

Physics and Science Fiction

Spring 2013

Instructor: Prof. David Snoke

Office: G-10 Allen Hall (don't be deterred by construction signs)

Phone: 4-9007

Email: snoke@pitt.edu

Office hours: I am available most of the day most weekdays. Call or email for appointment.

Books:

Required: D.W. Snoke, *Physics and Science Fiction* (available at the Pitt bookstore)
Science Fiction Anthology (available at the Pitt bookstore)

Supplementary books (for term paper; see below):

Robert Forward, *Indistinguishable from Magic* (Baen)

Fred Hoyle, *The Black Cloud* (Signet)

Paul Anderson, *Tau Zero* (Berkley)

Jules Verne, *From the Earth to the Moon* and *Round the Moon* (reprinted, e.g., by Amazon)

Lawrence Krauss, *The Physics of Star Trek* (Basic Books)

CourseWeb Site: There is a CourseWeb site associated with this course. It can be accessed through your <http://my.pitt.edu> account. This site will be used to make important announcements and to make special materials available.

Class schedule:

Class times: Tuesday, Thursdays 2:30-3:45

Class location: 102 Thaw Hall

Dates	Topic	Readings
Jan 8, 10	General approach to science	Chapter 1 "The Cold Equations"
Jan 15, 17	Newton's laws of motion	Chapter 2 "The Martian Way"
Jan 22, 24	Newton's law of gravity	Chapter 3 "Neutron Star"
Jan 29, 31	Thermodynamics—the atomic theory and the idea of vacuum	Chapter 4 "Take a Deep Breath"
Feb 5, 7	Thermodynamics—the Second Law	"The Big Bounce" "Night" "The Last Question" "Unfinished Story #1"
Feb 12, 14	Electric Field and Waves	Chapter 5 "Mind Games"
Feb 19, 21	Electric Field and Waves II MIDTERM EXAM Thursday, Feb 21	
Feb 26, 28	Special Relativity I	Chapter 6 "The Necklace"

Mar 5, 7	Special Relativity II	"Theory and Practice of Time Travel" "Theory and Practice of Teleportation"
Mar 11-15	NO CLASS- SPRING BREAK	
Mar 19, 21	General Relativity	Chapter 7 "Hole Man" "No Morning After"
Mar 26, 28	Quantum Mechanics I	Chapter 8 "At the Rialto"
Apr 2, 4	Quantum Mechanics II	Chapter 9 "Matter's End"
Apr 9, 11	Biophysics: Origin of Life	Chapter 10 "All the Myriad Ways"
Apr 16, 18	Biophysics: Mind	

Grading:

Grades will be based on (1) in-class quizzes based on the readings (20% of grade), (2) a midterm exam (30% of grade), (3) the final exam (40% of grade), and (4) a term paper (10% of grade).

The term paper must be based on one of the supplementary books listed above, or another book which you have gotten permission from the instructor to do. For full credit, you should discuss the following questions:

- a) What did you learn about physics from this book, beyond what you have learned in class? Give a short summary of how that physics works. (Also, did you find any mistakes in the author's physics, or place where others would disagree?)
- b) How well was the physics used in the story/stories? Did the physics aid the story or get in the way?

Help:

There are many resources available for help. These include:

- Resource Room, 312 Thaw Hall: This room is staffed by graduate student teaching assistants of the introductory physics and astronomy courses. Hours will be posted on the departmental website.
- Academic Resource Center, G1 Gardner Steel Conference Center (next to Thackeray Hall, around the corner from where you enter the building for your computer based recitation). The center is open Monday through Friday from 9 am to 4 pm. Tutoring sessions are generally one hour long. Students are encouraged to make an appointment in advance by calling 412-648-7920.
- If you wish to hire a private tutor, contact the Physics departmental office, 100 Allen Hall.

Academic Integrity:

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Disabilities:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890 / (412) 383-7355 (TTY), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.