



**ASTR 1303 01W – Stars and The Universe Online
COURSE SYLLABUS: Summer II 2015**

WHO I AM

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Please include "Astro Online" in the subject line.

WHAT THIS COURSE IS ABOUT

Course Description:

Astronomy is an ancient science with records dating back to the dawn of civilization. Despite this long history, it remains an exciting and vibrant area of ongoing study. In the coming years, astronomers may discover Earth-sized planets around other stars, see the first stars emerging from the cosmic dawn, and explore new physics in realms and laboratories that Earth-bound scientists can only dream of.

In this course, we will focus on studying stars and galaxies, as well as the natural laws and tools that astronomers use to study these distant objects. We'll begin by studying gravity, light, and telescopes. We'll then study the Sun as an example star and use it as a stepping stone to reach ever further into the Universe. Along the way we'll discover new worlds around other stars, peer into the hearts of black holes, witness collisions of galaxies, and piece together vital clues pointing to the origins of the Universe.

One big topic we will not cover is our own Solar System. If you want to know details about the eight planets, their moons, asteroids, meteors, and comets, you'll need to take ASTR 1304.

Student Learning Outcomes:

1. You will be able to explain the characteristics of stars and their life cycles.
2. You will be able to identify the classes of galaxies and their basic properties.
3. You will be able to state evidence supporting astronomers' explanations of the origin and fate of the Universe.
4. You will be able to evaluate statements about astronomy using the scientific method.
5. You will be able to identify constellations, stars, and deep-sky objects visible from Texas.

WHAT YOU ABSOLUTELY NEED

Materials – Textbooks, Software and Additional Reading:

Required:

- 21st Century Astronomy, Volume 2: Stars and Galaxies, 4th edition, by Kay, Palen, Smith, & Blumenthal, ISBN 978-0-393-92057-4
- A subscription to SmartWork, an online astronomy homework and tutoring system (see more below)
- A computer (PC or Mac) on which you can access the internet and install software
- Stellarium (www.stellarium.org) – FREE planetarium software
- Access to a scanner or other means of turning in some written work and sketches.
- You *DO NOT* need the green Lecture Tutorial book.

Suggested:

- Headphones for listening to online videos and participating in online office hours

Options for purchasing: (New Prices as of 7/12/2015)

- 21st Century Astronomy Volume 2 with SmartWork and eBook access
 - Best if you are only taking this astronomy course
 - From TAMU-C Bookstore: \$112.85
 - From wwnorton.com: \$98.75
- 21st Century Astronomy (entire book) with SmartWork and eBook access
 - Best if you are sure you will take Astr 1304: The Solar System as well as this course
 - From wwnorton.com: \$146.25
- 21st Century Astronomy (entire book), eBook with SmartWork ONLY (no hard copy)
 - Best if you are sure you are happy with eBooks; 360 day access
 - From wwnorton.com: \$57.08
- **Important: Used and rented textbooks usually do NOT include access to SmartWork, which will then cost an additional \$20 for 1 semester access.**

Course Prerequisites: None

HOW THE COURSE WILL WORK

Instructional Methods / Activities / Assessments

Course pace

While I realize that some online students prefer to complete a course as fast as possible and others like to wait several weeks and then do as much work as possible, these methods won't work with this course. Student interaction is a crucial part of learning, and we can't interact if no two students are on the same part of the course.

The course is broken up into 12 units. Because the summer semester is so compressed, most units only last a day or two, with work due a days or two thereafter. *The onus is on you to keep up with deadlines through eCollege*. eCollege has a Course Checklist tool to help you keep track of what you have and have not completed. If you go to the Course Home page and click on "Course Checklist" at the bottom you can access this tool.

Participation

Research into how people learn shows that the best learning comes from interaction. Simply reading material and taking online quizzes won't help you learn anything useful. I therefore will require you to participate actively in the course. Some of the methods we may use for this participation include threaded discussions on eCollege and live meetings using Adobe Connect on eCollege.

For each activity, I will be certain to spell out instructions, due dates, grading procedures, and minimum requirements. Of course, if you want to continue discussions beyond the minimum requirements, I encourage you to do so!

SmartWork: Reading Quizzes and Homework

SmartWork is an online astronomy homework and tutoring tool. Its advantages are that SmartWork will give you instant feedback on whether you got a question right or wrong and provide you with hints and tools to better learn the material.

There will be two types of SmartWork assignments: reading quizzes and homeworks. I will assign reading for each unit, and the reading quiz checks to see if you did the reading and watched the minilectures. The quiz is intended to be quick and have easier questions, with tougher questions on the homeworks. I suggest the following strategy: Skim the chapter in the text, looking at pictures, unit titles, and word definitions. At the end of the chapter is a brief chapter summary you should also read over. Then watch the minilectures, which cover most of the unit content, emphasizing important topics. Finally, re-read the chapter, in more depth this time. Then try the reading quiz. These quizzes are timed, so you will not have time to go back and search the chapter for the information.

Homework assignments will be assigned for each unit. These are intended to be the "capstone" of the unit; i.e. they should usually be the last thing you do in a unit. If you do the homework and find you still don't understand something, you definitely want to ask me about that topic in office hours or by email.

The grading policy for each SmartWork assignment are shown in each assignment. You may get multiple attempts to answer a question correctly; however, submitting an incorrect answer will cost you some credit. SmartWork will identify these questions as extra credit. Late homeworks are penalized 10% per day.

The following are considered cheating and will not be tolerated: Directly copying text from a website or other printed source, obtaining copies of solutions to homework questions (whether from past students or other sources), directly copying another student's work, etc. See the section on "Academic Integrity" below for full details.

Mini-Lectures and Response Questions

Within each unit, I will upload mini-lectures that you will be able to view. These videos are approximately 15 minutes each and will focus on one or two important points each.

Each video will be paired with a minilecture response activity on eCollege. The responses contain a few thought questions that allow you to check your learning to see if you understood the material and thought processes covered in the mini-lecture. These are an opportunity for you to begin to think about and work with the concepts before they show up on homework or exams without the pressure of getting a right or wrong answer. Some questions will be easy, some hard, and some will require you to put together more than one concept in order to figure out an answer.

The minilecture responses are not graded but allow you to check your learning in a no-pressure environment.

Exams:

Three online exams will be given during the semester through eCollege: the first after Unit 5: Telescopes, the second after Unit 9: Star Death, and the third at the end of the term. For the exams you may use whatever materials you like (text, homework solutions, internet searches, etc). However, the exams are *timed* and may only be taken once, so you will want to study the material well before taking the exam. The exams are not officially cumulative, but astronomy is a very intertwined science and topics covered on exam one will be required knowledge to answer questions on exam three.

Activities:

Activities include learning constellations in the night sky and exploring some current astronomy news and issues. The night sky activities will make use of Stellarium, a free downloadable program for your computer. The installation and basic usage of this program will be covered in Unit 1.

Labs:

Astronomy labs are a separate class (Astr 1103); you do not need to be enrolled in a laboratory section to earn credit in this course. You should speak with your academic advisor to determine if signing up for a lab section is right for your degree plan. You can take the lab courses in future semesters; they do not need to be taken concurrently. At the present, we do not offer online labs for astronomy.

Extra Credit: Observatory Visit, Science Museum Visit, or a Planetarium Show:

If you live close to Commerce, you will have two opportunities for an optional visit to the Commerce Observatory (about 5 miles south of Commerce): the evening of Tuesday, Sept 23 and Tuesday, Sept. 25. If both of these dates are cloudy, we have set a rain date of Tuesday, Oct. 21. Times are listed in the calendar at the end of this syllabus. At each session, there will be an activity you must complete in order to earn extra credit.

You can also earn extra credit by attending a planetarium show. The A&M-Commerce Planetarium also exhibits several different shows every Friday night at 7pm and 8pm. Tickets are \$4 for children and students with student ID, \$4.50 for senior citizens, and \$5 for adults. Go to <http://www.tamuc.edu/communityOutreach/planetarium/default.aspx> for a current listing of shows. If you attend a show, tell the staff that you are a member of this class. They will make a note that you attended. Then email me two paragraphs: one summarizing the show, and a second telling me something specific about the show that you found interesting and why. If and only if you complete both of these steps, you will get extra credit toward your lab grade.

If you are not near Commerce or cannot make it to these opportunities, you can visit a science-themed museum and send me a copy of your ticket stub and a short paragraph describing an interesting exhibit you saw at the museum.

Extra Credit Terms, Conditions, and Caveats: You may only earn extra credit once, though you are welcome to attend as many of the observatory and planetarium events as you like. All extra credit work must be turned in on or before the last day of class. Family of any age is welcome to the planetarium shows; be sure to check on the age-appropriateness of shows (all

are fine for all audiences, but some are aimed at children and some at adults). Credit is up to 2% toward your course grade.

Grading

Grading will be done on an absolute scale with no competition. If you all earn an A, you all get an A. I may “curve” grades for specific assignments at my discretion, but your percentage earned will never go down if I apply such a curve. Your current grades will be available through the gradebook on eCollege. Note that the gradebook on SmartWork is not official.

Beyond the extra credit described on the previous page, no extra credit opportunities are available.

Grading is weighted by assignment using the following weights:

Discussions	15%
Reading Quizzes	10%
Homework Assignments	30%
Exams	30% (10% each)
Activities	15%

The grading scale is:

90% to 100%	A
80% to 89.9%	B
70% to 79.9%	C
60% to 69.9%	D
Below 60%	F

TECHNOLOGY YOU WILL NEED

This course is a fully online course. You need to be comfortable with basic computing skills and web browsing, and to be able to learn to use the various tools on eCollege even if you are not familiar with them yet.

You will need the following technologies and software to be successful in this course:

- Internet access/connection – high speed recommended (not dial-up).
- A computer or laptop on which you have permission to install software for one of the following operating systems: Windows, Mac OSX, or Linux.
- Headset and/or microphone
- Access to a scanner or other way of making digital copies of handwritten materials.
 - I prefer PDF files to JPGs, but that is not required
 - Be sure that I can easily read your work by looking at the PDF or images before uploading them. I’m getting older and my eyes are not what they once were. Please take pity on me.
- Word processor
 - I can see the following types of files:
 - MS Word .doc/.docx
 - Apple Pages
 - Plain ASCII text

- If you have another type of word processor, you will need to save your output as a plain text file or PDF. Feel free to send me a test file to make sure I can read it.
- Stellarium – a free planetarium program available for PC, Mac, and Linux at www.stellarium.org
- Software to read PDF files (such as Acroread or Preview)
- SmartWork – the web-based astronomy homework system at smartwork.wwnorton.com. See *What You Absolutely Need* for details on how to purchase a subscription.

Additionally, the following hardware and software are necessary to use eCollege:

- Our campus is optimized to work in a Microsoft Windows environment. This means our courses work best if you are using a Windows operating system (XP or newer) and Internet Explorer (6.0, 7.0 and 9.0).
- eCollege claims to support Mac OS X and iPads (iOS 5.1 or later with some features disabled), as well as the Safari browser (on Macs) and Firefox and Chrome on Windows machines. Be advised that there are often problems, especially after a software update.
- I strongly recommend that you check that your computer and browser are compatible with eCollege by performing a “Browser Test” prior to the start of your course. To launch a browser test, login in to eCollege, click on the ‘myCourses’ tab, and then select the “Browser Test” link under Support Services.

HOW TO GET STARTED

SmartWork and eCollege Access Information

Homework and Reading Quizzes must be completed using SmartWork, smartwork.wwnorton.com. You are required to purchase a subscription to this site; it comes included with the textbook bundle available through the bookstore, or it can be purchased separately. Our Enrollment Key in SmartWork is **TAMUCSu2015**. SmartWork has support available at: books.wwnorton.com/books/buysmartwork

This course will be facilitated using eCollege, the Learning Management System used by Texas A&M University - Commerce. To access these materials, go to: <https://leo.tamuc.edu/Login.aspx>. You will need your CWID and password to log in. If you do not know your CWID or have forgotten your password, contact Technology Services at 903-468-6000 or helpdesk@tamuc.edu.

How This Course Is Organized

This course will be organized by units. Most units will last just a day or two, with two or three units a week. Some units cover one chapter in the text, some cover multiple chapters. You should check the course page often to see what activities and assignments are due and when.

What Should You Do First?

After reading this syllabus, you should proceed to the course page on eCollege and complete the activities and assignments listed under Unit 1. Due dates are specified on eCollege.

How Should You Proceed For Each Unit?

1. All activities and assignments for a unit will be listed on the unit’s main page on eCollege. The unit home pages are found in the left navigation bar of eCollege.
2. You should skim any reading assignments first.

3. Listen to any online minilectures listed within the unit and complete the associated response questions.
4. Re-read the reading assignments in more detail.
5. Complete the reading quiz for the unit on SmartWork.
6. Complete any other listed activities and assignments given in the unit.
7. If there is an activity under the unit, be sure to complete it by the deadline.
8. Even after completing the unit, you may want to check for any new content (such as new minilectures or external links) that I may post in order to clear up any confusing topics.
9. No new assignments will be posted in a unit once the unit opens.

HELP!!!!

Are you lost, confused, or worried?

First, **DON'T PANIC!**

Next, step back and try and pinpoint the source of your confusion:

- Have you read the textbook sections? If not, go read them! If you have, maybe you need to try a different reading method. Science textbooks are not like novels; they present information in a completely different method than most reading material, and there is no plot thread unfolding as you get further into a chapter. Here are some websites with suggestions on how to read science textbooks:
 - How to Read Effectively in the Sciences:
<http://academic.cuesta.edu/acasupp/AS/621.htm>
 - Reading Assignments in Science:
<http://www.studygs.net/science/readingtexts.htm>
 - The SQ4R Method for Reading: <http://scs.tamu.edu/?q=node/105>
- Have you watched the minilectures? These are designed to go over the main points where I think you might struggle with concepts.
- Do you just need some time away? Astronomy is too much to deal with all at once.
 - DO NOT try to do all the assignments in one sitting -- work on the assignment over a couple days and give your brain some time to absorb and mull over the information.
 - Except for the reading quizzes and exams, all activities are untimed. You can start your homework on SmartWork, go away a several hours days, and pick up where you left off, and not lose any points.
- Review the How To Get Started section above, and focus on how to be a successful student and how to proceed in each unit.
- If after all of this you are still confused or uncertain, it's time to seek help. Don't wait until the exam! Here you have many options:
 - Talk to your classmates! Use the student lounge or email to solicit help.
 - Attend my office hours (see next section). You can come to real or virtual hours, or make an appointment with me if none of those times work.
 - If you are still stuck, contact the Academic Success Center to search for other options that may help you.
<http://www.tamuc.edu/studentLife/campusServices/academicSuccessCenter/>

Are you experiencing technical difficulties?

If your problems are with eCollege:

Texas A&M University-Commerce provides students technical support in the use of eCollege. The student help desk may be reached by the following means 24 hours a day, seven days a week.

- **Chat Support:** Click on 'Live Support' on the tool bar within your course to chat with an eCollege Representative.
- **Phone:** 1-866-656-5511 (Toll Free) to speak with eCollege Technical Support Representative.
- **Email:** helpdesk@online.tamuc.org to initiate a support request with eCollege Technical Support Representative.
- **Help:** Click on the 'Help' button on the toolbar for information regarding working with eCollege (i.e. How to submit to dropbox, How to post to discussions etc...)
- **Please don't contact me** for eCollege problems. I'll just tell you to take the above steps.

If your problems are with SmartWork:

- If you are having trouble joining the class, see the "Joining SmartWork" link in the eCollege menu bar and the links on that page.
 - The most common problems are that you are confusing your registration code, which comes with your book or your online purchase, and the enrollment key, which is listed under How To Get Started above.
- If you are having other problems, go to the SmartWork student support page at <http://books.wwnorton.com/books/buysmartwork>.

HOW TO CONTACT ME AND STAY CONNECTED

Interaction with Instructor

Email: I can be reached by email at Kurtis.Williams@tamuc.edu. Please put "Astro Online" in your email subject header. It may take me up to 24 hours to send you a response (48 hours on the weekend or holidays). If you don't hear back from me in that time, please send another email or give me a call. I assume you check your campus email daily, so if I send out a class email, I'll assume you read it.

Virtual Office: Virtual Office is a link in the left menu bar of eCollege that allows you to start discussion threads with me. Note that these threads are not necessarily private. It may take me up to 24 hours to reply (48 hours on the weekend or holidays). Again, bug me after that time if you don't hear anything.

Adobe Connect and Class Live Pro: These are two tools that we will use for virtual office hours. Participation is optional, and instructions will be provided. Dates and times will be announced in advance and may vary depend on my schedule and course due dates. I will try to have live sessions at least once each week and before each exam.

Texts, Automated Emails and Twitter: I have set up an SMS (text and/or email) account for brief messages (like reminders of due dates, updates on class events, and things I find that are cool). Your use of these is completely optional; no critical information will be given out on SMS without an eCollege announcement also being made.

To register for text (SMS) updates, text “@astronline” (without quotes) to 81010. The service is free, but any standard messaging fees charged by your mobile provider will apply. To get automated email copies of any texts (like if you don’t have texting or don’t want to pay for it), send a blank email to: astronline@mail.remind.com. The service is also private: nobody (including myself) will see your phone number or email, and only I can send messages.

Office Hours: Office hours are available in both real-world and virtual formats. Office hours are times that I set aside when I promise to be in my office so that you can come by and talk to me. During real-world office hours, you can ask questions about the course material, ask about homework, see your current grade, or ask other questions about the class or astronomy in general. During virtual office hours, I will have a preset list of topics and you’ll be free to ask questions when we get to that time.

It’s important to realize that office hours are *not* just for students who are having problems in the course. If you are uncertain about anything, please visit, email, phone or drop into virtual hours before your small problems grow into big ones. If you are worried about what might be on the test, stop in. If you are curious about astronomy jobs and research opportunities, come by.

Office hours work best if you have your textbooks, class notes, and homework sets with you.

If you want to talk but cannot come during office hours, please contact me by email in order to set up an individual appointment. By setting an appointment, you both guarantee that I will be in my office (or online) and that I will have plenty of time to talk with you. You may feel free to stop by my office any time my door is open, but if you do not have an appointment and if it is not my scheduled office hours, please understand if I’m not free to talk at that instant.

Facebook: Please don’t try to friend me on Facebook. I prefer not to spam you with cat videos, and you won’t have to worry about me trolling you.

Netiquette

I expect all students to behave to basic standards of etiquette on the web (and in real life). Abusive or inappropriate comments will be removed and earn a reprimand; any additional lapses could result in disciplinary action. For a simple guide to netiquette, see <http://www.albion.com/netiquette/corerules.html>

RULES, RULES, RULES (UNIVERSITY POLICIES)

Academic integrity

A major goal of this and most every university course is for you to learn and appreciate subject material. Academic dishonesty (“cheating”) actively prevents you from achieving this goal. Academic dishonesty is taken seriously by the University and by me, and ***will not be tolerated***. (See the TAMU-C Code of Student Conduct and the TAMU-C Procedures A 13.04, 13.12, 13.31, and 13.32.)

This conduct is not only considered wrong in this course and at this University, but also in the real world. Engaging in these activities will get you fired from a job and prevent you from getting another job.

Unethical student conduct includes:

- **Plagiarism**, or copying the words of others with the intent of making it look like your own. Whether you use someone else’s phrase word for word, or whether you try and

change a few words, or even if you just borrow someone else's original idea and don't give them credit, that's unethical. Use your own words whenever possible, give credit to wherever you got an idea, and put direct quotes inside quotation marks.

- **Cheating** involves trying to trick me or others into thinking you did work that you really didn't do, or into thinking you know what you really don't know. This can include stealing exams, changing your answers on a graded exam or assignment and claiming it was graded wrongly, putting your name on someone else's homework, and so on.
 - **Searching the Internet for homework solutions and cutting/pasting the text you find is considered cheating.** Searching the Internet for help on a topic is okay. For example, suppose a question asks "Describe the life cycle of a star that has the same mass as the sun." Typing that phrase into Google and cutting and pasting the text in the answer box is considered cheating. Typing "star life cycles" into Google, reading a few web pages, and summarizing the information in your own words is not cheating.
 - Borrowing a previous student's homework, exams, or solution sets is considered cheating. "Borrowing" includes looking at someone's submitted homework, screen shots, stealing returned homeworks, and so on.
- **Collusion** is working with another person to cheat. This can include copying someone else's answers to an exam or assignment, doing work for another student, buying or otherwise obtaining homework/exam solutions from any source online or off-line, or any other instance of multiple people engaging in some form of cheating or dishonesty. Working with other students on an assignment is fine as long as everyone contributes and each student does their own work.
- **Any other activity that, to a reasonable person, looks wrong.** If you have any doubt whatsoever whether a certain action is considered dishonest, please ask me *before* engaging in the activity. There is no need to be embarrassed about asking, and I won't penalize you for asking! In this class, if you follow the maxim "it's easier to beg forgiveness than to ask permission", don't expect forgiveness to be forthcoming.

If you engage in academic dishonesty during any graded activity, you will receive no credit for that activity. More than one instance of dishonesty by a student will result in automatic failure of the course and referral of the student for disciplinary action.

For further information, search the Texas A&M-Commerce website for "academic integrity policy".

SmartWork and eCollege provide me with tools that check for common forms of online cheating and collusion. These include, but aren't limited to: time stamps, location stamps, and automated comparison of essay answers. I will use these tools.

Examination Policy

- For the online exams you may use whatever static materials you like, including your text, homework solutions, internet searches (as long as you do not cut-and-paste), etc. But see the next point...
- You must work on the exam alone – you may not discuss the exam with other students prior to the due date, you may not use any sort of communication like email, Skype, texting, ChaCha, talking, writing, semaphore, etc., etc., etc. to communicate with any other human during or after the exam.
- When an exam is assigned, you will have one week to complete the exam.
- The exams are *timed* and *may only be taken once*, so you will want to study the material well before taking the exam.

“Attendance” Policy

While this class will have no required synchronous (live online) meetings, you will be required to participate in online discussions. As such, you should be active in the class daily (particularly Monday – Thursday). If life happens and you will be unable to log on for an extended period of time, please contact me in advance to discuss options.

Assignment Policy and Due Dates

All assignments are posted on eCollege. Assignments and due dates will be posted in the main page for each unit. Submission requirements for each assignment will also be given on that page.

Late Work

Late assignments are penalized 10% for each day late (including weekends). Late exams will receive a zero.

Dropping The Course

A student may drop this course by logging into their myLEO account and clicking on the hyperlink labeled 'Drop a class' from among the choices found under the myLEO section of the Web page.

Incompletes

I only offer incompletes in extraordinary circumstances. Any student interested in an incomplete should contact me as soon as possible after the situation arises, and should keep in mind that I am not required to give you an incomplete and so may not offer you the opportunity. You should also know that you only have access to an eCollege course for two weeks following the final day of term.

Administrative Withdrawl

Although I have the right to drop you for excessive absences, I won't do so. You have a right to get an F if you decide to quit working but don't withdraw.

University Specific Procedures

ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library
Room 132**

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

COURSE OUTLINE / CALENDAR

The course will cover many of the topics outlined below. The dates below may change (never earlier, but possibly later) so pay attention to announcements on eCollege for final due dates.

1st Block: Tools of the Astronomer

- Unit 1: Introductions (Jul 13; work due Jul 16)
- Unit 2: The Scientific Method & Astronomy (Jul 14; work due Jul 20)
- Unit 3: Radiation (Jul 15; work due Jul 20)
- Unit 4: Spectroscopy (Jul 20; work due Jul 23)
- Unit 5: Telescopes (Jul 21; work due Jul 23)
- **Exam 1: Jul 23-26**

2nd Block: Stars

- Unit 6: The Sun (Jul 27; work due Jul 29)
- Unit 7: Properties of Stars (Jul 28; work due Jul 31)
- Unit 8: Stellar Evolution (Jul 30; work due Aug 2)
- Unit 9: Star Death (Aug 3; work due Aug 5)
- **Exam 2: Aug 5-7**

3rd Block: Galaxies and the Universe

- Unit 10: The Milky Way and its Neighbors (Aug 6; work due Aug 9)
- Unit 11: Cosmology (Aug 10; work due Aug 12)
- Unit 12: The Big Bang (Aug 11; Work due Aug 13)
- **Exam 3: Aug 13-14**

Observatory Visits:

- TBA