
Astro 105

Daytime

The Stars and Galaxies

IUPUI Physics Department

Spring 2023

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GENERAL INFORMATION

Description: An introductory survey of stars, galaxies, and cosmology. Plus other interesting information about spacetime.

Learning Objectives: By the final exam, you will have a basic understanding of:

(i) How scientific/astronomical explanations are formulated, tested, and modified or validated: Early theory of stellar dynamics, the Kelvin-Helmholtz model, and the modern quantum theory of nuclear fusion.

(ii) Differences between scientific and non-scientific evidence and explanations: Early stellar classifications versus modern stellar classifications based on the laws of astrophysics, relativity, and quantum physics.

(iii) Foundational knowledge and astronomical-specific concepts to address issues or solve problems: Stellar evolution theories and the end-states of stars: white dwarfs, neutron stars, and blackholes.

(iv) Observational, quantitative, and technological methods to gather data and generate evidence-based conclusions: Geological dating of Mars' and Moon's surfaces and how that evidence yields the age of our solar system, sun, and the development of general stellar evolution theories.

(v) How theories describe, explain, and predict natural phenomena: Cosmology, Big Bang Theory, and the "Horizon Problem".

(vi) How to locate sources of astronomical evidence to construct arguments: The cosmic microwave background radiation (CMBR) observational data versus the theory.

How Learning Objectives are Assessed: There will be a quiz almost every week that covers the material lectured during the previous week. There will be two (75 minutes) exams administered during the semester. There will be a semi-comprehensive final exam (also 75 minutes).

Text: *THE COSMIC PERSPECTIVE Stars, Galaxies & Cosmology* by Bennett, *et. al.*, any recent edition, Pearson Publishing. NOTE: This text is quite extensive and in most cases provides too much detail. In the end, you are responsible for knowing and understanding my lectures notes. You should use the text to supplement the lecture notes (*i.e.*, “fill in the details”) – the exams and quizzes are based on the lecture notes.

Web: <http://woodahl.physics.iupui.edu/Astro105/> Mark this website in your browser. At the web site you will find: Syllabus (which you are reading now) in PDF, Master Schedule in PDF, and announcements.

Contact: You must use your official “name@iupui.edu” email when contacting me. Others may be rejected by the UITS junk email filters.

Lecture: Meet from 10:30 AM - 11:45 AM on Tuesday and Thursday each week in LE 101. During the lectures I will cover, in detail the important concepts. The tests and quizzes are based on the lecture material. I urge you to collaborate with a classmate in sharing notes if one of you misses a lecture. (Lecture notes will not be provided.)

Quizzes: 10 quizzes, given about once a week, will be over all material since the previous quiz (or test). There are no makeups on any quizzes **under any circumstances**. Format for the quizzes is four multiple choice questions (with four possible answers). Keep your quizzes for exam review.

Exams: There will be two exams and a final exam (often called Exam III) as listed in the schedule. There are no makeups on any exams! Exam study guides will be posted about 1 week in advance. Do not miss an exam – you will receive a zero for that exam (there are no exceptions). Furthermore, no exams will be given early – if you have a an outside unmitigated conflict with an exam date/time, drop the course now. Format for the exams is generally seventy (± 10) multiple choice questions (with four possible answers) and 2 partial-credit computational (or short answer) problems. During the exams, it is essential to use a high quality, soft, dark pencil (No. 2 or HB) for the op-scan sheets. **Failure to use a pencil (or HB) during the exams results in a zero.** Exam scores (and quiz scores) will be posted on Canvas approximately one week after each exam.

Withdrawal: If it is necessary for you to drop this course, please do so officially, filling out all the necessary paperwork. Otherwise per University policy you will receive an F on your transcript.

Telescopes: The department has several telescopes for student use which may be borrowed for a few weeks at a time. Check with me for details.

Weighting: The final letter grade will be determined from your cumulative point total based on the following weights:

10 Quizzes	100
Exam I	100
Exam II	100
Final (Exam III)	100

Grades: The following are the *guaranteed* cuts for the letter grades based upon the 400 point total. In most cases the cuts will be lower than that advertised below:

A–	≥ 360
B–	≥ 320
C–	≥ 280

Special Note: Come to class, take neat notes, review your notes on a regular basis, supplement your knowledge by reading the text (this will help you fill-in the details and it is a fun book to read) and you will do fine in this course. This course is fun and not too difficult. If this syllabus seems too formal, please come talk with me, and don't worry.