PH 106 Section 003: General Physics W/Calc II

Spring 2013

4 Credit Hours

Primary Instructor: Dr. Ronald Buta

Core Designation: Natural Science

Syllabus subject to change.

Prerequisites

From the Student Records System

Both
- MATH 126 (undergrad)
- Or
- MATH 146 (undergrad)

And
- PH 101 (undergrad)
- Or
- PH 105 (undergrad)
- Or
- PH 125 (undergrad)

Course Description

The course is focussed on solving basic problems in electricity, magnetism, and optics. The class will be lecture style and will feature in-class demonstrations related to the topics under discussion. Additionally, clickers will be used to allow class participation and interaction.

Class meeting time: Tuesday and Thursday, 04:00-05:15pm, Room 227 Gallalee Hall.

The lab associated with PH106-003 will be taught by J. Yu (jyu18@crimson.ua.edu) and J. Beik Mohammadi (jbeikmohammadi@crimson.ua.edu), and will meet on Wednesday from 5:00-6:50pm in Room 329 Gallalee Hall.

The lab associated with PH106-004 will be taught by A. Amiri (aamiri1@crimson.ua.edu) and J. Yu (jyu18@crimson.ua.edu), and

will meet on Wednesday from 7:00-8:50pm in Room 329 Gallalee Hall.

The lab associated with PH106-005 will be taught by J. Beik Mohammadi (jbeikmohammadi@crimson.ua.edu) and A. Amiri (amiri1@crimson.ua.edu), and will meet on Wednesday from 3:00-4:50pm in Room 329 Gallalee Hall.

BEFORE each scheduled lab, students should go to LABs & Schedule and print out the appropriate lab instruction form.

Student Learning Outcomes

The main objectives of PH106 are to give students a basic qualitative and quantitative understanding of electricity (including electronic circuits), magnetism, and optics.

After taking PH106 you should be able to

- recognize and explain the scientific method, and evaluate scientific information.

- answer conceptual questions which require a solid understanding of electrical and magnetic forces.

- **apply** the concepts of electric fields and electric potential to relevant problems, using both differential and integral calculus.

- **apply** the concepts of magnetic fields to relevant problems

- **apply** the laws of physics to formulate a solution to a problem

- **analyze** electric circuits and **predict** their function

- solve problems which require knowledge of ray optics and optical image formation

Outline of Topics

Jan. 10 - Introduction to Electric charge

Jan. 15 - Chapters, 21,22 - Electric charge, Electric fields

Jan. 17 - Chapter 22: Electric fields

Jan. 22 - Chapter 23: Gauss's Law

Jan. 24 - Chapter 23: Gauss's Law

Jan. 29 - Chapter 24: Electric potential

Jan. 31 - Chapter 24: Electric potential

Feb. 5 - Chapter 25: Capacitance

Feb. 7 - Exam 1: Chapters 21-24

Feb. 12 - Chapter 25: Capacitance

Feb. 14 - Chapter 26: Current and resistance

Feb. 19 - Chapter 26: Current and resistance

Feb. 21 - Chapter 27: Circuits

Feb. 26 - Chapter 27: Circuits, Magnetic fields

Feb. 28 - Chapter 28: Magnetic fields

Mar. 5 - Chapters 28, 29: Magnetic fields, Magnetic fields due to currents

Mar. 7 - Exam 2: Chapters 25-28

Mar. 12 - Chapters 29, 30: Magnetic fields due to currents, Induction and Inductance

Mar. 14 - Chapter 30: Induction and inductance

Mar. 19 - Chapter 31: Electromagnetic oscillations

Mar. 21 - Chapter 31: Alternating current

Mar. 26 - SPRING HOLIDAYS - NO CLASS

Mar. 28 - SPRING HOLIDAYS - NO CLASS

Apr. 2 - Chapter 32: Maxwell's equations; magnetism of matter

Apr. 4 - Chapters 32, 33: Magnetism of matter; electromagnetic waves

Apr. 9 - Exam 3: Chapters 29-32

Apr. 11 - Chapter 33: Electromagnetic waves

Apr. 16 - Chapters 34: Images

Apr. 18 - Chapters 34, 35: Images, Interference

Apr. 23 - Chapteris 35, 36: Interference, Diffraction

Apr. 25 - Chapter 36: Diffraction

Apr. 30 - Final Exam, Tuesday, 07:00-09:30pm; part I: Chaps. 33-36, part II: comprehensive

Exams and Assignments

There will be three in-class exams as follows:

Exam 1, Chapters 21-24, Thursday, Feb. 7

Exam 2, Chapters 25-28: Thursday, Mar. 7

Exam 3, Chapters 29-32: Tuesday, Apr. 9

Final Exam Part 1, Chapters 33-36: Tuesday, Apr. 30, 7-9:30pm, Room 227 Gallalee Hall

Final Exam Part 2, comprehensive Chapters 21-32: Tuesday, Apr. 30, 7-9:30pm, Room 227 Gallalee Hall

All exams will be a mix of regular problem-solving and conceptual questions, and will be graded in a multiple choice format. For each exam there will be a study guide to provide some focus since the amount of material is so large.

Homework: The class will be using an online homework system called Sapling (cost $29.99). When you enroll in Sapling, you will be asked for a key code that will automatically sort you into your individual class sections. Here are sign-up instructions:

Use one of the following for your section number:
Section 003 - = apple
Section 004 - = orange
Section 005 - = banana

1. Go to https://saplinglearning.com
2. a. If you already have a Sapling Learning account, log in then skip to step 3.
b. If you have Facebook account, you can use it to quickly create a Sapling Learning account. Click the blue button with the Facebook symbol on it (just to the left of the username field). The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and timezone, accept the site

policy agreement, and click "Create my new account". You can then continue to step 3.
c. Otherwise, click "create account". Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the expandable list (listed by subject, term, and instructor) and click the title link.
4. Select your payment options and follow the remaining instructions.
When prompted, enter the key code:
5. Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.

During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to

support@saplinglearning.com

explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor.

Regular in-class quizzes, often of a conceptual nature, will be given almost every class period using the clickers from TurningPoint Technologies. These are required for the class and are available at the UA Supply Store (and other local bookstores) and cost $52 new and $39 used. The clicker comes with a lifetime user's license.

To use your clicker, you must register it for the class. This is done on the class Blackboard Learning website which you can access through mybama.ua.edu. Find the class in the Blackboard Learning section and in the left bar click on "Course Home Page" There you will see an icon labeled "Turning Point Registration Tool." There is no extra charge for registering the clicker. Please get your clicker by Tuesday, January 15. The Response Device ID is the 6-digit ID under the barcode on the back of your clicker.

The receiver in Room 227 is on Channel 27. To register your responses in this room, you must change your clicker to this channel. To change channels:

- press menu

- press "yes" (down button) until "Change Channel" is highlighted

- press "Enter"

- Type "1"

- press "Enter"

- you should see "Channel Changed," "Receiver Found"

- use a similar procedure to set the clicker for "Presentation Mode": Menu--> Yes -->"Presentation" --> Enter. You should see "Presentation Mode, Channel 1". To test this, press any number key. You should see "Not accepting answers!" If you see "Sending ... No receiver on channel XX within range," then you are on the wrong channel.

Grading Policy

Lab grade: 15%

Homework: 15%

In-class clicker quizzes: 10%

Exam 1: 12%

Exam 2: 12%

Exam 3: 12%

Final exam, Part 1: 12%

Final exam, Part 2: 12%

Policy on Missed Exams & Coursework

There will be no makeup exams or makeup homework. If for some reason you miss an in-class exam, the final exam will count more to make up for it.

Attendance Policy

There is only one way to take this class, and that is: SERIOUSLY. Being serious means attending class on its scheduled days, and being there when the class is supposed to start and staying in the class until it is finished for the day. Late arrivals or early departures are disruptive practices that should be avoided. If you miss classes you will miss the in-class clicker quizzes, which is not recommended because they will be given almost every class period. However, the clicker quiz scores will be computed out of a minimum number, such that any clicker credit above tht minimum will count as extra credit. Another reason for regular attendance is that we cannot cover all the topics in the textbook, and if you miss classes you will not be able to keep up with the

topics that actually are covered.

Required Texts

UA Supply Store Textbook Information

- **HALLIDAY / FUNDAMENTALS OF PHYSICS VOL 2**
  (Required)
- **NONE / RESPONSE PAD XR (XRC-01)**
  (Required)

Other Course Materials

There are no course materials needed other than the textbook, a TurningPoint Technologies clicker, and registration for Sapling.

Extra Credit Opportunities

Any possible opportunities for extra credit will be discussed during the semester.

Policy on Academic Misconduct

All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.

The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct.

Disability Statement

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary. If you have a disability, but have not contacted the Office of Disability Services, please call 348-4285 or visit 133-B Martha Parham Hall East to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

Severe Weather Protocol

In the case of a tornado warning (tornado has been sighted or detected by radar, sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the National Weather Service and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take. The Office of Public Relations will disseminate the latest information regarding conditions on campus in the following ways:

- Weather advisory posted on the UA homepage
- Weather advisory sent out through Connect-ED--faculty, staff and students (sign up at myBama)
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM
- Weather advisories are broadcast via WUOA/WVUA-TV, which can be viewed across Central Alabama. Also, visit wvuatv.com for up-to-the-minute weather information. A mobile Web site is also available for your convenience.