

VILLANOVA UNIVERSITY  
Department of Physics

Course Description

**PHYSICS 1500**  
**The Concept of Light**

**Fall 2003**  
Dr. Javad Siah

- TEXT BOOK:** 1. *NEWTON TO EINSTEIN – the trail of light*  
Author: Ralph Baierlein  
(Cambridge University Press, 2<sup>nd</sup> Ed. 1999)  
2. Additional handouts from different sources

**What kind of a course?** : This is a non-calculus based, three credit, one semester course. Although no laboratory work is required in this course, there will be in class demonstrations of some experiments by the instructor during the lecture hours.

**FORMAT:** Two of the three weekly lectures are devoted to in class lectures and demonstrations. The third weekly lecture is conducted as distance learning, during which students are helped by the instructor. Copies of lectures in Microsoft Power Point format will be available to the students at the web site for the course.

**OBJECTIVE:** The main goal of this course is to provide instruction and some demonstrations for the understanding of light. Throughout the semester the students are familiarized with our evolving views of the nature of light during the past four centuries.

This course is different from the more traditional general survey type physics courses in the fact that it is built around a small number of ideas. Following the trail of light we arrive at the age old paradox on the nature of light. Is light a wave or a particle? What role did light play in Einstein's thought about the nature of space, time and energy? We will learn how light could be regarded as a link between the two independent components of space and time. We will also see how the solution of the wave particle paradox and Einstein's theory of space, time and energy have turned the intuitive world view upside down, showing that our intuition must always be challenged!

In discussing the concept of light, I will demonstrate the nature of scientific methods and theories. We will see how inductive reasoning in science shapes our observations and generalizations into powerful tools called physical laws.