Topics in Astrophysics

Fall 2018 | Physics 364 | 10:20 A.M. AB

Instructor:

Name: Dr. Tom Kirkman | Phone: 363–3811 | email: tkirkman@csbsju.edu
Office: PEngel 136 | Informal Office Hours: 8:00 A.M. – 5:30 P.M.

Texts:

- *Quantitative Astronomy* by Thomas L. Swihart (Prentice Hall, 1992) Chapters: 1–11
- http://www.physics.csbsju.edu/364/
  http://www.physics.csbsju.edu/astro/

Grading:

Your grade will be determined by averaging four scores: total homework score, midterm exam score, and the final exam score (which is double-counted). Assigned homework is due at the beginning of the next class period. Approximate exam dates are: 24 September (Monday) and 17 October (Wednesday) but they can easily be changed.

Questions:

There is no such thing as a dumb question. Questions asked during lecture do not "interrupt" the lecture, rather they indicate your interests or misunderstandings. I'd much rather clear up a misunderstanding or further develop a topic of interest than continue a dull lecture.

Remember: you are almost never alone in your interests, your misunderstandings, or your problems. Please help your classmates by asking any question vaguely related to astronomy. If you don't want to ask your question during class, that's fine too: I can be found almost any time in my office (PEngel 136) or the nearby Physics labs.

Topics:

This course deals with how the universe works on the "large" distance scale (i.e., $\gg R_\oplus$). After an introduction to the coordinate systems of astronomy, we'll start by applying basic physics to planets, stars, galaxies, ... We'll try to find *simple* (and hence not fully correct) answers to some of the basic questions of astrophysics like: How are planets constructed? What types of stars exist? How are stars born? Why do they shine? How do they die? How do stars fit into the larger structure of galaxies? How do the galaxies fit together to form the universe? How did it all start? How will it all end? How did dead astronomers figure all of this out? Of course, behind these surface questions lie the really interesting questions: Why do we ask the above types of questions? What determines whether an answer is "correct"? How robust are are the questions and answers?

One final point: it is important to remember that the subjects of our study are not in the book; they are on display every (clear) night. Look up from the sidewalk and apply this course to real life. Use your star charts to identify stars in the sky this month and every future month!

References:

The Physical Universe by Frank Shu (1982) — an insightful elementary text QB43.2.S54

Fundamental Astronomy by H. Karttunen, P. Kröger, H. Oja, M. Poutanen, D. J. Donner (6^{th}, 2017) — previously used textbook QB43.2.F86

An Introduction to Modern Astrophysics by B. Carroll and D. Ostlie (2017) QB461.C35

Galaxies in the Universe by L. Sparke and J. Gallagher (2007) QB857.S63

Astrophysical Concepts by M. Harwit (2006) QB461.H37; *The Physics of Astrophysics I: Radiation & II: Gas Dynamics* by Frank Shu (University Science, 1992) — typical graduate texts

Periodical References:

Astrophysical Journal — typical technical astronomy journal published by the American Astronomical Society.

Astronomy & Astrophysics — a European journal

Monthly Notices of the Royal Astronomical Society — British since 1895

Network References:

`http://www.nasa.gov/` — NASA homepage

`http://www.aavso.org` — American Association of Variable Star Observers

`http://adsabs.harvard.edu/` — SAO/NASA Astrophysics Data System (abstracts)

`http://skyview.gsfc.nasa.gov/` — NASA SkyView

`http://simbad.u-strasbg.fr/simbad/` – SIMBAD Astronomical Database

`http://www.noao.edu/` — National Optical Astronomy Observatories homepage

`http://www.nrao.edu/` — National Radio Astronomy Observatories homepage

`http://www.aas.org/` — American Astronomical Society homepage