DEPARTMENT OF PHYSICS

PHYSICS 162 – Galaxies & Cosmology **Spring 2001**

INSTRUCTOR:	H. E. Smith Office: 340 SERF E-Mail: *hsmith@ucsd.edu* Extension: 534-4558 Office Hours: Th 10:00 – 11:30, or by appointment.
INSTRUCTOR'S SECRETARY:	Trudi Elkins Office: 331 SERF E-Mail: *Trudy_CASS@hotmail.com* Extension: 534-4478
COURSE SCHEDULE:	Lectures: TTh 2:20 – 3:40pm SERF 329

COURSE INFORMATION: *http://casswww.ucsd.edu/physics/ph162*

COURSE DESCRIPTION: The structure and properties of normal galaxies, galaxy rotation and dynamics, galaxy formation and evolution, the physics of active galactic nuclei: radio galaxies, Seyfert galaxies and quasi-stellar objects, the extragalactic distance scale, and physical cosmology. Physics 160, 161, 162 may be taken as a three quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. A small amount of outside preparation may be advisable for students who have not taken Physics 160. *Prerequisites: Physics 2 or 4 sequence or equivalent, upper division standing in physical science or engineering.*

COURSE TEXT/REFERENCES: Rowan-Robinson, *Cosmology* (3rd ed; Oxford, 1996) is the nominal text for this course; readings will also be assigned or suggested from time to time in books set aside on reserve in the S&E Library and CASS Marlar Libraries. Books that will be placed on reserve include:

Carroll & Ostlie	*Modern Astrophysics*	Addison Wesley
Elmegreen, D.	*Galaxies & Galactic Structure*	Prentice Hall
Kutner, M.	*Astronomy: A Physical Perspective*	Harper & Row
Peterson, B.	*Active Galactic Nuclei*	Cambridge
Rowan-Robinson, M.	*Cosmology*	Oxford
Sandage, A.	*The Hubble Atlas of Galaxies*	Carnegie Institution
Zeilek & Gregory	*Introductory Astronomy and Astrophysics*	Saunders

Of these, Carroll & Ostlie is a very good general astrophysics reference, but weak on extragalactic astrophysics. The books by Kutner and Zeilek & Gregory are good general references at a somewhat more phenomenological level than Carroll & Ostlie. For those of you without previous astrophysics background, a selection of readings, designed to provide appropriate background, will be provided. Additional references will be placed on reserve as required.

In addition, there are shelves full of other texts or semi-popular books on various aspects of astronomy at the Undergraduate Library. Several magazines including *Scientific American*, *Science*, *Discover*, *Astronomy*, *Sky and Telescope*, and *Mercury* regularly carry articles relevant to the course material. If you have a particular question or problem, I will be happy to suggest suitable references. In addition, bibliographies of articles and references in various publications have been published from time to time in *Mercury* magazine. These may help provide a start in thinking about subjects for your Research Paper (see below).

TOPICS (Tentative):

Galaxies:	Classification & Global Properties Rotation/Dynamics
Dark Matter	
The Extragalactic Distance Scale	
Activity:	Nonthermal Emission Processes – Synchrotron Radiation Compact Radio Sources AGN Bestiary: Seyfert Galaxies, Quasi-stellar Objects, Starbursts
Cosmology:	Standard Big Bang Models Primordial Nucleosynthesis Cosmological Backgrounds Inflation Galaxy Formation and Evolution Cosmological Tests

HOMEWORK: Problems and exercises will be assigned during the lectures and will be collected for grading approximately bi-weekly. These will be exercises designed to expand on material covered in lecture and will be comparable to questions and problems on the two exams. In addition there will be two or three "lab exercises" which will be part of the homework grade. The first of these will be on "Galaxy Classification".

RESEARCH PAPER: A research paper on a topic relevant to the subject of this course will be due on *Thursday, May 31.* The paper should demonstrate knowledge beyond the level of the lectures in some area of extragalactic astrophysics and should use as primary reference material at least one significant paper in one of the relevant astrophysical journals. A list of 'hot topics' will be circulated or you may select a subject of your own choosing. I will ask you to submit a brief (one page *neatly* handwritten is acceptable) description of your proposed project to me by Tuesday, May 1. This will allow me to review your topic and to suggest appropriate reference material. I suggest that you restrict your subject to an area that can be described in detail in approximately 10 typewritten (double-spaced) pages. Papers should be typewritten and should list all reference materials used.

GRADING:

Grades will be calculated as follows:	Homework	40%
	Research Paper	60%