

Astronomy 104 Fall 2017 Instructor: Dr. Don Summers 915-7032
 Lewis 101 TTh 1:00-1:50 Office Hours: Lewis 221 TThF 2-3
 Lab Starts Text: Cosmic Perspective, Bennett et al., 8th Ed.
 Lab 1: August 30, Wednesday 7- 8:50 Kennon Observatory TA: Kurpakus Keegan
 2: August 30, Wednesday 9-10:50 Kennon Observatory TA: Mukunda Acharya
 3: August 31, Thursday 7- 8:50 Kennon Observatory TA: Tiffany Claire
 4: August 31, Thursday 9-10:50 Kennon Observatory TA: Tiffany Claire
<http://www.phy.olemiss.edu/Astro/Lab/Lab.html>
 104 Lab Manual: Buy at Rebel Graphics, Sam-Gerard Hall

| Date | Subject | Chapters to read before class |
|--------|--|----------------------------------|
| 22 Aug | Introduction | |
| 24 Aug | Distances, light years, stars, constellations, galaxies | Chap 1 & 2 |
| 29 Aug | Star motion:daily/yearly Transits Angles Sidereal Time | Chap 2 |
| 31 Aug | Longitude/Latitude, Right Ascension/Declination, RA/Dec | Chap S1 |
| 5 Sep | Kepler's 3 laws, Newton's Laws, Gravity, orbits | Chap 3 & 4 |
| 7 Sep | Matter, Energy, Temperature, Atomic energy levels | Chap 5 |
| 12 Sep | Light, Wavelengths, Spectral Lines, Doppler Shift | Chap 5 |
| 14 Sep | Spectroscopes, Wien's Law, Black Body Radiation | Chap 5 |
| 19 Sep | Telescopes: Optical, Radio, X-ray... | Chap 6 |
| 21 Sep | FIRST HOUR EXAM | |
| 26 Sep | Why does the sun shine?, Sunspots, Neutrinos | Chap 14 |
| 28 Sep | Stars: Distances Luminosity Magnitudes Temperature Size | Chap 15 |
| 3 Oct | HR Diagram. Stellar Masses and Binary Stars. | Chap 15 |
| 5 Oct | Gas --> New Stars, Old stars Move off the Main Sequence | Chap 16 |
| 10 Oct | Variable Stars, Red Giant and White Dwarf Stars | Chap 17 |
| 12 Oct | Supernovae, Neutron Stars, Gravity Waves, and Black Holes | Chap 18 |
| 17 Oct | Crab Nebula | Chap 18 |
| 19 Oct | SECOND HOUR EXAM | |
| 24 Oct | Our Milky Way Galaxy, Globular Star Clusters | Chap 19 |
| 26 Oct | 100 Billion Galaxies | Chap 20 |
| 31 Oct | Finding Distances with Cepheid Variables, Galaxies | Chap 20 |
| 2 Nov | Hubble's Law, Redshifts, and Distances | Chap 20 |
| 7 Nov | Quasars and Active Galaxies | Chap 21 |
| 9 Nov | Cosmology, Expanding Universe, Big Bang, 3K Radiation | Chap 22 |
| 14 Nov | Early Universe, Inflation, Big Bang, Sub-Atomic Particles | Chap 22 |
| 16 Nov | THIRD HOUR EXAM | |
| 28 Nov | Dark Matter in Galaxies and Galaxy Clusters | Chap 23 |
| 30 Nov | Life in the Universe | Chap 24 |
| 7 Dec | COMPREHENSIVE FINAL EXAM, 12:00 noon, Thursday, not earlier! | |

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| Grading | 1st Exam | 12% | Save all exams to study for the final. |
| Scheme | 2nd Exam | 12% | |
| | 3rd Exam | 12% | |
| | FINAL EXAM | 20% | Bring a picture ID to tests. |
| | Pop Quizzes | 15% | Save all quizzes. |
| | Lab | 25% | |
| | Attendance | 4% | Scan your ID card at the start of each class |

Bring a scientific calculator (e.g. Texas Instruments TI-30Xa) to labs/tests.
 Please come to the lab 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. Grading is +/-.

$$10^{11} \times 10^{11} = 10^{22}$$

stars/galaxy x galaxies = stars in the universe

Reasonable accommodations for students with disabilities will be provided.
 Learning Objectives: To learn how stars, galaxies, and other wonders
 of the Universe work and to find out how astronomers made these
 discoveries and to do some of the actual experiments.