Physics 302L: Electricity and Magnetism, Light, Atomic, and Nuclear Physics  
_Texas Common Number: PHYS 1302_

This course puts an emphasis on questions of numerical physics. The course is designed for students who do not intend to do further work in natural sciences; the mathematics required involves only standard algebra and some trigonometry. Topics covered include electric charges, fields, and energy, along with magnetism, electromagnetic waves, early quantum theory, nuclear physics and radioactivity.

**Prerequisites**

Completion of PHY 302K.

**Course Organization**

This course is divided into five learning modules containing a total of fourteen lessons. Each lesson contains a statement of learning objectives, a reading assignment, written instructor discussion, and supplementary CD-ROM and internet resources to help students better understand the concepts. All lessons within a learning module must be completed before moving onto the next module. An instructor is available via a message center to provide feedback and respond to questions.

Topics include:

**Module 1**
- Lesson One: Electric Charge and Electric Field
- Lesson Two: Electric Potential and Electric Energy
- Lesson Three: Electric Currents

**Module 2**
- Lesson Four: DC Circuits
- Lesson Five: Magnetism

**Module 3**
- Lesson Six: Electromagnetic Induction and Faraday’s Law
- Lesson Seven: Electromagnetic Waves
- Lesson Eight: Light - Geometric Optics

**Module 4**
- Lesson Nine: The Wave Nature of Light
- Lesson Ten: Optical Instruments
- Lesson Eleven: Early Quantum Theory, Model of the Atom

**Module 5**
- Lesson Twelve: Quantum Mechanics of Atoms
- Lesson Thirteen: Nuclear Physics and Radioactivity
- Lesson Fourteen: Nuclear Energy, Effects and Uses of Radiation
**Required Materials**


**Grading**

This course consists of 14 instructor-graded assignments, a midterm exam, and a comprehensive final exam. Each assignment is comprised of five to seven questions to be completed mathematically. All exams must be completed at a proctored testing location, with arrangements to be made by the student.

- Instructor-Graded Assignments 40%
- Midterm Exam 20%
- Final Exam 40%

In addition to completing all assignments and earning the minimum number of points to receive a passing grade, students must earn at least 60% on the final exam in order to receive a passing grade in the course.

This course is independent study and is self-paced. Students have five (5) months upon registration in which to complete all coursework, with an additional 30 days allotted for completion of the final exam.

**University Extension**

For more information about University Extension courses and policies, please visit [www.utextension.org](http://www.utextension.org). Questions may be directed to our office at (512) 471-2900 or [uex@austin.utexas.edu](mailto:uex@austin.utexas.edu). Office hours are M – F, 8 a.m. – 5 p.m. CST.