Extragalactic Astrophysics / PHYS-GA 2051 / Fall 2024 / Syllabus

This course teaches the astrophysics of galaxies and quasars at the graduate level.

You can find the course notes at the course web site. Please read the introduction posted on the web site.

Useful textbooks are *Galaxy Evolution* by Cimatti, Fraternali, & Nipoti, and *Extragalactic Astronomy and Cosmology*, by Peter Schneider. A good fraction of my notes are drawn from those books.

Class meets Monday and Wednesday at 11:00am in Room 902 of 726 Broadway.

The classes will proceed as shown on the next page (subject to revision!).

The following are the expectations in the course and classes:

- *Reading*: I expect you to read the provided notes *before* each class. I am likely to call on you in class to ask specific questions about things I think are especially important.

- *Homework*: Each week I will assign one of the questions in the notes we covered, due each week starting Tuesday, Sept 16. I encourage you to discuss and work on this together. If any subset of you would like to submit as a group, please ask my permission beforehand.

- *Homework Presentation*: On Thursday after each exercise is due, I will ask one student to describe their solution to the class; you won't have warning but I am not expecting a polished presentation.

- *Review Paper & Presentation*: Before Tuesday, Sept 16, I will assign you each a topic covering a recent finding in extragalactic astrophysics. You will prepare a short review paper and a presentation for the class. The paper should be formatted in LaTeX and be about 8 pages of text and figures plus references and (if appropriate) figures. Mid-semester a *full draft* of this paper will be due—meaning, a version you think is done (spoiler alert: I will have comments and questions and requests to more fully probe issues so it won't be done). I expect to give substantial feedback on the draft in preparation for the final version due at the semester's end. You will each prepare a 10 minute presentation summarizing your review paper.

It is common now for many people to make use of generative AI tools (e.g. Co-Pilot) for programming or other tasks. *If you do so in the homeworks or the review paper, I require you to document doing so, providing the prompt and the raw output.* More generally, just remember that these tools are only useful if you can determine that they are working correctly, so using them doesn't save you from checking the results.

Sep. 4	Inventory	
Sep. 9	Light I & II	
Sep. 11	Telescopes & Atmosphere	
Sep. 16	Detectors, Images, Spectra	**Exercise #1 due**
Sep. 18	Distance Ladder	
Sep. 23	Cosmology & Structure	**Exercise #2 due**
Sep. 25	Stellar Populations I	
Sep. 30	Stellar Populations II	**Exercise #3 due**
Oct. 2	Stellar Populations III	
Oct. 7	Galaxy Populations	**Exercise #4 due**
Oct. 9	Stellar Dynamics I	
Oct. 14	Stellar Dynamics II	**Exercise #5 due**
Oct. 16	Stellar Dynamics III	
Oct. 21	Stellar Dynamics IV	**Exercise #6 due**
Oct. 23	Interstellar Medium I	
Oct. 28	Interstellar Medium II	**Full paper draft due**
Oct. 30	Dust	
Nov. 4	Gravitational Lensing I	**Exercise #7 due**
Nov. 6	Gravitational Lensing II	
Nov. 11	Gravitational Lensing III	**Exercise #8 due**
Nov. 13	Groups & Clusters	
Nov. 18	Active Galactic Nuclei I	**Exercise #9 due**
Nov. 20	Active Galactic Nuclei II	
Nov. 25	Lyman-α Forest	**Exercise #10 due**
Dec. 2	Theory of Galaxy Formation I	
Dec. 4	Theory of Galaxy Formation II	**Exercise #11 due**
Dec. 8	Theory of Galaxy Formation III	
Dec. 11	Future of Extragalactic Astronomy	
Dec. 19	—	**Final paper due**