**LIBERTY UNIVERSITY**
**Physics 232 & 232L – University Physics II & Laboratory (4 Credit Hours)**
**Fall 2011 (SH 135, T-TH, 3:35-4:50)**

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**AS 105**

**Office Hours:**
**MWF 2:45 - 3:35**
**TR 12:15 - 1:00**
**And by appointment**

*Thus shall you say to them: "The gods who did not make the heavens and the earth shall perish from the earth and from under the heavens" It is he who made the earth by his power, who established the world by his wisdom, and by his understanding stretched out the heavens.* ***Jeremiah 10:11-12 (E.S.V.)***

## I. Course Description

Electricity, magnetism, optics, and modern physics using calculus based mathematics.

## II. Rationale

This course is required for the mathematics, biochemistry, computer science, and engineering majors. The study of physics 232 introduces the student to a thorough treatment of the use of electricity and magnetism, optics, and modern physics. The student will perform laboratory experiments and conduct measurements to support the theory. The emphasis will be mostly on the concepts of static electricity, circuits, capacitance, and magnetism.

## III. Prerequisite statement

Math 132 & Phys 231 are the minimum prerequisites.

***It is the student's responsibility to make up any prerequisite deficiencies, as stated in the Liberty University Catalog, which would prevent the successful completion of this course.***

## IV. Materials List

Required:

- A **NON-GRAPHING** scientific calculator is required. Use of calculators on cell phones, PDA's, etc. is not permitted.
- Textbook – Physics for Scientists and Engineers; 6th Edition; Paul A. Tipler; W. H. Freeman & Company. *Note: electronic copies or just the second volume of the two volume set should also suffice. Visit the LU bookstore for further details.*
- NOTE: All students must purchase a laboratory manual. No photocopies of experiments will be accepted because of copyright laws.
- * All Labs from Wilson/Hernandez: Physics Laboratory Experiments (Custom Edition).

## V. Learning Outcomes

A.

a. Demonstrate a basic understanding of electricity, magnetism, optics, and modern physics by mastering the learning objectives for each chapter and sections listed in the course content. These objectives provide the basis for tests. The concepts are as follows:

Static Electricity, Magnetism, optics, and modern physics applications to physical problems using calculus and algebraic methods.

b. Analyze and solve problems using the laws, textbook examples and materials provided in the classroom.

c. Apply acquired problem solving skills to work physics homework.

B.

d. Reading assignments are on syllabus in schedule table below.
e. Homework will be assigned using Webassign and written problems given in lecture.
f. Students are responsible for all assignments given in lecture and assigned in Blackboard.

## VI. Assignments/Requirements

**Assignments:**

- WebAssign homework is available for this course and an email with the course key is posted in the announcements section of Blackboard. WebAssign is a relatively small portion of your total grade, but most students really do need to do many problems to understand physics. If you finish a problem in WebAssign and don't understand what you did to get it correct then you're not making good use of your time. If you worry over a point in WebAssign and are fairly certain that it is just a formatting issue then you may also be making poor use of your time. In the end, you should ask yourself can I read the Lecture Notes and text with understanding? Can you do the written problems, or at least set them up and get stuck on the calculation?
- Written Problems 1-30 will not be directly collected, but these problems are more important than WebAssign to your grade and you are expected to work them out carefully. A ten-minute quiz will be given about every two weeks where you will face one of the written problems verbatim, or a closely related problem, if you keep up to date on the written problems then these quizzes should be simple. If not, there will not be sufficient time to figure out the problems. You are allowed to take the quiz with your handwritten notes, and my posted pdf-lecture notes, but no textbook or other materials. The idea behind this is two-fold:
  - i.) WebAssign is a good starting point but a horrible endpoint for your studying. It is crucial that you work out the problems in total with proper explanations of your approach. I do expect you learn how to use both vectors and calculus to solve problems similar to those I explain in lecture. The whole argument is the answer, unfortunately WebAssign sometimes gives students the wrong idea that the process is immaterial and the answer is key. Both answer and the derivation are of interest and you will be expected to provide both as you solve problems in your future jobs.
  - ii.) Cramming all the homework until the due date is a poor and foolish habit. I intend to award those who work with the class in part with these quizzes. Generally, as soon as lecture covers a topic you should be working on those problems the same day or at the latest the following day.

- Three two-hour exams will be given during lab periods as detailed in the calendar in section X. These exams must be taken at the appointed time and date unless a university approved absence overlaps directly with the time.
- Final Exam is comprehensive.
- Overall we should cover the topics listed in the calendar in section X.

**Requirements:**

| | |
|---|---|
| Cognitive Growth: | Demonstrate ability to apply the knowledge acquired to problem solving<br>Demonstrate mathematical proficiency by simplifying expressions, using identities and solving equations |
| Product: | Homework, Quizzes and Three midterm exams. |
| Process: | Student studies materials and ask questions in and out of lecture to resolve problems. |

## VII. Grading Policies

- Homework must be turned in on or before the due date or no credit is generally awarded.
- **Tests and quizzes must be taken as scheduled.** No make-up tests/quizzes will be given after the scheduled time, except in the case of emergency (see Section X. below). If a test/quiz is missed due to an official university sponsored event, arrangements must be made with the instructor **in advance of departure** to take the test at an alternate time. If no arrangement is made then by default the final is given added weight. For other excused absences, the student must contact the instructor by email at the earliest opportunity in order to make arrangements for make-up work. (See attendance policy below.)

### Course Grade

| | | |
|---|---|---|
| Test 1 | 150 Points | 15% |
| Test 2 | 150 Points | 15% |
| Test 3 | 150 Points | 15% |
| Quizzes | 100 Points | 10% |
| WebAssign | 100 Points | 10% |
| Lab Reports | 70 Points | 7% |
| Final Examination | 280 Points | 28% |
| Total | 1000 Points | 100% |

A 900 – 1000 Points (90-100%) B 800 – 899 Points (80-89% C 700 – 799 Points (70-79%)
D 600 - 699 Points (60-69%) F below 600 Points (60%)

Grades are based on academic performance in this class. Effort is required, but it is not necessarily a sufficient condition for success.

## VIII. Attendance Policies

Class attendance is **essential** and students are expected to be present; however, if an absence is unavoidable, **students are responsible for ALL material covered and assignments made during an absence**.

Students should be present for the entire class and should be prepared to take notes in class.
Phones. beepers, iPods, etc. should be turned off and put away during class. No food or drink is permitted in class.

For the good of the Liberty University student body, a consistent attendance policy is needed so that all students in all majors will understand the expectations of faculty in all their courses. **In general, regular and punctual attendance in all classes is expected of all students.** At times, students will miss classes. These absences will be identified as either excused or unexcused and will be handled per the policy below.

**Excused Absences**

- Excused absences include all Liberty University sponsored events, to include athletic competition or other provost-approved event.
- Absences due to medical illness that are accompanied by a doctor's note will be excused.

- Absences due to family situations such as a death in the family or a severe medical condition will be excused
- Students will **not** be penalized for excused absences and will be permitted to make arrangements to complete missed work.

**Unexcused Absences**

- Classes that meet:
  - Three times per week will permit three unexcused absences per semester.
  - Twice per week will permit two unexcused absences per semester.
  - Once per week will permit one unexcused absence per semester.
- Questions regarding unexcused absences must be resolved by the student with the faculty member within one week of the absence. Students may appeal decisions to the dean.
- Extraordinary circumstances regarding excessive absences will be addressed by the student with the faculty member, department chair, and dean as required.
- Penalties for each unexcused absence over the permitted number per semester will be as follows:

  50 points for classes that meet 3 times per week
  75 points for classes that meet 2 times per week
  150 points for classes that meet once per week
- Students who are late for class 10 minutes or less are considered tardy but present for the class. If a student misses in-class work due to tardiness, the faculty member may choose not to allow the student to make up this work. Three class tardies will be counted as one unexcused absence.
- Students who are more than 10 minutes late for class are considered absent

## IX. Other Policies

**Dress Code**

Students are expected to come to class dressed in a manner consistent with *The Liberty Way*.

**Honor Code**

We, the students, faculty, and staff of Liberty University, have a responsibility to uphold the moral and ethical standards of this institution and personally confront those who do not.

**Academic Misconduct**

Academic misconduct includes: academic dishonesty, plagiarism, and falsification. See *The Liberty Way* for specific definitions, penalties, and processes for reporting. In addition, if a student is found cheating in my course then any special waivers such as dropping test grades for final exam are nullified.

**Disability Statement**

Students with a documented disability may contact the Office of Disability Academic Support (ODAS) in DH 2016 to make arrangements for academic accommodations. For all disability testing accommodation requests (i.e. quieter environment, extended time, oral testing, etc.) the Tutoring/Testing Center is the officially designated place for all tests administered outside of the regular classroom.

**DROP/ADD POLICY**

A Fall/Spring course may be dropped without a grade, tuition, and fee charges within the first five days of the semester. From the sixth day until the end of the tenth week, a Fall/Spring course may be withdrawn with a grade of W or WF

**Classroom Policies**

The inappropriate use of technology, such as cell phones, iPods, laptops, calculators, etc. in the classroom is not tolerated. Other disruptive behavior in the classroom is not tolerated. Students who engage in such misconduct will be subject the penalties and processes as written in *The Liberty Way*.

**Laboratory Policies:** *All labs for Physics 232L are from Wilson/Hernandez: Physics Laboratory Experiments, 6th Ed., Liberty Custom Edition. No photocopies are permitted due to copyright considerations.

**Beneficial dictator policy:**
I reserve the right to modify all aspect of this syllabus if the policies are seen (by me) to be needlessly hurtful to the students. This may result in the addition or subtraction of assignments and/or the shifting of due dates. All such changes are communicated via email and lecture meeting. Obviously, this policy does not apply to university-wide policies such as attendance or point scale since I have no authority to modify said policies. However, such policies as I initially set I reserve the right to modify said policies when it is beneficial for the student.

## X. Calendar for the semester/term

| Date | Topic | Pages in text | Comments |
|---|---|---|---|
| T/8-23 | Electric fields & Coulomb's Law | 603-616 | |
| TH | Electric fields | 603-616 | No Lab Meeting |
| T/8-30 | Electric fields from charge distributions | 616-634 | |
| TH | Flux & Gauss' Law | 616-634 | No Lab Meeting |
| T/9-6 | Gauss' Law | 642-656 | |
| TH | $\vec{E} = -\nabla V$, the electric potential | 642-656 | Lab #9, Fields and Equipotentials |
| T/9-13 | Potential due to charge distributions | 656-673 | |
| TH | Capacitors & energy | 656-673 | Lab #10, Ohm's Law |
| T/9-20 | Capacitor physics | 681-700 | |
| TH | Resistors and resistance | 681-700 | TEST 1 in Lab Time |
| T/9-27 | Direct Current circuits | 700-714 | |
| TH | RC circuits | 700-714 | Lab #11, The Measurement of Resistance |
| T/10-4 | Magnetic fields & magnets | 727-752 | |
| TH | Biot-Savart Law | 727-752 | Lab #12, Resistance is Series and Parallel |
| T/10-11 | Ampere's Law | 753-754 | |
| TH | FALL BREAK | | |
| F | FALL BREAK | | |
| T/10-18 | Faraday's Law | 765-780 | |
| TH | Lenz' Law & motional EMF | 765-780 | Test 2 in Lab Time |
| T/10-25 | Inductance & energy in inductors | 780-787 | |
| TH | LR circuits | 780-787 | Lab # 13, Reflection and Refraction |
| T/11-1 | Maxwell's Equations | 806-829 | |
| TH | Radio waves & Polarizations | 806-829 | Lab #14a, Spherical Mirrors and Lenses |
| T/11-8 | Ray reflections & Snell's Law | 839-857 | |
| TH | Wave dispersion, fiber optics | 839-857 | Lab #14b, Spherical Mirrors and Lenses |
| T/11-15 | Interference | 898-922 | |
| TH | Thin films, diffraction | 898-922 | Test 3 in Lab Time |
| M/11-22 | THANKSGIVING | | |
| T | THANKSGIVING | | |
| W | THANKSGIVING | | |
| TH | THANKSGIVING | | |
| F | THANKSGIVING | | |
| T/11-29 | Nuclear physics | 1017-1039 | |
| TH | Nuclear physics | 1017-1039 | The Transmission Diffraction Grating |
| T/12-7 | Something interesting. | Not in text. | |
| F/12-10 | FINAL EXAM: | | See university exam calendar. |