

## Physics 467: Special Topics - Astrophysics

- Also known as: PHY 467, CRN 91735, Credits 3.0.
- Instructor: Dr. Shashi Kanbur, Rm 124A, Snygg Hall, SUNY Oswego.
- Email: kanbur@oswego.edu, Tel: 2679.
- Office Hours: Monday 4-5pm Thursday: 9.30-10.30am, Fridays 10-11am or make an appointment by phone or email.
- Lectures: MWF, 1.50-2.45pm.
- Book: "The Physics of Stars", by A. C. Phillips.
- Book: "First Principles of Cosmology", by E. V. Linder.
- Layout of the Course:
  - Traditional lectures, some class demonstrations, some computer demonstrations.
  - Calculus based.
  - Reading Assignments, homeworks, in class exams and a comprehensive final.
  - Syllabus
    - \* Quick Review - Chapter 1 of Phillips.
    - \* Chapters 2, 3, 5, 6 of Phillips.
    - \* Quick review of GR.
    - \* Various chapters of Linder's book.
  - This is not set in stone - may change as the semester progresses.
  - Grading: 50% exams - two in class plus one comprehensive. 25% homeworks - this includes some "computer lab exercises" and 25% a project.
  - The Project is a literature review: you should discuss the literature on your chosen topic both in a written report and in a presentation in class: suggested topics:
    - \* The extra-galactic distance scale.
    - \* Large scale structure simulations.
    - \* Gravitational lensing and extra-solar planets.
    - \* Main sequence fitting.
    - \* Modeling convection.

- \* Stellar structure model - write a computer program to compute a model star under certain approximations.
  - \* Dark energy.
  - \* Write a program to compute the Saha Ionization equilibrium for a given  $T, \rho$ .
  - \* Write a program to compute a Kurucz model atmosphere for a given  $T, g_e$ .
  - \* The WMAP satellite.
  - \* The Cosmic Microwave Background.
  - \* Why does a Cepheid pulsate?
  - \* Non-radial oscillations in the Sun and the standard Solar Model.
  - \* A review of the Spergel et al. (2006) paper - may do this as a "class project".
  - \* Supernovae and their use in cosmology.
  - \* Pulsars.
  - \* White Dwarfs.
  - \* Neutron stars.
  - \* Observational evidence for the existence of black holes.
  - \* Dark matter.
- These are only suggestions - discuss your project with me and decide a title before the end of September. This is not a course on the memorization of formulae. These will be given if needed.
  - Final comprehensive exam. Unless its a medical emergency, there will be no makeup for this final comprehensive exam.
  - There will be makeups for the two in class exams but I strongly urge you to take these on the scheduled days.
  - Problem sets - with perhaps 4-5 questions most weeks. Due the following week. Grades and solutions follow the week after. Can discuss the assignments with each other but final, submitted solution must be your own. If you fail to hand in an assignment on time, you will get 0 for that assignment. Problem sets are important since the in class exams and final will consist of questions very similar to the exams. Its in your interest to show your working in these problem sets and also the exams since I wont just give marks for the final answer.
  - I will take attendance in class though it doesn not count to your final grade.
  - Will give lecture notes which contain all the required material - also in the book.

- Lectures will consist of going over these notes, going over more worked problems and real-life examples. Web site: [www.oswego.edu/~kanbur/phys467](http://www.oswego.edu/~kanbur/phys467)
- How do I succeed in this class?
  - \* Come to class; bring the book and lecture notes, plus a pencil, notepad and a calculator.
  - \* Do reading assignments; Do assigned homeworks; go over worked problems; go over homework and homework solutions. Think about the material - try to understand the concepts.
  - \* Stay current.
  - \* Ask questions: in class, by appointment, office hours. If I dont know the answer, will try to get an answer by the next class.