

# ASTRONOMY 105-52: STARS, GALAXIES AND COSMOLOGY



Spring 2015



This course will explore the development of the Universe as it is currently perceived, from the formation and evolution of stars, to the properties of galaxies and clusters, to large-scale structure, to events following the Big Bang. This course satisfies the **Quantitative Analysis** requirement but assumes no math beyond high school algebra. Physics will be developed as needed.

**Classroom attendance is expected**; please be prompt. Test material emphasizes lectures.

**Professor:** Dr. Debra Elmegreen

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**Office Hours:** MW 1:00-2:00 *or by appointment; feel free to drop by or call or email*

**Required Text:** *Astronomy Today: Vol. 2, Stars & Galaxies*, 8th ed., Chaisson & McMillan (ISBN-13: 9780321988836; Addison Wesley Publishers) **Note:** You must get online access to Mastering Astronomy for homework; this comes with the bookstore edition. You may instead use a used 7<sup>th</sup> or 8<sup>th</sup> edition or buy the e-text, and purchase the access code separately online through [masteringastronomy.com](http://masteringastronomy.com).

**Student intern:** Deep Anand ([gaanand@vassar.edu](mailto:gaanand@vassar.edu))

## SYLLABUS

Wk	Date	Subject	Reading
1	Jan. 28-30	overview, gas clouds, dust	ch.3.1-3.3, 18
2	Feb. 2-6	protostars, star formation, spectra	ch. 19.1-19.4, 4.1-4.3
3	Feb. 9-13	blackbody radiation, magnitude, distances	ch. 3.4, 17.1-17.4
4	Feb. 16-20	H-R diagram, nucleosynthesis, stellar evolution	ch.16.6,17.5-17.8,20.1-20.2
5	Feb. 23-27	white dwarfs, pulsars, neutron stars, supernovae	ch. 20.3-20.4, 21, 22.1-22.4
6	Mar. 2-6	variable stars, binaries, globular and galactic star clusters, Milky Way	ch. 18.4, 19.6, 20.5-20.6, 23.1-23.4
7	Mar. 9-13	21 cm radiation, rotation, dark matter, galactic center, Great Debate	Part 4 intro, ch. 23.5-23.7, 19.5, 3.5
	Mar. 16-27	<i>Spring break</i>	---
8	Mar. 30-Apr. 3	galaxies: spiral, elliptical, irregular; structure, density waves, large scale star formation	ch. 23.5, 24.1, 25.1
9	Apr. 6-Apr. 10	interacting galaxies, galaxy formation, Local Group, galaxy clusters	ch. 24.2, 25.2-25.3, 25.5
10	Apr. 13-17	Hubble law, standard candles, redshift, quasars	ch. 24.3-24.5,22.5, 22.8, 25.4
11	Apr. 20-24	Seyferts, black holes, active galaxies, microwave radiation, Big Bang	ch. 24.4-24.5, 26, 27.5-27.6
12	Apr. 27-May 1	deceleration parameter, spacetime curvature, dark energy, first 3 minutes, pair production	ch. 27.1-27.3
13	May 4-May 8, 11	phase transitions, inflation, cosmic strings, branes	ch. 27.4

**Final Grade** will be based on the following:

<b>Homework</b> ( <i>approximately weekly</i> )	40%
<b>3 tests</b> ( <i>approx. every 4 wks</i> )	30%
<b>Comprehensive self-scheduled final</b>	30%

Check this course on <http://moodle.vassar.edu> for announcements, lecture highlights and slides, homework assignments, syllabus, & resources.

**Homework:** Assignments will be given approximately weekly using the online system Mastering Astronomy, <http://www.masteringastronomy.com/site>. You will need your personal access code from your book. The course ID is ASTR10552VASSAR2015 for section 52 (10:30). *Late homework will be downgraded 10% for every day it is late. Ask about homework questions **before** the morning they are due.*

Reading assignments should be adjusted as necessary to keep pace with the lecture material; dates are approximate. **Reading the material in advance of the lecture is highly recommended.**

*Academic accommodations are available for students with disabilities who are registered with the Office of Disability and Support Services. Please schedule an appointment with me early in the semester to discuss any accommodations for this course which have been approved by the Director of Disability and Support Services as indicated in your accommodation letter.*