

AY 101 Section 002: Intro To Astronomy

Spring 2012

3 Credit Hours

Primary Instructor: Dr. Ronald Buta

Core Designation: Natural Science

Syllabus subject to change.

Prerequisites

From the Student Records System

No prerequisites found.

Course Description

The course is focussed on learning basic concepts in astronomy, ranging from our own solar system to stars, galaxies, and cosmology. The class will be lecture style and will feature in-class demonstrations related to the topics under discussion. Additionally, clickers will be used to allow class participation and interaction.

No knowledge of astronomy is needed as a prerequisite. This is a survey course, so there will not be many details. The course will also be mostly descriptive, with no mathematics for most topics, and a minimal amount for some topics. We are living in a golden age of astronomy where new discoveries are constantly being made. The course will describe how our view of the universe has changed over time and cover new discoveries as they occur.

Class meeting time: MWF, 10:00-10:50am, Room 227 Gallalee Hall.

Student Learning Outcomes

The main objectives of AY101 are to give students a basic qualitative understanding of astronomy and to provide the necessary background for taking related courses (like the night lab, AY 203) if desired.

After taking AY 101 you should be able to

- 1) identify key concepts in the arts, sciences, and humanities to provide a broad perspective on the human condition.
- 2) recognize and explain the scientific method, and evaluate scientific information.
- 3) characterize the appearance and motion of celestial objects.
- 4) identify the key conceptual advances (and associated figures) in the history of astronomy.
- 5) understand the relationship between light, matter, and energy in an astronomical context.
- 6) understand how telescopes function to collect data on celestial objects and how the atmosphere affects the way we see the Universe.
- 7) understand the content, formation and evolution of planetary systems.
- 8) understand the nature and evolution of stars.
- 9) understand the nature and evolution of galaxies.
- 10) understand the nature and evolution of the Universe.
- 11) understand how the concepts of living organisms on Earth might be applied to life on other worlds.

Outline of Topics

The schedule is for the adopted textbook: "The Cosmic Perspective Fundamentals" by Bennett, Donahue, Schneider, and Voit, 1st edition.

Jan 11 - Introduction to the class

Jan 13 - Chapter 1 Review of basic concepts in astronomy

Jan 16 - NO CLASS - MLK DAY

Jan 18 - Chapter 1,2 Definition of Planets, Seasons, Celestial Sphere
 Jan 20 - Chapter 2 Lunar Phases, Eclipses
 Jan 23 - Chapters 2,3 Planetary Motion, Stellar Parallax, Geocentric vs. Heliocentric models
 Jan 25 - Chapter 3 Kepler's Laws of Planetary Motion, Galileo's Discoveries, Newton's Law
 Jan 27 - Chapter 3 Telescopes, Hallmarks of Science
 Jan 30 - Chapter 4 Introduction to the Solar System,
 Feb 1 - Chapter 4 Conservation Laws, Formation of the Solar System,
 Feb 3 - Chapter 4 Age of the Solar System
 Feb 6 - Chapter 5 Properties of Terrestrial Planets, Properties of Light
 Feb 8 - EXAM 1: Chapters 1-4
 Feb 10 - Chapter 5 Atmospheres, Greenhouse effect, Evolution of Terrestrial Planets
 Feb 13 - Chapter 5,6 Evidence of Global Warming, Properties of Jovian Planets
 Feb 15 - Chapter 6 Properties of Jovian Moons, Rings,
 Feb 17 - Chapter 6 Asteroids and Comets and the Mass Extinctions
 Feb 20 - Chapter 7 Introduction to Extra Solar Planets, Doppler Effect,
 Feb 22 - Chapter 7 Characteristics and Theory of Extra Solar Planets
 Feb 24 - Chapter 8 Introduction to the Sun, Spectroscopy,
 Feb 27 - Chapter 8 Properties of Stars, Measuring Mass, Luminosity, and Surface Temperature
 Feb 29 - Chapter 8 The Hertzsprung-Russell Diagram
 Mar 2 EXAM 2: Chapters 5-8
 Mar 5 - Chapter 9 Introduction to Stellar Evolution, Star Birth,
 Mar 7 - Chapter 9 Main Sequence Stars, Stellar Death
 Mar 9 - Chapter 9 Testing Stellar Models with Star Clusters
 Mar 12 - NO CLASS - SPRING BREAK
 Mar 14 - NO CLASS - SPRING BREAK
 Mar 16 - NO CLASS - SPRING BREAK
 Mar 19 - Chapter 10 White Dwarfs
 Mar 21 - Chapter 10 Neutron Stars
 Mar 23 - Chapter 10 Black Holes
 Mar 26 - Chapter 11 The Milky Way Galaxy
 Mar 28 - Chapter 11 External Galaxies
 Mar 30- Chapter 11 Quasars
 Apr 2 - Chapter 12 Measuring Distances to Galaxies
 Apr 4 - EXAM 3: Chapters 9-11
 Apr 6 - NO CLASS - HONORS DAY
 Apr 9 - Chapter 12 Expansion of the Universe
 Apr 11 - Chapter 12,13 Galaxy Evolution, The Big Bang
 Apr 13 - Chapter 13 The Cosmic Background Radiation
 Apr 16 - Chapter 13 Inflationary Model
 Apr 18 - Chapter 14 Dark Matter
 Apr 20 - Chapter 14 Large Scale Structure of the Universe
 Apr 23 - Chapter 14 Dark Energy
 Apr 25 - Chapter 15 Life in The Universe
 Apr 27 - ALIEN DAY - Chapter 15 The Search for Intelligent Extraterrestrial Life
 May 1 - FINAL EXAM, 11:30am-02:00pm, Room 227 Gallalee Hall

Exams and Assignments

There will be three in-class exams as follows:

Exam 1, chapters 1-4 of text: Wednesday, February 8

Exam 2, chapters 5-8 of text: Friday, March 2

Exam 3, chapters 9-11 of text: Wednesday, April 4

The final exam will have two parts: Part 1: covering topics in Chapters 12-15, and Part 2: a comprehensive exam on Chapters 1-11.

Date of Final Exam: Tuesday, May 1, 11:30am - 02:00pm, Room 227 Gallalee Hall

All exams will be graded in a multiple choice format. For each exam there will be a study guide to provide some focus since the amount of material is so large. NOTE: NO exam scores will be dropped!

Homework and reading exercises will be assigned regularly. Late homework will have a graduated penalty. All assignments will be carried out through Mastering Astronomy. Follow the instructions in this file:

<http://bama.ua.edu/~rbuta/spr12/ay101-002/instructions.doc>

Regular in-class quizzes will be given almost every class period using the clickers from TurningPoint Technologies. These are required for the class and are available at the UA Supply Store (and other local bookstores) and cost \$52 new and \$39 used. The clicker comes with a lifetime user's license. An explanation of how these clickers are used is provided on

<http://frc.ua.edu/wpcontent/uploads/2009/09/ttstudentguide.pdf>

To use your clicker, you must register it for the class. This is done on the class eLearning website which you can access through mybama.ua.edu. Find the class in the eLearning section and in the left bar click on "Course Content." There you will see an icon labeled "Register Clicker Here." There is no extra charge for registering the clicker. Please have your clicker by Wednesday, January 18. The Response Device ID is the 6-digit ID under the barcode on the back of your clicker.

The receiver in Room 227 is on Channel 27. To register your responses in this room, you must change your clicker to this channel. To change channels:

- press menu
- press "yes" (down button) until "Change Channel" is highlighted
- press "Enter"
- Type "27"
- press "Enter"
- you should see "Channel Changed," "Receiver Found"
- use a similar procedure to set the clicker for "Presentation Mode": Menu--> Yes -->"Presentation" --> Enter. You should see "Presentation Mode, Channel 27". To test this, press any number key. You should see "Not accepting answers!" If you see "Sending ... No receiver on channel XX within range," then you are on the wrong channel.

Grading Policy

Homework: 15%

In-class clicker quizzes: 10%

Exam 1: 15%

Exam 2: 15%

Exam 3: 15%

Final exam, Part 1: 15%

Final exam, Part 2: 15%

Policy on Missed Exams & Coursework

There will be no makeup homework, but if for a legitimate reason you miss an in-class exam, you must let me know no more than one class period after the test so I can schedule a timely make-up. Exams missed without explanation will be assigned a zero.

Attendance Policy

There is only one way to take this class, and that is: SERIOUSLY. Being serious means attending class on its scheduled days,

and being there when the class is supposed to start and staying in the class until it is finished for the day. Late arrivals or early departures, as well as taking naps, surfing the internet, looking at iPads, etc., are disruptive practices that should be avoided. If you miss classes you will miss the in-class clicker quizzes, which is not recommended because they will be given almost every class period. However, the five lowest clicker quiz scores will be dropped to have some flexibility in this matter. Another reason for regular attendance is that the schedule of chapters is only approximate, and if you miss classes you will not be able to keep up with the topics that actually are covered.

Required Texts

UA Supply Store Textbook Information

- **BENNETT / COSMIC PERSPECTIVE FUNDAMENTALS W/MASTERING ASTRONOMY**
(Required)

It is expected that students will read the scheduled textbook sections BEFORE class in order to be prepared for the topics to be discussed. These sections are listed in the outline of topics.

Other Course Materials

There are no course materials needed other than the textbook, a TurningPoint Technologies clicker, and Mastering Astronomy.

Extra Credit Opportunities

Possible opportunities for extra credit will be discussed during the semester. Often, these will involve observing sessions with one of the departmental telescopes, either on top of Gallalee Hall or at Moundville Archaeological Park. Announcements of these will be made in class and through the class elearning website.

Policy on Academic Misconduct

All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.

[The Academic Misconduct Disciplinary Policy](#) will be followed in the event of academic misconduct.

Disability Statement

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary. If you have a disability, but have not contacted the Office of Disability Services, please call 348-4285 or visit 133-B Martha Parham Hall East to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

Severe Weather Protocol

In the case of a tornado warning (tornado has been sighted or detected by radar, sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from

adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the [National Weather Service](#) and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take. The Office of Public Relations will disseminate the latest information regarding conditions on campus in the following ways:

- Weather advisory posted on the UA homepage
- Weather advisory sent out through Connect-ED--faculty, staff and students ([sign up at myBama](#))
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM
- Weather advisories are broadcast via WUOA/WVUA-TV, which can be viewed across Central Alabama. Also, visit wuatv.com for up-to-the-minute weather information. A mobile Web site is also available for your convenience.