

ASTR 110 INTRODUCTION TO ASTRONOMY

3 Credits (CRN 60005)

Asynchronous Online Course – Check in Daily

INSTRUCTOR: Sean P. Moroney, Ph.D.
OFFICE HOURS: WCC CAMPUS - Imiloa 118 Fridays 9:00 – 11:00 AM
ONLINE - BlackBoard Collaborate To Be Scheduled
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EFFECTIVE DATE: Summer I 2017 (22 May – 30 June 2017)

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O'ahu's Ko'olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION

Introduction to the astronomical universe for non-science majors.

Activities Required at Scheduled Times Other Than Class Times

No additional activities

ONLINE ACCESS

This course may be found at windwardcc.instructure.com.

STUDENT LEARNING OUTCOMES

The student learning outcomes for the course are:

1. Outline the development of astronomy from ancient times to present and explain the role of the scientific method in this historical context.
2. Describe and explain the apparent motions of the celestial bodies, especially as related to naked-eye observations.
3. Identify the appropriate instruments used by astronomers to understand the universe.
4. Outline the origins of our solar system and appraise the leading cosmological theories of the origin of the universe.
5. Describe the physical and chemical properties of the objects in our solar system and apply the concept of comparative planetology.
6. Describe the physical and chemical nature of stars, and especially our sun, and apply the astronomical techniques used to measure stellar properties.
7. Outline the evolutionary stages in a star's life and compare and contrast the structure of our Milky Way and other galaxies.
8. Apply astronomical concepts to the search for extraterrestrial life.

COURSE MODULES

The course is structurally divided into 6 Modules, each of which has a 1-week window within which various Course Tasks are to be carried out and completed. The Course Calendar below identifies those time segments.

Module 1 – Early Ideas up to Modern Times: Here we cover the basics. These include the appearance of the universe from a moving platform (Earth) within the solar system, the basic everyday astronomical that are so commonplace we don't consider them astronomical, and the discoveries that laid the foundations of modern astronomy.

Module 2 – Basic Science Concepts, with Applications to Local Origins: We next cover the basic principles of physics necessary to understand how the universe works. These principles include the laws of motion, gravitation, electromagnetic radiation, and atomic structure. Then the origin of the solar system is discussed; this is related to the basic physics just covered.

Module 3 – Solar Systems, Ours and Others: We then consider the present-day solar system: the planets, their moons, and the other bodies orbiting the sun. Finally, the discoveries of exoplanets, worlds orbiting other stars, are reviewed. Ideas about the formation of those solar systems are discussed.

Module 4 – Stars, Birth to Death: Next, we examine the sun, our nearest star, and discuss its properties. The nature and the variety of stars is then discussed. The H-R Diagram is introduced both as a tool for cataloging star types and as a way of displaying their evolutionary development. The end-stages of low- and high-mass stars (white dwarfs, neutron stars, and black holes) are discussed.

Module 5 – Galaxies and the Universe: The Milky Way Galaxy is explored. Then, the various types of galaxies and their characteristics are reviewed. The cosmology of the Big Bang and how the Universe was formed are reviewed.

Module 6 – The Cutting Edge of Astronomy: The current topics of dark matter and dark energy are explored, along with considerations of the ultimate fate of the Universe. We conclude with a discussion of the possibilities of life in other places within the cosmos.

COURSE TASKS

The course tasks described here rely considerably upon active involvement and participation by all course members. Details on all these course tasks will be supplied separately.

- **Individual Project (20% of the Course Grade):**
 - Each student will explore an assigned topic and will prepare a presentation to be posted into a Gallery within the Course Canvas site.
 - The Project will have a Due Date that will be near the end of the Course. Instructions will be posted in the Course Canvas site.

- **MasteringAstronomy HomeWorks**
 - **(15% of the Course Grade for the A assignments; 5% of the Course Grade for the B assignments):**
 - These HomeWorks will be accessed from within the Course Canvas website, found at windwardcc.instructure.com. The Course ID, necessary for initial enrollment in MasteringAstronomy, is **moroney80273**.
 - The HomeWorks are aligned by Chapter in the text. Each Chapter has 2 Homeworks, labeled as HW ##A and HW ##B, where ## is the Chapter Number (01 to 19). A HW ##A consists of 15 randomly selected multiple choice questions from that Chapter; a HW ##B consists of a single (1) randomly selected short answer question, also from that Chapter.

- The Homeworks will be available for fixed intervals given in the MasteringAstronomy schedule below. The **best 15 of 19 HW-A** scores and the **best 15 of 19 HW-B** scores will be counted toward the final grade.

- **Video Review Quizzes (VRQs) (20% of the Course Grade):**
 - Each Section of each Chapter has a narrated Video Lecture located in the Course Canvas site. These may be found located in separate Chapter Modules under Modules in the Left Menu. There is one Video Lecture for each Section of the Chapter.
 - Within each of the Chapter Modules, alongside the Video Lecture, is a Video Review Quiz (VRQ). The Video Lecture should be watched – at least once – before taking the VRQ. There are five (5) questions in each VRQ.
 - The VRQs are timed, with each attempt being allotted five (5) minutes. A VRQ may be taken three (3) times, with the best of the three grades being the one which is recorded; the VRQ may not be paused once it has begun.
 - A Module's VRQs must be taken no later than the end of that Module.

- **Ask the Professor (10% of the Course Grade):**
 - During the timeframe of each Module, in a forum set up for this purpose, each student will pose one (1) question on specific Module-related topics, which the Instructor will then explore in some detail. Thought-provoking questions on the current subjects are requested.
 - Follow-up questions from the same student and/or from different students are welcome.
 - The grade given for the question will depend on the quality of the question, with a trivial question getting a lower grade and a profound thought-provoking question getting a higher grade.
 - After a Module closes out, the questions asked, and their answers, will continue to be visible; no new questions may be posted after that time.

- **Ask the Student (10% of the Course Grade):**
 - During the timeframe of each Module, in a forum set up for this purpose, the instructor will pose a question on a specific Module-related topic. The students are expected to explore these topics in some detail and to post a considered and thoughtful response.
 - All students will be responsible for answering the same question in each Module. However, any answers previously posted will not be visible to an answering student until that student submits his/her own answer.
 - Follow-up responses from the same student and/or from different students are welcome.
 - The grade given for the answers will depend on the quality of the answer, with a minimalist answer getting a lower grade and a well-thought-out answer getting a higher grade.
 - After a Module closes out, the questions asked, and their answers, will continue to be visible; no new answers may be accepted after that time.

- **Tests (20% of the Course Grade):**
 - Two (2) Tests, taken online through Canvas, will take place, one just after the midpoint and one at the end of the Course, according to the Test Schedule listed below. Each Test will cover all of the Chapters in one half of the course.
 - Each Test will consist of 50 questions, randomly selected from a pool of multiple-choice and true/false questions.
 - The time allowed for each Test will be 120 minutes. Once the Test is opened, it may not be paused or cancelled.
 - Three (3) attempts at each Test will be permitted. The best score of the three will be the one recorded.

GRADING OF COURSE TASKS

The course grade will be computed as follows:

| | Number | Max. Score |
|-----------------------------|----------------------------|-------------|
| Projects | 1 | 20% |
| MA HomeWorks A | Best 15 of 19 | 15% |
| MA HomeWorks B | Best 15 of 19 | 5% |
| Video Review Quizzes | Best 5/6 of Sections | 20% |
| Ask the Professor | Best 5 of 6 (1 per Module) | 10% |
| Ask the Student | Best 5 of 6 (1 per Module) | 10% |
| Module Tests | 2 | 20% |
| | Total = | 100% |

(MA = MasteringAstronomy)

Course work submitted after specified Due Dates will be subject to a Lateness Deduction, which will generally be 10% per calendar day late after the Due Date. The Lateness Deduction may be excused for a valid documented reason.

GRADING SCALE

The final letter grade will be based on the total percentage that the student has earned from all the course tasks. Each letter grade and its respective level of achievement is provided in the following table:

| Letter Grade | Definition |
|--------------|--|
| A | 90% - 100% of cumulative points possible |
| B | 80% - 89.9% of cumulative points possible |
| C | 70% - 79.9% of cumulative points possible |
| D | 60% - 69.9% of cumulative points possible |
| F | below 60% of cumulative points possible |

Other grades may be assigned as listed in the WCC Catalog.

LEARNING RESOURCES

Textbook:

[The Essential Cosmic Perspective Plus MasteringAstronomy with eText – Access Card Package, 7th ed.](#)
by Bennett, Donahue, Schneider, and Voit. Pearson Education, Inc. ISBN = 9780321927842

Course Canvas site:

www.windwardcc.instructure.com: It is here that the course comes alive. Explore this site and ask questions about its features.

Website:

www.masteringastronomy.com: Pearson Education's Astronomy website, replete with animations, videos, and eText. This will also house the HomeWorks for the course, permitting their completion according to the student's own schedule. This is also accessible through the link, My Labs and Mastering, in the Left Menu of the Course Canvas site.

ATTENDANCE

Checking in regularly and interacting with the Instructor and the class is expected. It will be important to observe the Due Dates for the course. A steady progress forward will get us all successfully to the goal.

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale 'Akoakoa 213 for more information.

Revised May 25, 2011

CALENDARS OF DUE DATES

PROJECTS

| Project | Due | Available | |
|---------|---------|-----------|---------|
| | Date | From | To |
| 1 | 25 June | 22 May | 28 June |

ASK THE STUDENT/PROFESSOR (ASK-S/ASK-P) MASTERINGASTRONOMY HOMEWORKS (MA) VIDEO REVIEW QUIZZES (VRQs)

| Module | Chapters | Due | Available | |
|--------|----------|---------|-----------|---------|
| | | Date | From | To |
| 1 | 1 – 3 | 30 May | 22 May | 2 June |
| 2 | 4 – 6 | 6 June | 29 May | 9 June |
| 3 | 7 – 10 | 13 June | 5 June | 16 June |
| 4 | 11 – 14 | 20 June | 12 June | 23 June |
| 5 | 15 – 17 | 27 June | 19 June | 30 June |
| 6 | 18 - 19 | 2 July | 26 June | 3 July |

MODULE TESTS (MTs)

| Module Test | Chapters | Due | Available | |
|-------------|----------|---------|-----------|---------|
| | | Date | From | To |
| 1 | 1 – 10 | 20 June | 12 June | 23 June |
| 2 | 11 - 19 | 30 June | 24 June | 3 July |

COURSE CALENDAR**ASTR 110 OL – Summer I 2017**

| <u>Week</u> | <u>Date</u> | <u>Module</u> | <u>Topics</u> |
|--------------------|--------------------|-------------------------------|---------------------------------|
| 1 | 22 – 28 May | 1 | Course Introduction Chs. 1-3 |
| 2 | 29 May – 4 June | 2 | Chs. 4-6 |
| 3 | 5 – 11 June | 3 | Chs. 7-10 |
| 4 | 12 – 18 June | 4 | Chs. 11-14 |
| 5 | 19 – 25 June | 5 | Chs. 15-17 |
| 6 | 26 – 30 June | 6 | Chs. 18-19 |
| | 4 July 2017 | Summer I Semester Ends | |