

**DEREE COLLEGE SYLLABUS FOR: :**

**PY 1005 LE INTRODUCTION TO MODERN PHYSICS**

**3/0/3**

(Fall 2016)

**PREREQUISITES:**

None

**CATALOG DESCRIPTION:**

Fundamental concepts and principles of modern physics are presented in a comprehensive way together with everyday life implications. Nuclear energy, Einstein's theories, space travel, Schrödinger's cat and black holes will reveal their secrets over a scientific journey with the laws of nature as companions.

**RATIONALE:**

The course introduces students to fundamental aspects of modern physics, relating them to everyday applications. It aims to introduce students to frontiers of modern physics and illustrate the benefits that scientific investigation brings to society. It unveils the contribution of science in the improvement of the quality of life and helps students appreciate developments in modern physics.

**LEARNING OUTCOMES:**

- As a result of taking this course, students should be able to:
1. Demonstrate understanding of the scientific method of work and the evolution of physics from the classical to its modern era.
  2. Demonstrate knowledge and understanding of electric and magnetic phenomena in everyday life.
  3. Discuss the nature of light and the electromagnetic spectrum and outline practical applications.
  4. Demonstrate knowledge of the fundamentals of important physics theories (e.g. relativity, quantum) and discuss the way they challenge our preconceptions.
  5. Explain radioactivity and discuss different aspects of nuclear energy in nuclear reactors and in the universe.

**METHOD OF TEACHING AND LEARNING:**

- In congruence with the teaching and learning strategy of the college, the following tools are used:
- Class lectures, interactive learning (class discussions, group work) video presentations, and practical problems solved in class.
  - Exercises and analysis of special topics are assigned as homework, and are reviewed in class
  - Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.
  - Use of a blackboard site, where instructors are free to post course documents, timely announcements, as well as additional resources.

**ASSESSMENT:**

**Formative:**

Multiple "diagnostic" tests	<b>0</b>
Multiple choice/short answers/ matching /long questions /problem solving	<b>0</b>

**Summative:**

In-class Midterm examination (1 hour)	<b>40%</b>
In-class comprehensive Final examination (2 hour)	<b>60%</b>

The midterm examination tests Learning Outcomes 1, 2 and 3.

	The final examination tests all Learning Outcomes.
<b>INDICATIVE READING:</b>	<b>REQUIRED READING:</b> Serway, Vuille. 2015. <i>College Physics</i> . 10 <sup>th</sup> edition, Cengage Learning.
<b>INDICATIVE MATERIAL:</b> (e.g. audiovisual, digital material, etc.)	<b>REQUIRED MATERIAL:</b> N/A <b>RECOMMENDED MATERIAL:</b> N/A
<b>COMMUNICATION REQUIREMENTS:</b>	Verbal skills using academic/professional English
<b>SOFTWARE REQUIREMENTS:</b>	Word, Powerpoint, Excel
<b>WWW RESOURCES:</b>	<a href="http://saunderscollege.com/physics/college">http://saunderscollege.com/physics/college</a> <a href="http://krev.com">http://krev.com</a> <a href="http://physicsworld.com/">http://physicsworld.com/</a> <a href="http://scienceworld.wolfram.com/physics/">http://scienceworld.wolfram.com/physics/</a> <a href="http://arxiv.org/">http://arxiv.org/</a> <a href="http://www.physicsclassroom.com/">http://www.physicsclassroom.com/</a> <a href="http://www.physicstoday.org/">http://www.physicstoday.org/</a> <a href="http://www.iop.org/">http://www.iop.org/</a> <a href="http://phoenix.phys.clemson.edu/tutorials/index.html">http://phoenix.phys.clemson.edu/tutorials/index.html</a> <a href="http://phet.colorado.edu/en/simulations/category/physics">http://phet.colorado.edu/en/simulations/category/physics</a> <a href="http://www.physicslessons.com/iphysics.htm">http://www.physicslessons.com/iphysics.htm</a> <a href="http://surendranath.tripod.com/AppletsJ2.html">http://surendranath.tripod.com/AppletsJ2.html</a>
<b>INDICATIVE CONTENT:</b>	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Fields and Forces</li> <li>3. Electricity (Static/Current)</li> <li>4. Magnetism/Electromagnetism</li> <li>5. Optics</li> <li>6. Atomic and Nuclear Physics</li> <li>7. Developments of Classical Theories</li> </ol>