Course: Concepts in Physics (Physics 5)
Instructor: Jim Gunton
Office: LL418
Phone: 8-3959
Email: jdg4@lehigh.edu
Text: Physics: Concepts and Connections, Art Hobson (Prentice Hall)
Lab: Thursdays 1:10 pm – 4 pm (LL221); Ben Sofka, Instructor

Course

Each of us has a special set of talents, which we spend our lives developing, if we are lucky. Some of us are natural entrepreneurs; some are artists. Some of us are good with our hands; others (like myself) are not. Some of us write well; others speak effectively. Not all of us are gifted at mathematics and science, but nonetheless these are crucial components of a successful civilization. It is my hope that I can provide each of you with a better understanding of the basic concepts of physics in this one semester course, which will at most rely on elementary mathematics. The course is not intended for students who are ready for a more mathematical treatment, involving calculus, for example.

Physics is a fundamental science and provides the foundation of modern science and technology, including the development of so many modern medical techniques such as MRI, laser eye surgery, PET scans, ultrasound, etc.

I would also hope that this course would change your world view, by broadening your understanding of the scientific approach and by leading to an appreciation for the amazing fact that our universe is comprehensible. This course is sometimes entitled "Physics for Poets," which represents my particular viewpoint. To quote from the originator of this title, Robert March, "What does a physicist have to say to a poet? First and foremost, that scientists (or at least the best of them) practice their craft because they think it is fun. And what makes it fun can be summarized in one word: wonder—the sense of awe that comes when the familiar world melts away and we catch a glimpse of something marvelous behind. This sense provides a bridge between the spirit of the arts and that of science." I hope I can convey to you throughout this course that sense of wonder, which is a significant part of what it means to be human.

The only requirements for this course are intelligence (which you have in abundance) and a conscientious approach. The latter requirement includes: (i) reading assigned materials prior to lecture and laboratory, (ii) attending all lectures and laboratories, (iii) completing all assigned homework problems, and (iv) seeing

the instructor if you are having trouble. When due, written homework assignments should be turned in to me, prior to the start of the lecture.

Laboratory: There is a laboratory section of this course that meets once a week. There will be approximately 11 different labs in the semester. The first lab is this week
and meets in LL 221 on Thursday, from 1:10 – 4 pm. . YOU MUST BUY A LAB BOOK TO WRITE EACH LAB REPORT IN. PLEASE BUY THIS AT THE BOOKSTORE BEFORE COMING TO LAB THURSDAY.

Grading:

Your numerical grade will be determined as follows:

Two One Hour Exams	200
Homework	100
Laboratory	150
Final Examination	200
TOTAL	650

I view homework as an initial step in the learning process and will grade it primarily on the basis of the effort that you put in. **Course participation is important and I take this into consideration when you are on a borderline between two grades.**

Accommodations for Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

Course Syllabus

Here is a **tentative list** of the reading assignments for the course. I will let you know if we need to make any adjustments as we go along. Written homework will be assigned as the semester progresses.

Date	Topic	Read
Jan 16	Models of the Cosmos	
Jan 18	Copernicus, Kepler	Chap 1
Jan 20	Galileo to Galaxies (and seasons)	
Jan 23	First Law of Inertia	Chap 3
Jan 25	Motion in One Dimension	
Jan 27	Newton's Second Law: F=ma	Chap 4
Jan 30	Newton's Third Law	
Feb 1	Conservation of momentum	
Feb 3	Conservation of Energy	Chap 5
Feb. 6	Rotational Motion	
Feb. 8	Gravitational force	
Feb 10	Birth and death of stars	Chap 6
Feb 13	Heat	
Feb 15	Second law of thermodynamics	
Feb 17	Review for Exam 1	
Feb 20	First Exam	Chap 7
Feb 22	Electrostatics and Electric Currents	
Feb 24	Magnetism	
Feb 27	Electromagnetic Induction	
Feb 29	Waves	
Mar 2	No Class-Ill	Chap 8,9
Mar 5-9	SPRING BREAK	
Mar 12	Waves and Properties of Light I	

Mar 12	Properties of Light II	
Mar 14	Properties of light III, Sound	
Mar 16	?	Chap 10
Mar 19	Review for Exam 2	Chap 11
Mar 21	Special Relativity 1	
Mar 23	Special Relativity 2	
Mar 26	Exam 2	
Mar 28	General Relativity	
Mar 26	Modern cosmology	Chap 11
Mar 28	Quantum theory__light spectra	
Mar 30	Light waves and photons_duality	Chap 12
April 2	Quantum theory…uncertain principle	
April 4	Quantum theory of atoms	Chap 13
April 6	Applications of quantum theory	
April 9	Nuclear physics I	
April 11	Nuclear physics II	Ch 14,15
April 13	Nuclear Physics III	
April 16	Fusion and Fission	
April 18	The Energy Challenge	Ch 16
April 20	Quantum fields I	Ch 17
April 23	Quantum fields II	
April 25	REVIEW FOR FINAL I	
April 27	REVIEW FOR FINAL II	

April 13	Nuclear physics III