1 (1410 BPS)

(6) 02/16 --- 02/20 | Ch 18 Magnetic Fields and Forces

(7) 02/23 --- 02/27 | Ch 19 EM Induction and Ch 20 EM Waves

(8) 03/02 --- 03/06 | Ch 19 AC Circuits
    03/09 --- 03/13 | Spring Break (no classes)

(9) 03/16 -- Monday | Ch 19 AC Circuits
    03/18 -- Wednes | Midterm Review
    03/20 -- Friday | Exam #2 (1410 BPS)

(10) 03/23 --- 03/27 | Ch 21 Geometrical Optics

(11) 03/30 -- 04/03 | Ch 21 Geometrical Optics, Ch 22 Wave Optics

(12) 04/06 -- Monday | Ch 22 Wave Optics
    04/08 -- Wednes | Midterm Review
    04/10 -- Friday | Exam #3 (1410 BPS)

(13) 04/13 --- 04/17 | Ch 20 Relativity, Ch 23 Modern Physics

(14) 04/20 --- 04/24 | Ch 24 Atomic Physics, Ch 25 Nuc. Physics

(15) 04/27 --- 04/29 | Ch 26 Particles
    04/29 -- Wednes | Assessment exercise
    05/01 -- Friday | Final Review

05/04 -- Monday | Final Exam: 8:00-10:00pm, Location: TBA

05/05 -- Tuesday | Alternate Final Exam
Only for University approved reasons and scheduled no later than 04/15.
• Web Links

The URL for LON-CAPA is: http://msu.loncapa.org

To register you iClicker for class participation points go to http://iclicker.com.

The homepage for the Physics and Astronomy Department is: http://www.pa.msu.edu

Please note that additional resources, such as a math review and tools, are available in LON-CAPA.

• Textbook

Rex & Wolfson: Essential College Physics, Volume 2. Edition 2. This book is required. If you took PHY231 in the Fall 2014 and purchased the complete book/set you do NOT need to purchase this volume.

You will also need an i-Clicker for class participation/quizzes during lectures.