Astronomy 104: Spring 2015 Intro, Stars, Galaxies, and Cosmology

Class: M & W Lewis 101,
Instructor: James Hill jhill6333@gmail.com 662-547-6970 (H)
Office Hours: Kennon 1: MW 2:00-3:45
Lab section and hours TBA
Text: Cosmic Perspective, Bennett et al., 7th Ed, 2013 **You will need access to the text**

Learning Objectives:
(a) The scale of the universe, the history of astronomy, and some laws of astrophysics
(b) How stars, galaxies, and the history of the Universe are currently understood.
(c) To do experiments in the labs demonstrating astronomical concepts.

Read and study the assigned chapters before class. The schedule below is subject to adjustment, but tests will be on the indicated dates.

Date	Subject	Chapter(s)
21 Jan	Introduction to the course (syllabus), scale of the universe	Chapter 1
26 Jan	History of the universe, constellations, definitions	Chapter 1 & 2
28 Jan	Star motion: daily/yearly, Angles, Sidereal Time, the Moon	Chapter 2
2 Feb	Celestial coordinates, Right Ascension/Declination, RA/Dec	Chapter S1
4 Feb	Historical background for astronomy, the nature of science	Chapter 3
9 Feb	Physics background for astronomy, Matter, Energy, Temperature	Chapter 4
11 Feb	Light and matter, spectroscopy: light tells about matter	Chapter 5
16 Feb	Spectroscopy continued: Wien's Law, Black Body Radiation	Chapter 5
18 Feb	FIRST HOUR TEST	Chapters 1-5
23 Feb	Telescopes: Optical, Radio, X-ray, etc.	Chapter 6
25 Feb	Stars: the Sun, structure, energy source, Sun–Earth relation	Chapter 14
2 Mar	Stars: Survey, how we determine their properties?	Chapter 15
4 Mar	Stars: continued: HR Diagram. Stellar Masses and Binary Stars.	Chapter 15
16 Mar	Stars: birth and early life	Chapter 16
18 Mar	Stars: main sequence life	Chapter 17
23 Mar	Stars: old age and death,	Chapter 18
25 Mar	SECOND HOUR TEST	Chapters 6 &14-18
30 Mar	Galaxies: Our Milky Way Galaxy, discovery and components	Chapter 19
1 Apr	Galaxies: Classification	Chapter 20
6 Apr	Galaxies: Distances to galaxies, the cosmic distance ladder	Chapter 20
8 Apr	Galaxies: Hubble's Law, the expanding universe	Chapter 20
13 Apr	Galaxies: Lookback time, Quasars and Active Galaxies	Chapter 21
15 Apr	Cosmology: The "Big Bang" Theory	Chapter 22
20 Apr	Cosmology: Expanding Universe,	Chapter 23
22 Apr	Cosmology: Particle physics, inflation, nucleosynthesis	Chapter S4
25 Apr	Cosmology: Particle physics, inflation, nucleosynthesis	Chapter S4
27 Apr	THIRD HOUR TEST	Chapters 19-23
29 Apr	Are we alone? Search for Extraterrestrial life	Chapter 24
4-8 May	COMPREHENSIVE FINAL EXAMS	
	4 May 5:00 pm class: exam 7:30 pm Monday	Chapters 1-6; 14-24
	8 May 4:00 pm class: exam 4:00 pm Friday	Chapters 1-6; 14-24

Semester Final Grading Algorithm
19% Homework/Quizzes
25% Labs
12% 1st Test
12% 2nd Test
12% 3rd Test
20% Final Exam

Mid-term grade March 6 (1/3 quizzes, 1/3 labs, 1/3 test 1.)

Attendance at all classes is expected. The Automated Attendance System using your Ole Miss ID card will be used. Always have your ID with you and inform the instructor if the scanner doesn't record your presence. Excess absences or missed quizzes will affect your grade. There will be some in-class quizzes covering the information covered during that class. These cannot be made up without a valid excuse. Bring blank scantrons to class each day.

Hard copies of chapter outlines will be handed out at the beginning of classes. Take-home/ open book HW/quizzes will be given out at each class and Scantron answer sheets for these will be due at the end of the following class. (get the purple form # 16485)

Chapter outlines and answers to previous HW/quizzes and tests will be posted on "Blackboard". Keep and use your back outlines, corrected quizzes, and tests to use for review and as study guides for the final exam. Once answers to quizzes or tests are posted on Blackboard about a week after they are due, they will not be accepted for credit. Missed HW/quizzes or tests must be made up within one week unless prior permission is obtained. Missed tests may only be made up during office hours in Kennon.

Labs Start: Jan 26. Maximum 3 labs can be missed and still pass the course
Lab Sections: for changes contact Dr. Tibor Torma.
Labs meet Monday-Thursday 7-8:50 or 9-10:50 at Lewis 1 or Kennon Observatory
For information on or to check lab grades:
http://www.phy.olemiss.edu/~kakukk/Astro/Lab/Lab.html
Bring a scientific calculator to labs/tests (Texas Instruments TI-30Xa is a good choice).

Astro 104 Lab Manual is required. These may be purchased of the University Printing Office. (915-7066) next to the water tower and across from the University Police Department

Please come to the lab the right night and time you have signed up for.
Labs are a required part of the course. You must do at least 70% of the labs to pass. Come to labs even if it is raining. Some labs will be held at the dark observing site off campus.

Reasonable accommodations for students with disabilities will be provided.

Recommended web sites: I'm always looking for other good sites to check out)
APOD (Astronomy Picture of the Day) at **apod.nasa.gov** daily images and information
Another interesting site to subscribe to is **universetoday.com** for space news.
Get monthly sky maps and info at **skymaps.com**

Recommended supplementary books (for lifelong learning - if you find another favorite, please let me know)

First Light: The Search for the Edge of the Universe, Richard Preston, Random house, 1996
Fly-on the wall description of Palomar astronomer's search for quasars.

The Realm of the Nebulae, Edwin Hubble, Yale Univ. Press, 1936
Classic view of the discovery of the expanding universe by the discoverer

The Nature of the Universe, Fred Hoyle, Harper & Bro., 1950
Description by a major player in 20th century cosmology ("against the "Big Bang")

The First Three minutes, Steven Weinberg, Basic Books, 1988
Nobel laureate describes the "big bang"

The Life and Death of Stars, Kenneth Lang, Cambridge Univ. Press, 2013
Very readable story of stellar evolution

Galaxies and the Cosmic Frontier, William Waller & Paul Hodge, Harvard Univ. Press, 2003
Complete description of galaxies and their place in the cosmos

Rare Earth: Why Complex Life is Uncommon in the Universe, Peter Ward & Don Brownlee,
Copernicus Books, 2000. The subtitle says it all. Fascinating read.

Cosmic Clouds, James Kaler, Scientific American, 1997
Galaxy recycling through nebulae

Stars, James Kaler, Scientific American, 1998
Readable and comprehensive story of stellar classification and function.

The Man Who Sold the Milky Way, David Levy, Univ. of Arizona Press, 1993
A biography of Bart Bok

The Red Limit, Timothy Ferris, quill, 1983
A bit dated, but clear, story of cosmology

The Creation of the Universe, George Gamov, Dover, 2004
Fun reprint of a 1952 description of the big bang theory by one of its developers

Echo of the Big Bang, Michael Lemonick, Princeton, 2003
A journalist follows the WMAP mission that confirms the CMB and age of the universe

Blind Watchers of the Sky, Rocky Kolb, Helix Books, 1996
Story of the people that shaped our view of the cosmos by a leading cosmologist

The Inflationary Universe, Alan Guth, Perseus Books, 1997
An autographical description of what "banged" in the big bang by its discoverer.

Cosmos: A Personal Oddysey Carl Sagan, Random House, 1980
Dated, but still a fascinating read. (also on CVD as is the reissued one from 2014

A Universe From Nothing, Lawrence Krauss, Free Press, 2012
Why there is something rather than nothing.

Supplementary DVDs, the next 2 can be ordered from Amazon
400 Years of the Telescope, PBS home video, 2008, 60 minutes
The Creation of the Universe, Timothy Ferris, 90 minutes

DVD courses from "The Teaching Company". www.thegreatcourses.com.
Expensive, but great references. Other classes in their catalog on many subjects

Understanding the Universe 2nd ed. Alex Fillippenko
The Life and Death of Stars, Kevian Stassun
Cosmology: The History and Nature of Our Universe, Mark Whittle