



UNIVERSITY of HAWAII®
WINDWARD
COMMUNITY COLLEGE

ASTR 110 – Survey of Astronomy - 63247

[3 Credits (CRN 63247)]

MW, 10:00 – 11:15 AM

INSTRUCTOR: Sean Moroney

OFFICE: Imiloa 112B

OFFICE HOURS: [Online Sunday, 7:00 – 8:00 PM]

TELEPHONE: [(808) 236-9117] EMAIL: [moroney@hawaii.edu]

EFFECTIVE DATE: [Fall/2022]

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 the Ko'olau region of O'ahu 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

Activities Required at Scheduled Times Other than Class Times

None

STUDENT LEARNING OUTCOMES

As a result of taking this course, students can expect to attain the following outcomes:

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 TASKS

The Course Tasks described herein assume an active involvement and participation by all course members.

Further details on all these Course Tasks may be found in the various documents in the Left Menu / Resources / Course Docs.

- **First Week Introductions (FWI) 1% of the Course Grade (as Extra Credit):**
 - In the first nine days of the Course, each Student is to post, in the appropriate forum, complete answers to five introductory questions. Each Student should then review the postings of the other Students and should then reply, abiding by the Netiquette protocols posted on the Course website, to a minimum of two (2) of the fellow Students.
 - By the Due Date; the postings should be all complete. WCC has linked any absence of responses to the possibility of being disenrolled from the course.
- **Projects (25% of the Course Grade):**
 - There will be two (2) Projects during the term.
 - The Project Reports will have Due Dates that are, in general, independent of the 5-Module Schedule. Please consult the Course Calendars at the end of the Syllabus.
 - Announcements about the availability of the Topics and their Due Dates will be posted as they become necessary.
 - Basic Project Instructions are available for both Project Topics and both Project Reports in their Text Headers in the Assignments section of the Left Menu. A more complete set of Project Instructions, covering both Topics and Reports is available in Laulima's Left Menu / Resources / Course Docs.
 - The Topics selected for the Project Reports must be submitted for approval by their posted Due Dates. Please see the Topics Text Boxes and the Projects Course Docs for further guidance.
 - Each Topic selection is valued at 10 points of the 100 points for its Project. A Topic may be resubmitted continuously until the end of a Grace Period until it is approved.
 - Each Project Report is valued as 90 points of the 100 points for that Project.
 - The SLOs for each Module apply to these Assignments.
- **Weekly Quizzes (WQs) (20% of the Course Grade):**
 - In each of the 15 Weeks of the term, there will be two (2) Weekly Quizzes (WQs). There are ten (10) questions in each WQ.

- Each WQ has a specific date of availability and a specific Due Date. Each continues to be available during a 4-day grace period, during which a 5%-per-day Lateness Deduction may be assessed. After each Grace Period, the WQ becomes unavailable.
 - The WQs are timed, with each attempt being allotted thirty (30) minutes. A WQ may not be paused once it has begun.
 - Each WQ may be taken a maximum of three (3) times; the best score of the three is the one that will be recorded.
 - The **best 26 of the 30 WQ** scores will be counted toward the final grade.
 - The SLOs for each Module apply to these Assignments.
- **Ask the Professor (AskP) (10% of the Course Grade):**
 - Twice in each of the five (5) Modules, in forums set up for this purpose, each student will be asked to pose two separate Questions on Module-related topics, which the Instructor will then explore in some detail.
 - The Questions asked must be thought-provoking Questions, exploring the information, and the implications thereof, presented in the Module.
 - Thought-provoking Questions do not include asking for the Instructor's opinion on any subject.
 - Unacceptable Questions are those which require simply looking up the answer in the text or online; there must be some depth to any Question asked. The Questions asked must make sense and must not contain errors in the science. Improper spelling, grammar, and/or sentence structure can disqualify a Question. If a Question is rejected, it may be reworked and resubmitted for credit without penalty, except for any relevant Lateness Deduction.
 - The grade given for an accepted 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.
 - Follow-up Questions from the same student and/or from different students are welcome.
 - After a Week closes out, the Questions asked, and their answers, will continue to be visible; no new Questions may be posted after that time.
 - There will be ten (10) AskP assignments in total.
 - The **best 8 of the 10 AskP** scores will be counted toward the final grade.
 - The SLOs for each Module apply to these Assignments.
 - **Ask the Student (AskS) (10% of the Course Grade):**
 - Twice in each of the five (5) Modules, in forums set up for this purpose, the Instructor will pose two separate thought-provoking Questions on subject matter relevant to the current Module. Students are expected to explore these topics in some detail and to post considered and thoughtful responses.
 - Answers previously posted will not be visible to an answering student until that student submits his/her own answer.
 - Answers to the Questions must be given in short essays of about 100 words. The answers should go into some depth and may bring in related ideas and information from current astronomical news items or from other sources. Answers should include a Reference section if information was drawn from an outside source.

- Grades given for the answers will depend on the answer quality, with minimalist answers getting lower grades and well-thought-out answers getting higher grades.
 - In addition, each student must offer a critique to two (2) answers from fellow students. All critiques must have an objective basis in the Science.
 - Critiques may be positive (adding in supporting information) or negative (pointing out or correcting errors).
 - Critiques must be substantive and must add to the knowledge base being built in the class. While compliments, and like comments, are acceptable, they will not count toward grading.
 - **The rules and behavior of Netiquette are to be observed at all times in all our online interactions.**
 - For additional detail on the full procedure, please review the document, The AskS and AskP Assignments, found in Laulima's Left Menu under Resources / Course Docs.
 - There will be ten (10) AskS assignments in total.
 - The **best 8 of the 10 AskS** scores will be counted toward the final grade.
 - The SLOs for each Module apply to these Assignments.
- **Cosmic News Articles (CN-A) (1% of the Course Grade):**
 - During each of the five (5) Modules, in forums set up for this purpose, students will present and discuss recent Cosmic News Articles, related to the current Weekly topics, from web-based internet sources.
 - Students are to explore the current astronomical news media for topics of interest, looking for relevant News Articles with a single common theme or subject matter. They will read them carefully, making notes to help integrate their contents. Finally, they will compose and post thoughtful summaries in a Cosmic News Report.
 - The Articles chosen must be related to the same topic. A topic like "Mars" is too large and ill-defined; a topic like "The Polar Ice Caps of Mars" is much more suitable.
 - No two students may use the same Article; it's first-come, first-served on the Articles.
 - Articles are claimed for individual use by submitting the choice of the single topic, along with the list of Articles, in the appropriate location within Laulima.
 - The first step is to locate at least 2, but no more than 4, Cosmic News Articles of interest **on a single topic** and then to lay claim to them.
 - Online sources of Articles will be supplied by the Instructor; students may discover others on their own.
 - Basic instructions on doing these Cosmic News assignments are available in the Text Headers of each Assignment. Additional information is also available in the Left Menu / Resources / Course Docs.
 - Once submitted, the Instructor will then review the Articles for significance and relevance; once approved, the CN-A score will be entered, and the student can then move on to preparing the Report.
 - The CN-A assignment is worth 10 of the 100 points for the full CN-(A+R) assignment; the CN-A score amounts to 1% of the Course Grade.
 - The Grace Period here is the 10 days following the Articles' Due Date; the Lateness Deduction is 5% per day, or fraction thereof.
 - After the Grace Period ends, all of the postings will continue to be visible; no new postings may be accepted after the end of the Grace Period.
 - There will be five (5) CN-A assignments in total.
 - The **best 4 of the 5 CN-A** scores will be counted toward the final grade.

- The SLOs for each Module apply to these Assignments.

- **Cosmic News Reports (CN-R) (9% of the Course Grade):**
 - After reviewing the Cosmic News Articles, the students' second step is to compose a summary of the Articles and then to prepare the Cosmic News Report.
 - The CN-R must be factual; but it may conclude with the student's own insights into the importance and relevance of the Articles. It should also connect with information being covered current in the course.
 - The Grace Period here is the 4 days following the Report Due Date; the Lateness Deduction is 5% per day, or fraction thereof.
 - The grade given for each Assignment will depend on the depth and breadth of the Report and on any subsequent discussions, with minimalist postings getting lower grades and well-thought-out postings getting higher grades.
 - Grammar and spelling are quite important. It will be useful to have someone with good language skills function as a proofreader for each Assignment.
 - The Report is worth 90 of the 100 points for the full CN-(A+R) assignment; this amounts to 9% of the Course Grade.
 - There will be five (5) CN-R assignments in total.
 - The **best 4 of 5 CN-R** scores will be counted toward the final grade.
 - The SLOs for each Module apply to these Assignments.

- **Module Tests (MTs) (20% of the Course Grade):**
 - Five (5) Tests, taken online through Laulima, will take place at approximately 3-week intervals. Each MT will cover all of the Chapters/Sections in one of the three Modules 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 90 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.
 - The SLOs for each Module apply to these Assignments.

- **Weekly Reflections (WRs) (3% of the Course Grade):**
 - There is a lot of interesting information in the news from space in this era.
 - In the WR assignments, we'll be sharing the things we thought were most stunning about what the class has covered and what the world's news has brought in.
 - In a short paragraph, let us all know what new facts and insights you thought most remarkable. Then comment on the thoughts of two of your fellows.

- **Attendance (A) (2% of the Course Grade):**
 - Being active in this online course each Week is important for your academic progress.
 - The Participation score, which notes the submission of assignments and the reading of the postings of other students attests to your presence.

ASSESSMENT TASKS AND GRADING

The course grade will be computed as follows:

| Assignment | Number | Max. Score |
|---------------------------------|-------------------------|------------|
| <i>First Week Introductions</i> | <i>1 (Extra Credit)</i> | <i>1%</i> |
| Projects * | 2 | 30% |
| Weekly Quizzes * | Best 26 of 30 (Drop 4) | 20% |
| Ask the Professor * | Best 13 of 15 (Drop 2) | 10% |
| Ask the Student * | Best 13 of 15 (Drop 2) | 10% |
| Module Tests * | Best 4 of 5 (Drop 1) | 25% |
| Weekly Reflections* | 15 | 3% |
| Attendance | 15 | 2% |
| Total = | | 100% |

Course work submitted after specified Due Dates (marked with *) will be subject to a Lateness Deduction, which will generally be 5% per calendar day late, or fraction thereof, after the Due Date. Lateness Deductions may be excused for a valid documented reasons.

Assignment Grading will be completed within one week after the Due Date for that Assignment.

If a Grade is disputed, that dispute must be originated within three (3) weeks after the Due **COURSE CONTENT. (This section is optional)**

Concepts or Topics

The course is structurally divided into 5 Modules, each of which has a 3-week window within which various Course Tasks are to be carried out and completed. The Course Calendar below identifies those time segments.

Module 1 - 22 Aug to 11 Sep:

Here we cover the basics. These include the overall view of the universe as it stretches through space and time, the development through time of the advances in the understanding of the things in the sky, the local phenomena we see from our perspective on a moving platform (Earth) within the solar system, the understanding of the types of radiation that inform us about the cosmos, and the technology that lets us actually detect interesting phenomena in deep space. (SLOs 1, 2, &3)

MODULE 1 LEARNING OBJECTIVES:

Upon completion of this Module, the student will be able to:

- 1.1 - Discuss the spatial dimensions and the age of the universe.
- 1.2 - Identify the motions of the Earth and of the Sun, the stars, and all the galaxies.
- 1.3- Describe the development of Astronomy from ancient days through to the present.
- 1.4 - Explain the ordinary celestial and terrestrial phenomena of day and night, the seasons, and the motions of the Moon and the planets, both as the ancients saw them and as we see them today.
- 1.5 - Discuss the various components of the electromagnetic spectrum and identify how these radiations relate to physical phenomena in deep space.
- 1.6 - Compare and contrast the types of modern telescopes and how they work together to give us a deeper understanding of celestial phenomena.



Module 2 - 12 Sep to 2 Oct:

The origin of the solar system is discussed. The various planetary and satellite bodies of the Solar System are then reviewed in detail. The current state of our knowledge of the terrestrial planets, the jovian planets, and their moons is examined. (SLOs 3, 4, & 5)

MODULE 2 LEARNING OBJECTIVES:

Upon completion of this Module, the student will be able to:

- 2.1 - Describe how the Solar System formed according to the Nebular Theory.
- 2.2 - Describe Earth as a planet, explaining its various properties.
- 2.3 - Describe the other worlds of the inner Solar System - Mercury, Venus, Mars, and the Moon.
- 2.4 - Explain the differences of the jovian planets when compared with the terrestrial worlds.
- 2.5 - Describe the rings of the jovian planets, the differences among their many moons, and the orbiting body known as Pluto.



Module 3 - 3 Oct to 23 Oct:

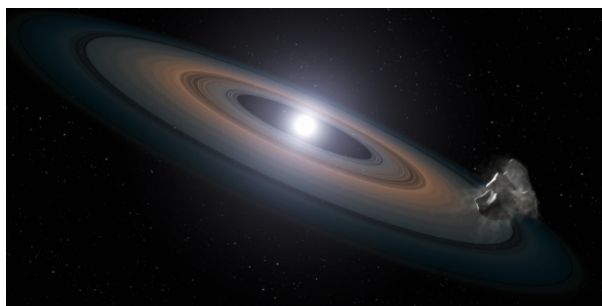
The comets, asteroids, and meteorites in our Solar System are examined. The recent discoveries of other solar systems and of the varieties of planets orbiting distant stars is discussed. Then the nearest star, our Sun, and the other stars are compared and contrasted. The properties of stars of all types is reviewed. The H-R Diagram is introduced both as a tool for cataloging star types and as a way of displaying their evolutionary development. (SLOs 4, 5, & 6)

MODULE 3 LEARNING OBJECTIVES:

Upon completion of this Module, the student will be able to:

- 3.1 - Discuss the differences between asteroids and comets and how these compare with meteorites.
- 3.2 - Integrate what has been learned so far into the current theory of how the Solar System formed.
- 3.3 - Describe the Sun, its cyclical activity, and its internal structure and composition.
- 3.4 - Explain the process of energy generation in the Sun by nuclear fusion.

- 3.5 - Explain how a star's absolute luminosity and temperature are measured and how its size and motion may be determined..
- 3.6 - Demonstrate how the H-R Diagram classifies the stellar population.



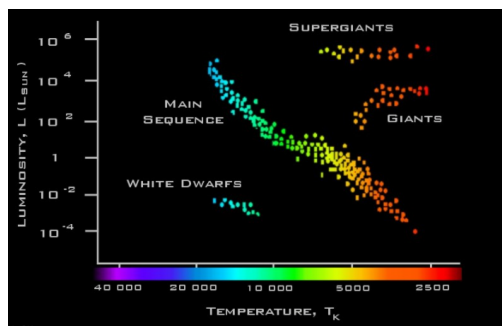
Module 4 - 24 Oct to 13 Nov:

The measurement of the stellar distances and the contents of the space between the stars is investigated. The birth and aging of different types of stars is discussed. The end-stages of low- and high-mass stars (white dwarfs, neutron stars, and black holes) are then explored. (SLOs 6 & 7)

MODULE 4 LEARNING OBJECTIVES:

Upon completion of this Module, the student will be able to:

- 4.1 - Describe the process of determining the distances to the stars.
- 4.2 - Describe the nature of the material that occupies the space between the stars.
- 4.3 - Describe the process of star formation.
- 4.4 - Explain the differences between our Solar System and the recently discovered Solar Systems around other stars.
- 4.5 - Describe the changes in a star's characteristics with time, as shown on the H-R Diagram.
- 4.6 - Explain the differences between the events leading to the death stages of low-mass and high-mass stars.
- 4.7 - Compare and contrast the formation and properties of neutron stars and black holes.



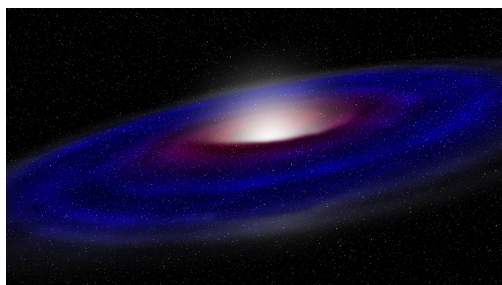
Module 5 - 14 Nov to 4 May:

Galaxies, both the Milky Way Galaxy in which we are located and other types that we have measured, are examined. Their distances, along with their implications, are reviewed. The cosmology of the Big Bang, along with the current topics of dark matter and dark energy, are examined. We conclude with a discussion of life in the cosmos. (SLOs 4, 7, & 8)

MODULE 5 LEARNING OBJECTIVES:

Upon completion of this Module, the student will be able to:

- 5.1 - Describe the structure of the Milky Way Galaxy.
- 5.2 - Identify the different types of galaxies.
- 5.3 - Explain how the distances to galaxies is determined.
- 5.4 - Describe the nature of quasars.
- 5.5 - Describe the distribution of galaxies within the universe.
- 5.6 - Describe the evidence for the existence of dark matter.
- 5.7 - Describe the evidence in favor of the Big Bang Theory.
- 5.8 - Explain the overall process of the Big Bang and how it resulted in today's universe.
- 5.9 - Explain how dark energy is exerting its effects on the universe.
- 5.10 - Discuss the possibilities of life elsewhere in the universe.



Skills or Competencies]

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.

LEARNING RESOURCES

Textbook:

[Astronomy](#) by Fraknoi, Morrison, and Wolf. Openstax/Rice University (2017).

Here is a direct link to the textbook: <https://openstax.org/details/books/astronomy>

You can access the free online, phone app, and PDF formats of Openstax books by following these steps:

1. Go to <https://openstax.org/subjects>
2. Click on the cover of the book you would like to view. This will take you to its Details page
3. Under the **Get the book** heading on the left, select the format you would like to use. It's that easy!

In addition to our free formats, we also provide low-cost print copies for all our books. Individual orders can be placed through [Amazon](#), and bookstores can order through our [partnered suppliers](#).

Course Laulima site:

www.laulima.hawaii.edu: It is here that the course comes alive. Explore this site and ask questions about its features.

ADDITIONAL INFORMATION (This may be included here or in an appendix.)

- **Instructor Bio - Sean Moroney, PhD**

- I've had a life-long interest in the sciences, with Physics as a particular favorite. I've taken a BS in Physics, a MS in Physics, and a PhD in Engineering Mechanics, with a specialty in Biomechanics. Astronomy, as exemplified in all of our space-age discoveries, has been a source of continued wonderment as everyone learns more and more about the Cosmos we are in.
- **Work Submitted Late**
 - Work submitted after the Due Date will receive a Lateness Deduction of 5% per calendar day (or fraction thereof) for each day late. This will happen during the Grace Period which begins directly after the Due Date is past. Grace Periods are variable in length and tend to be no more than three (3) days in duration. If there are extenuating circumstances that can be documented, the Lateness Deductions may be waived, in whole or in part; however, the Instructor must be notified about the circumstances in the shortest possible time.
- **Missed Work**
 - Generally, work not submitted will receive the grade of zero. It is the student's responsibility to stay current with all the Assignments and to keep track of upcoming Due Dates. If there are extenuating circumstances that interfere with this orderly progression, the Instructor must be notified at the earliest date, so that accommodations can be made. If an overly long time period has passed in which a sizable amount of coursework is not submitted, it may not be possible for more than a small fraction of that work to be eligible for completion.
- **Extra Credit**
 - Extra Credit is not generally offered in this course. However, a small number of the lowest-graded assignments in most of the categories will be removed from the pool of scores contributing to the Final Grade. This will happen at the end of the term.
 - Any information you feel the student needs to know
- **MySuccess:**
 - Students may be referred for extra help or advising through MySuccess. Students can also explore resources at MySuccess.Hawaii.edu and windward.hawaii.edu/MySuccess]
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DISABILITIES ACCOMMODATIONS

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 Accessibility Counselor to discuss reasonable accommodations that will help you succeed in this class. Roy Inouye can be reached at (808) 235-7448, royinouye@hawaii.edu, or you may stop by Hale Kāko'o 106 for more information.

SEX DISCRIMINATION AND GENDER-BASED VIOLENCE RESOURCES (TITLE IX)

Windward Community College is committed to providing a learning, working, and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking.

If you or someone you know is experiencing any of these, WCC has staff and resources to support and assist you. To report an incident of sex discrimination or gender-based violence, as well as receive information and support, please contact one of the following:

Jojo Miller, Confidential Advocate

Phone: (808) 348-0663

Email: advocate@hawaii.edu

Office: Hale Kāko‘o 110

Desrae Kahale, Mental Health Counselor & Confidential Resource

Phone: (808) 235-7393

Email: dkahale3@hawaii.edu

Office: Hale Kāko‘o 101

Karen Cho, Deputy Title IX Coordinator

Phone: (808) 235-7404

Email: kcho@hawaii.edu

Office: Hale ‘Alaka‘i 120

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.

For more information regarding sex discrimination and gender-based violence, the University’s Title IX resources and the University’s Policy, Interim EP 1.204, go to manoa.hawaii.edu/titleix/

ACADEMIC INTEGRITY (This section is optional)

Work submitted by a student must be the student’s own work. The work of others should be explicitly marked, such as through use of quotes or summarizing with reference to the original author.

In this class, students who commit academic dishonesty, cheating or plagiarism will have the following consequence(s):

- Students will receive a failing grade for plagiarized assignments.
- All cases of academic dishonesty are referred to the Vice Chancellor for Student Affairs.

ALTERNATE CONTACT INFORMATION

If you are unable to contact the instructor, have questions that your instructor cannot answer, or for any other issues, please contact the Academic Affairs Office:

- Location: Alaka‘i 121
- Phone: (808) 235-7422

TECH SUPPORT SERVICES

Course Technology:

Learning Management System utilized by this course is [Laulima](#), accessible from the [WCC main web site](#), under “Services for Students” tab.

Hardware and Software Expectations:

Students should be comfortable operating a computer browser, such as Mozilla Firefox or Safari, using email, downloading and uploading files. In addition, students should be comfortable using Adobe Acrobat Reader ([download the free software here](#)) and basics programs within Microsoft Office package (Word, Excel and PowerPoint). Microsoft Office can be obtained via University of Hawai‘i’s [Information Technology Services](#). In addition, students should make sure they have the free Adobe Acrobat Reader.

It is recommended that you:

- Use a more recent model desktop or laptop (2014 or later), either Windows or Mac.
- Have access to reliable high-speed Internet connection.
- Use Mozilla Firefox as your web browser, as Laulima is designed to work best with it. Note: that we do not recommend using Internet Explorer for submitting work or taking tests in Laulima.
- Depending on your browser settings, PDF files may open in a new window or tab or automatically download to your download folder

Other technical support:

University of Hawai‘i’s [Information Technology Services Help Desk](#) is available 24 hours a day, 7 days a week (including holidays) either via email (help@hawaii.edu) or by phone (808-956-2669).

Accessibility at UH and software accessibility information:

- University of Hawai‘i’s accessibility policies and services are available at the following link: [Accessibility at UH](#).
- To access the accessibility information for each software used in the course, follow the links below:
 - [Macintosh Accessibility Info](#)
 - [Mozilla Firefox Accessibility Info](#)
 - [Microsoft Office Accessibility Info](#)
 - [Adobe Acrobat Reader Accessibility Info](#)

ACADEMIC SUPPORT SERVICES

Tutorial services

Tutorial services are offered free of charge and are open to all WCC students currently enrolled. Tutoring may be long-term, short-term, or single visit, depending upon the needs of the student. To sign up for a tutor, refer to one of the many programs listed below:

- **Tutor.com:** The University of Hawaii Community Colleges offers free online, on-demand tutoring, through [Tutor.com](#).
- **TRiO Student Support Services (TRiO SSS):** The purpose of [TRiO SSS](#) is to provide services (everything from tutoring to filing taxes to financial aid and food) and to foster an institutional climate supportive of the success of low-income, first-generation, and/or disabled college students.
- **Ho'onui Ike:** [Ho'onui Ike](#) is an academic assistance program that utilizes peer-assisted study and coaching sessions.
- **Ka Piko Student Success Services:** [Ka Piko Student Success Services](#) are free to all WCC students and consist of the following resources (please follow the links below for more information):
 - [Math Lab](#)
 - [Writing Center](#)
 - [Speech Lab](#)
 - [Supplemental Instruction](#) (SI)
 - [Peer Mentoring Center](#)

Other student services

- [WCC Library](#), located in Hale La'akea, provides access to printed and digital books, periodicals, articles and more. In addition, it provides access to video and audio resources, as well as computers, individual and group study areas and rooms.
- [WCC Bookstore](#): textbooks, computers, software, food items and more can be purchased here.
- [Testing Center](#) (located in Hale La'akea) provides test proctoring services for placement tests, distance education online and written tests and make-up tests for campus courses.
- WCC [Counseling and Advising](#) department, located in Hale 'Ākoakoa 212, is comprised of college counselors, faculty and support staff who work to support students' personal and academic growth and development.
- WCC [Mental Health and Wellness](#) provides a range of counseling services and activities on campus to support students' life goals and academic goals.
- [Disabilities Services](#), located in Hale La'akea 232, provides information and services to students with disabilities in order to perform functions that might otherwise be difficult or impossible. Testing and academic accommodations can include the following: tape recorded material, note takers, use of adaptive equipment and more.

COURSE DOCS IN LAULIMA

The Course Docs section in the Resources section of the Left Menu in Laulima is another critically important section that contains some necessary information about the Assignments and other aspects of the Course.

The Course Docs section should be reviewed carefully in the early Weeks of the Course.

CALENDAR OF ASSIGNMENTS

FIRST WEEK INTRODUCTIONS (FWI)

The FWI Assignment is DUE by the EOD
on 28 August 2002.

This is a WCC requirement. If not done,
There is a possibility of being dropped from the course.

Participation (Attendance) (P)

Participation will be measured on a weekly basis.

On Monday mornings, the activities of and
the work done by each student will be assessed;
a grade will then be posted.

CALENDARS OF DUE DATES

PROJECTS

| Project | Available from | Due Date | Available to |
|------------------|----------------|--------------|--------------|
| Project 1 Topic | 22 August | 11 September | 25 September |
| Project 1 Report | 22 August | 9 October | 12 October |
| Project 2 Topic | 17 October | 6 November | 20 November |
| Project 2 Report | 17 October | 4 December | 7 December |

ASK THE STUDENT/PROFESSOR (ASK-S/ASK-P)

| AskS & AskP | | | | |
|-------------|-----|--------|--------|--------|
| MODULE | ASK | OPEN | DUE | CLOSE |
| 1 | 1 | 22 Aug | 1 Sep | 4 Sep |
| | | | | |
| | 2 | 1 Sep | 11 Sep | 14 Sep |
| 2 | 3 | 12 Sep | 22 Sep | 25 Sep |
| | | | | |
| | 4 | 22 Sep | 2 Oct | 5 Oct |
| 3 | 5 | 3 Oct | 13 Oct | 16 oct |
| | | | | |
| | 6 | 13 Oct | 23 Oct | 26 oct |
| | 7 | 24 Oct | 3 Nov | 6 Nov |

| | | | | |
|---|----|--------|---------------|--------|
| 4 | | | | |
| | 8 | 3 Nov | 13 Nov | 16 Nov |
| 5 | 9 | 14 Nov | 24 Nov | 27 Nov |
| | | | | |
| | 10 | 24 Nov | 4 Dec | 8 Dec |

MODULE TESTS (MTs)

| Module Test | Available from | Due Date | Available until |
|-------------|----------------|----------|-----------------|
| 1 | 8 Sep | 14 Sep | 17 Sep |
| 2 | 29 Sep | 5 Oct | 8 Oct |
| 3 | 20 Oct | 26 Oct | 29 Oct |
| 4 | 10 Nov | 16 Nov | 19 Nov |
| 5 | 1 Dec | 7 Dec | 8 Dec |

WEEKLY REFLECTIONS (WRs)

| WEEK | FROM | DUE | CLOSE |
|------|--------|--------|--------|
| 01 | 26 Aug | 28 Aug | 29 Aug |
| 02 | 2 Sep | 4 Sep | 5 Sep |
| 03 | 9 Sep | 11 Sep | 12 Sep |
| 04 | 16 Sep | 18 Sep | 19 Sep |
| 05 | 23 Sep | 25 Sep | 26 Sep |
| 06 | 30 Sep | 2 Oct | 3 Oct |
| 07 | 7 Oct | 9 Oct | 10 Oct |
| 08 | 14 Oct | 16 Oct | 17 Oct |
| 09 | 21 Oct | 23 Oct | 24 Oct |
| 10 | 28 Oct | 30 Oct | 31 Oct |

| | | | |
|-----------|--------|---------------|--------|
| 11 | 4 Nov | 6 Nov | 7 Nov |
| 12 | 11 Nov | 13 Nov | 14 Nov |
| 13 | 18 Nov | 20 Nov | 21 Nov |
| 14 | 25 Nov | 27 Nov | 28 Nov |
| 15 | 2 Dec | 4 Dec | 5 Dec |

WEEKLY QUIZZES (WQs)

| MODULE | QUIZ | FROM | DUE | CLOSE |
|--------|------|--------|--------|--------|
| 1 | 01 | 25 Aug | 31 Aug | 3 Sep |
| | 02 | 25 Aug | 31 Aug | 3 Sep |
| | 03 | 1 Sep | 7 Sep | 10 Sep |
| | 04 | 1 Sep | 7 Sep | 10 Sep |
| | 05 | 8 Sep | 14 Sep | 17 Sep |
| | 06 | 8 Sep | 14 Sep | 17 Sep |
| 2 | 07 | 15 Sep | 21 Sep | 24 Sep |
| | 08 | 15 Sep | 21 Sep | 24 Sep |
| | 09 | 22 Sep | 28 Sep | 1 Oct |
| | 10 | 22 Sep | 28 Sep | 1 Oct |
| | 11 | 29 Sep | 5 Oct | 8 Oct |
| | 12 | 29 Sep | 5 Oct | 8 Oct |
| 3 | 13 | 6 Oct | 12 Oct | 15 Oct |
| | 14 | 6 Oct | 12 Oct | 15 Oct |
| | 15 | 13 Oct | 19 Oct | 22 Oct |
| | 16 | 13 Oct | 19 Oct | 22 Oct |
| | 17 | 20 Oct | 26 Oct | 29 Oct |
| | 18 | 20 Oct | 26 Oct | 29 Oct |
| 4 | 19 | 27 Oct | 2 Nov | 5 Nov |
| | 20 | 27 Oct | 2 Nov | 5 Nov |
| | 21 | 3 Nov | 9 Nov | 12 Nov |
| | 22 | 3 Nov | 9 Nov | 12 Nov |
| | 23 | 10 Nov | 16 Nov | 19 Nov |
| | 24 | 10 Nov | 16 Nov | 19 Nov |
| | 25 | 17 Nov | 23 Nov | 26 Nov |

| | | | | |
|---|----|--------|--------|--------|
| 5 | 26 | 17 Nov | 23 Nov | 26 Nov |
| | 27 | 24 Nov | 30 Nov | 3 Dec |
| | 28 | 24 Nov | 30 Nov | 3 Dec |
| | 29 | 1 Dec | 7 Dec | 8 Dec |
| | 30 | 1 Dec | 7 Dec | 8 Dec |

COURSE CALENDAR

ASTR 110 OL – Fall 2022

| <u>Module</u> | <u>Module Focus</u> | <u>Date</u> | <u>Chapter - Title</u> | |
|---------------|--|-----------------|------------------------|--------------------------------|
| 1 | Overview of the Universe, the Perspective from Earth, Gravity, Light, & Astronomers' Tools | 22 Aug - 28 Aug | 1 | Science and the Universe |
| | | | 2 | Observing the Sky |
| | | 29 Aug - 4 Sep | 3 | Orbits and Gravity |
| | | | 4 | Earth, Moon, and Sky |
| | | 5 Sep - 11 Sep | 5 | Radiation and Spectra |
| | | | 6 | Astronomical Instruments |
| 2 | The Solar System's Many Worlds, Their Moons, & Comparative Planetology | 12 Sep - 18 Sep | 7 | Other Worlds |
| | | | 8 | Earth as a Planet |
| | | 19 Sep - 25 Sep | 9 | Cratered Worlds |
| | | | 10 | Earthlike Planets |
| | | 26 Sep - 2 Oct | 11 | The Giant Planets |
| | | | 12 | Rings, Moons, and Pluto |
| 3 | The Debris of the Solar System, the Sun, Starlight, & Stellar | 3 Oct - 9 Oct | 13 | Comets and Asteroids |
| | | | 14 | Cosmic Samples and Origins |
| | | 10 Oct - 16 Oct | 15 | The Sun: A Garden-Variety Star |

| | | | | |
|--------------------------|---|-----------------|--------------------|--|
| | Characteristics and Classifications | | 16 | The Sun: A Nuclear Powerhouse |
| | | 17 Oct- 23 Oct | 17 | Analyzing Starlight |
| | | | 18 | The Stars |
| 4 | The Space Between the Stars, Star Formation, the Exoplanets, Stellar Evolution, Death, & End-Stages | 24 Oct - 30 Oct | 19 | Celestial Distances |
| | | | 20 | Between the Stars |
| | | 31 Oct - 6 Nov | 21 | The Birth of Stars |
| | | | 22 | Stars from Adolescence to Old Age |
| | | 7 Nov - 13 Nov | 23 | The Death of Stars |
| | | | 24 | Black Holes |
| 5 | Galaxies, Their Types and Evolution, The Big Bang, Dark Matter, & Astrobiology | 14 Nov - 20 Nov | 25 | The Milky Way Galaxy |
| | | | 26 | Galaxies |
| | | 21 Nov- 27 Nov | 27 | Active Galaxies and Quasars |
| | | | 28 | Evolution and Distribution of Galaxies |
| | | 28 Nov – 4 Dec | 29 | The Big Bang |
| | | | 30 | Life in the Universe |
| CONCLUSION and SUMMATION | | | 5 – 8 Dec | |
| | | 16 Dec 2022 | Fall Semester Ends | |