



UNIVERSITY of HAWAII®
WINDWARD
COMMUNITY COLLEGE

ASTR 110 SURVEY OF ASTRONOMY

CRN = 60382 3 Credits

Term Dates - 26 Aug to 17 Dec 2021

Asynchronous Online Course – Check in Daily

INSTRUCTOR:	Sean P. Moroney, Ph.D.	
OFFICE HOURS:	WCC CAMPUS - Imiloa 112B	TBD
	ONLINE – Canvas / Zoom	Sunday 7:00 – 8:00 PM
TELEPHONE:	(808) 236-9117	EMAIL: moroney@hawaii.edu
EFFECTIVE DATE:	Fall 2021	

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 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

PREREQUISITES

There are no prerequisites for this course.

ONLINE ACCESS

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

ANNOUNCEMENTS

The Announcements section in Canvas is a critically important section for the transmission of information about the course.
The Announcements should be checked frequently.

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.

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 Canvas site:

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

ATTENDANCE & PARTICIPATION

Checking in regularly and interacting with the Instructor and the class is expected. A number of our Assignments require some level of interaction with the Instructor and with other class members. It will be important to observe the Due Dates for the course. A steady progress forward will get us all successfully to the goal.

EXPECTATIONS

Communication

Students are expected to behave politely, respectfully, and professionally while communicating with their peers and the Instructor in online discussions, email, video conferencing, and in other forms of interactions. The UH Internet Etiquette (i.e., “Netiquette”) is available for review in Canvas / Modules / Course Docs.

Communication

Students are expected to attend class regularly, to participate in class discussions, to stay current with the course material, and

OTHER CENTRALIZED COURSE INFORMATION

Information on many other aspects of this course may be found in Canvas / Modules / Course Docs.

COURSE MODULES

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: 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 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: 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 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.



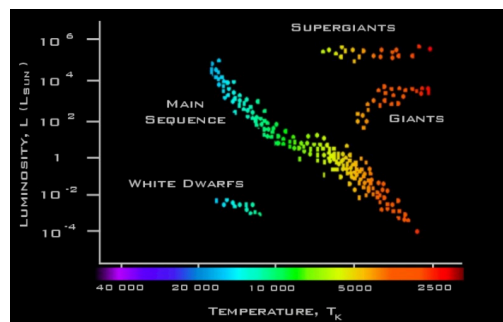
Module 3: The comets, asteroids, and meteorites in our Solar System are examined. The recent discoveries of other solar systems and of the varieties of planets orbiting distant stars is discussed. Then the nearest star, our Sun, and the other stars are compared and contrasted. The properties of stars 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)

- 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: 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)

- 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: 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)

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.

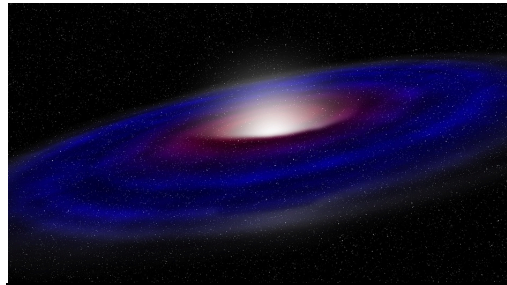
5.6 - Describe the evidence for the existence of dark matter.

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.



COURSE TASKS

The course tasks described here rely considerably upon active involvement and participation by all course members.

Further details on all these course tasks will be by the Announced placement of labeled documents in the Course Docs section of the Left Menu.

- **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 Module Schedule. Instructions are available in the Info Text Headers in the Project Topics and the Project Reports in the Assignments section of the Left Menu. Instructions may also be available in the Left Menu / Modules / Course Docs.
- The Topic selected for each Project Report must be submitted for approval by a particular Due Date. Instructions for this are posted in the Assignment site a reminder will be posted as an Announcement. The Topic selection is valued as 10 points of the 100 points for the Project. The Topic may be resubmitted continuously during a Grace Period until it is approved.
- The Project Report is valued as 90 points of the 100 points for the Project.
- The Instructor will post some review comments in a Projects Discussion Forum. Follow-up discussion from the same student and/or from different students are welcome. As part of the Assignment, each student is expected to meaningfully answer any and all questions posed by the Instructor and by other students.

- **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 schedule of the WQs is given below.
 - The **best 26 of the 30 WQ** scores will be counted toward the final grade.

- **Ask the Professor (AskP) (10% of the Course Grade):**
 - During the timeframe of each of the five (5) Modules, in a forum set up for this purpose, each student will be asked to pose two separate thought-provoking questions on Module-related topics, which the Instructor will then explore in some detail.
 - Questions asked must not be simple look-up-the-answer questions; there must be some depth to the question. Any question that is asked must make sense and must not contain errors in the science. Improper spelling, grammar, and/or sentence structure can disqualify a question. Such questions will be rejected; the question may be reworked for credit to be earned.
 - Thought-provoking questions do not include asking for the Instructor's opinion on any subject.
 - 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.
 - If a question is too simple or has built-in conceptual errors, the student may be asked to resubmit a better question.
 - 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 schedule of the AskPs is given below.
 - 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):**
 - During the timeframe of the fifteen (15) Weeks, in a forum set up for this purpose, the instructor will pose two separate thought-provoking questions on topics relevant to the current Module. The students are expected to explore these topics in some detail and to post considered and thoughtful responses.
 - Any answers previously posted will not be visible to an answering student until that student submits his/her own answer.
 - The answer to the question must be given in a short essay of 100 or more words. The answer should go into some depth and may bring in related ideas and information from current astronomical news items or from other sources. An answer should include a Reference section if information was drawn from an outside source.
 - The grade given for the answer 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.
 - In addition, each student must offer a critique to two (2) answers from fellow students. 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.
- The rules and behavior of Netiquette are to be observed at all times and in all our online interactions.
 - After a Week closes out, the questions asked, and their answers, will continue to be visible; no new answers may be accepted after that time.
 - There will be ten (10) AskS assignments in total.
 - The schedule of the AskSs is given below.
 - 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 the timeframe of each of the five (5) Modules, in forums set up for this purpose, students will present and discuss Cosmic News Articles, related to the current Weekly topics, from web-based internet sources. Students are expected to find Articles of interest, to read them carefully, and then to post thoughtful summaries.
 - Instructions on doing each of these assignments, and the related Cosmic News Reports, will be posted in Announcements and in the Info Text Header of each Assignment. Instructions may also be available in the Left menu / Modules / Course Docs.
 - 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 claim them by posting their titles and locations in the appropriate location within Canvas. 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. These claimings of Articles have Due Dates (and Grace Periods), listed below.
 - Online sources of Articles will be supplied by the Instructor; students may discover others on their own.
 - The Grace Period here is the 10 days following the Articles Due Date; the Lateness Deduction is 5% per day, or fraction thereof.
 - 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 claiming of the Articles 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.
 - After the Assignment closes, 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 schedule of the CN-As is given below.
 - 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 second step is to compose a summary of the Articles and then to prepare a Report. The Cosmic News Report 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 Instructor will post some review comments in a CN Discussion Forum. Follow-up discussion from the same student and/or from different students are welcome. As part of the Assignment, each student is expected to meaningfully answer any and all questions posed by the Instructor and by other students.

- 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 of 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.
 - After the Assignment closes, all of the postings will continue to be visible; no new postings may be accepted after the end of the Grace Period.
 - The CN-Rs will be placed in an AstroGallery for all to read and share. Questions from student to student, from student to instructor, and from instructor to student.
 - There will be five (5) CN-R assignments in total.
 - The schedule of the CN-Rs is given below.
 - 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 Canvas, will take place at approximately 3-week intervals, according to the Test Schedule listed below. 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 Schedule of the MTs is given below in the Calendar Section.
 - The SLOs for each Module apply to these Assignments.
- **Participation (P) (5% of the Course Grade):**
 - Being active in this online course each Week is important for your academic progress.
 - A maximum participation grade of 10 points per week can be earned by visibly making postings and engaging in discussions with the other students and/or with the Instructor.

GRADING OF COURSE TASKS

The course grade will be computed as follows:

Assignment	Number	Max. Score
Projects *	2	25%
Cosmic News Articles*	Best 4 of 5 (Drop 1)	1%
Cosmic News Reports*	Best 4 of 5 (Drop 1)	9%
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)	20%
Participation	15	5%
---	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 after the Due Date. The Lateness Deduction may be excused for a valid documented reason.

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 Date.

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% - 89.99% of cumulative points possible
C	65% - 79.99% of cumulative points possible
D	50% - 64.99% of cumulative points possible
F	below 50% of cumulative points possible

Computed grades will not be rounded up.

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

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

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:

Madoka (Doka) Kumagai, Confidential Advocate
 Phone: (808) 348-0663 (cellular)
 Phone: (808) 956-6084 (office)
 Email: kumagaim@hawaii.edu

Desrae Kahale, Mental Health Counselor & Confidential Resource
 Phone: (808) 235-7393
 Email: dkahale3@hawaii.edu
 Office: Hale Kāko‘o 101

Karla K. Silva-Park, Title IX Coordinator
 Phone: (808) 235-7468
 Email: karlas@hawaii.edu
 Office: Hale ‘Ākoakoa 220

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/

INCOMPLETE GRADE PROCEDURE

Incomplete grades are reserved for cases of illnesses and other emergencies that cause a student to be unable to complete the course by the Last Day of Instruction. In such cases, the

instructor has the option of issuing an "Incomplete" grade at the end of the semester. Requests for an "Incomplete" must be accompanied, in a timely manner, by substantive documentation. The Instructor must be notified of such issues in the shortest time; requests for an Incomplete grade must be made before the course is completed.

If granted, the "Incomplete" grade will then require a written agreement between the instructor and the student clearly defining the remaining course requirements and the time frame within which they are to be completed. The College will review "I" grades six months subsequent to posting. Unresolved "I" grades will be converted to "F" grades subsequent to the review.

Be aware that active duty military can be charged for tuition for not completing a course as soon as 90 days after the end of the course if the "I" is not changed to a passing grade. Therefore, completing the course in a timely manner is prudent.

ACADEMIC INTEGRITY

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

ADDITIONAL INFORMATION

- **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.
- **Attendance and Participation**
 - 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.
- **Communication Expectations**
 - Students are expected to behave politely, respectfully, and professionally while communicating with their peers and the Instructor in online discussions, email, video conferencing, and in other forms of interactions. The UH Internet Etiquette (i.e., "Netiquette") is available for review in Canvas / Modules / Course Docs.

- **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 tend to be no more than four (4) 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 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 to request that more than a small fraction of that work may 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.

- **MySuccess**
 - Students may receive extra help or advising through the MySuccess program. These resources can be explored at MySuccess.hawaii.edu and at windward.hawaii.edu/MySuccess.

CALENDARS OF DUE DATES

PROJECTS

Project	Due Date	Available from	Available to
Project 1 Topic	12 September	23 August	2 October
Project 1 Report	10 October	23 August	14 October
Project 2 Topic	7 November	18 October	27 November
Project 2 Report	5 December	18 October	9 December

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

AskS & AskP				
MODULE	ASK	OPEN	DUE	CLOSE
1	1	23-Aug	2-Sep	6-Sep
	2	2-Sep	12-Sep	16-Sep
2	3	13-Sep	23-Sep	27-Sep
	4	23-Sep	3-Oct	7-Oct
3	5	4-Oct	14-Oct	18-Oct
	6	14-Oct	24-Oct	28-Oct
4	7	25-Oct	4-Nov	8-Nov
	8	4-Nov	14-Nov	18-Nov
5	9	15-Nov	25-Nov	29-Nov
	10	25-Nov	5-Dec	19-Dec

COSMIC NEWS - ARTICLES (CN-A)

MODULE	FROM	DUE	CLOSE
1	23-Aug	29-Aug	8-Sep
2	13-Sep	19-Sep	29-Sep
3	4-Oct	10-Oct	14-Oct
4	25-Oct	31-Oct	4-Nov
5	15-Nov	21-Nov	25-Nov

COSMIC NEWS - REPORTS (CN-R)

MODULE	FROM	DUE	CLOSE
1	23-Aug	12-Sep	16-Sep
2	13-Sep	3-Oct	7-Oct
3	4-Oct	24-Oct	28-Oct
4	25-Oct	14-Nov	18-Nov
5	15-Nov	5-Dec	9-Dec

MODULE TESTS (MTs)

Module Test	Available from	Due Date	Available until
1	6 September	16 September	20 September
2	27 September	7 October	11 October
3	18 October	28 October	1 November
4	8 November	18 November	22 November
5	29 November	9 December	11 December

WEEKLY QUIZZES (WQs)

MODULE	QUIZ	FROM	DUE	CLOSE
1	01	27-Aug	5-Sep	9-Sep
	02	27-Aug	5-Sep	9-Sep
	03	3-Sep	12-Sep	16-Sep
	04	3-Sep	12-Sep	16-Sep
	05	10-Sep	19-Sep	23-Sep
	06	10-Sep	19-Sep	23-Sep
2	07	17-Sep	26-Sep	30-Sep
	08	17-Sep	26-Sep	30-Sep
	09	24-Sep	3-Oct	7-Oct
	10	24-Sep	3-Oct	7-Oct
	11	1-Oct	10-Oct	14-Oct
	12	1-Oct	10-Oct	14-Oct
3	13	8-Oct	17-Oct	21-Oct
	14	8-Oct	17-Oct	21-Oct
	15	15-Oct	24-Oct	28-Oct
	16	15-Oct	24-Oct	28-Oct
	17	22-Oct	31-Oct	4-Nov
	18	22-Oct	31-Oct	4-Nov
4	19	29-Oct	7-Nov	11-Nov
	20	29-Oct	7-Nov	11-Nov
	21	5-Nov	14-Nov	18-Nov
	22	5-Nov	14-Nov	18-Nov
	23	12-Nov	21-Nov	25-Nov
	24	12-Nov	21-Nov	25-Nov
5	25	19-Nov	27-Nov	1-Dec
	26	19-Nov	27-Nov	1-Dec
	27	26-Nov	3-Dec	7-Dec
	28	26-Nov	3-Dec	7-Dec
	29	3-Dec	9-Dec	12-Dec
	30	3-Dec	9-Dec	12-Dec

COURSE CALENDAR

ASTR 110 OL – Fall 2021

<u>Module</u>	<u>Module Focus</u>	<u>Date</u>	<u>Chapter - Title</u>	
1	Overview of the Universe, the Growth of Astronomy and of Science	23 Aug - 29 Aug	1	Science and the Universe
			2	Observing the Sky
		30 Aug - 5 Sep	3	Orbits and Gravity
			4	Earth, Moon, and Sky
		6 Sep - 12 Sep	5	Radiation and Spectra
			6	Astronomical Instruments
2	The Solar System's Many Components, and the Physical Laws of Motion and of Gravitation	13 Sep - 19 Sep	7	Other Worlds
			8	Earth as a Planet
		20 Sep - 26 Sep	9	Cratered Worlds
			10	Earthlike Planets
		27 Sep - 3 Oct	11	The Giant Planets
			12	Rings, Moons, and Pluto
3	Exoplanets, the Sun, and the Stars	4 Oct - 10 Oct	13	Comets and Asteroids
			14	Cosmic Samples and Origins
		11 Oct - 17 Oct	15	The Sun: A Garden-Variety Star
			16	The Sun: A Nuclear Powerhouse
		18 Oct - 24 Oct	17	Analyzing Starlight
			18	The Stars
4	Stellar Endings and Galaxies	25 Oct - 31 Oct	19	Celestial Distances
			20	Between the Stars
		1 Nov - 7 Nov	21	The Birth of Stars
			22	Stars from Adolescence to Old Age
		8 Nov - 14 Nov	23	The Death of Stars
			24	Black Holes
5	Cutting Edge Topics of Today	15 Nov - 21 Nov	25	The Milky Way Galaxy
			26	Galaxies
		22 Nov - 28 Nov	27	Active Galaxies and Quasars
			28	Evolution and Distribution of Galaxies
		29 Nov - 5 Dec	29	The Big Bang
			30	Life in the Universe
		17 Dec 2021	Fall Semester Ends	