Syllabus (two pages):
PHYS 2426 & 2426L, University Physics II, Fall 2012
Class: TR, 8:00 am – 9:15 am, Science Building, room 135

Instructor: **Dr. Carlos A. Bertulani**
Office: Science Bldg. 140
Phone: 886-5882
Office hours: W 12:00 - 2:15 pm
e-mail: carlos.bertulani@tamuc.edu
http://faculty.tamu-commerce.edu/cbertulani/

Laboratory: **L1 -** Tue, 12:30-1:50 pm Science Building 107
L2 - Wed, 5:00-6:50 pm Science Building 114

The first lab will start a week later than the lectures.

Textbook: Textbooks on Introductory Physics are outrageously expensive (~ $200). In many cases they are used for one semester only. We are living the first decades of the internet age, where plenty of excellent and copyright free material can be downloaded. Top universities and dedicated lecturers understand this and have prepared online materials that are sometimes even better than most commercial textbooks.
In this course we will use the online material from

1 - http://faculty.tamu-commerce.edu/cbertulani/
→
Class Notes
→
Introductory Physics II (Electromagnetism)

2 - MIT Web Course
http://web.mit.edu/8.02t/www/802TEAL3D/visualizations/coursenotes/index.htm

Course Content: Four semester hours. A calculus based physics course on electromagnetism for science, mathematics and engineering students.
The student will learn electricity and magnetism with a calculus based method.

Goals and Learning Outcomes for this Course

Goal 1: Students will understand the discipline-specific knowledge in electromagnetism, covering the subjects:

- Electric Charge
- Electric Fields
- Gauss' Law
- Electric Potential
- Capacitance
- Current & Resistance
- Circuits
- Magnetic Fields
- Magnetic Fields due to Currents
- Induction & Inductance
- Magnetism of Matter; Maxwell's Equations
- Electromagnetic Oscillations & Alternating Current
- Electromagnetic Waves.
-

Objective 1: Students will know the concepts of electromagnetism and demonstrate a proficiency in the fundamental concepts in this area of physics.

Objective 2: Students will be able to explain concepts of electromagnetism and to show a working knowledge of a broad array of physical phenomena that are based upon fundamental concepts of electromagnetism.

Goal 2: Students will have strong physical reasoning and problem solving skills and apply these skills to the solution of theoretical and applied problems.

Objective 1: Students will be able to solve problems using their knowledge and skills in physics. They will use critical thinking skills to formulate and solve quantitative problems in electromagnetism.

Objective 2: This course will offer a curriculum emphasizing physical science to produce professionals capable of applying broad theoretical insight to solution of practical problems**.**

Assessment

The following measures will be used to assess the success of this course in achieving the above objectives:

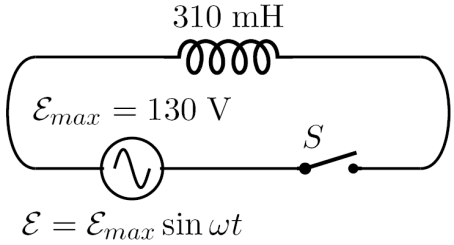
Student Work: exams, reports, and lab work.

- The course will have 2 midterm tests, plus a comprehensive final covering all course material.

- The total grade will consist of Exams (70% total), and quality of the laboratory reports (30%).

A typical exam question is shown below. Expect 5 of similar questions in each midterm exam, and 8 in the final exam.

In the circuit below, the inductor is 310 mH, the maximum voltage is 130 V, and the inductive reactance is 40 Ω.



What is the current's frequency in the inductor?

- Laboratory guide sheets for each experiment will be provided. Each student will be requested to turn in a lab test report at the end of each laboratory session.
  A typical lab report will aks you to explain the concepts:
  1. At rest there is no interaction (force) between charges and magnetic poles. Magnet does not affect charged electroscope.
  2. Moving charges are affected by magnets. The crooks tube apparatus with electron beam deflected by magnetic fields. We model the interaction as invisible magnetic fields reaching out from the bar or ring magnets.
  3. Moving charges (electrical currents) produce magnetic fields. Electro-magnets illustrate this point by affecting compasses and attracting paper clips.
  4. Moving or changing magnetic fields (magnets) interact with charges and cause them to move (creating currents). The magnets moved in and out of a coil of wire attached to a galvanometer (current meter).
  5. Changing magnetic fields created by either changing bar magnets or by changing currents of electromagnets create changing currents in nearby conductors.
  6. Changing magnetic fields create changing electric fields which create changing currents which create changing magnetic fields…. and so on. One result of this is electromagnetic waves – light is an example.

Student Perception Survey: to determine whether students believe that they have achieved the objectives of the Physics major.

- This survey will be developed in the Fall of 2012, and administered to students at the end of the semester.

- The physics department utilizes an online questionnaire provided via the MyLeo TamuC system with statements regarding various elements of instruction. These comments are given to the instructor and department head soon after the grades are recorded. If students have concerns about the classroom experience during the semester they should inform the

instructor of those concerns and failing a satisfactory response may, as a last resort, contact the physics department head with those concerns.

Attendance and Tardiness: Students are expected to be on time and present for all class meetings. Excused absences can be arranged prior to the class period being missed for appropriate activities as determined by the instructor. If an emergency results in an absence, the student should contact the instructor as soon as possible informing the instructor of the emergency and inquiring about ways to make up the missed class. The instructor will make judgments on how to handle the situation. Possible reasons for an excused absence are listed in the " Student's Guidebook" under class attendance policy. Attendance and tardy records will be maintained and both may result in deductions from your overall grade.

Classroom Behavior: Disorderly conduct which interferes with the normal classroom atmosphere will not be tolerated. The classroom instructor is the judge of such behavior and may instruct a disorderly student to leave the room with an unexcused absence or in more serious situations a student may be removed from the class with a failing grade.

Cheating and other Breaches of Academic Conduct: Academic cheating, plagiarism, and other forms of academic misconduct may result in removal of the student from class with a failing grade or may in extreme cases result in suspension or expulsion from the University as described in the "Code of Student Conduct" section of the " Student's Guidebook".

ADA Eligible Students: ADA eligible students should make arrangements with the instructor in the first week of the semester about special arrangements needed for classroom or testing facilities and procedures to accommodate the disability.