COURSE INFORMATION

COURSE TITLE
AST102 - Astronomy II: GT-SC1

COURSE DESCRIPTION
Emphasizes the structure and life cycle of the stars, the sun, galaxies, and the universe as a whole, including cosmology and relativity. Incorporates laboratory experience.

This course is one of the Statewide Guaranteed Transfer courses. GT-SC1

- gtPathways Requirement Course Information Page

CREDIT HOURS
4 credits. (3 credits - text and course learning materials; 1 credit - laboratory).

SUGGESTED PREREQUISITE KNOWLEDGE

- See your home college for information on specific pre- and co-requisites. We strongly recommend that you have college level math, reading, writing, and study skills before enrolling in this course.

- Proficiency in basic computer skills (i.e. keyboarding, e-mail, and WWW skills) is highly recommended in order to effectively participate in the course.

CCCONLINE COURSE POLICIES

The CCCOnline Course Policies page contains information about the student's role in the classroom, grading policies, and rights and responsibilities.
COURSE MATERIALS

Your textbook is available online as an eText. You do not need to purchase any additional materials. For specific information on refund policies and the optional black and white textbook available for purchase please contact the CCCOnline bookstore.

MINIMUM COMPUTER REQUIREMENTS

To complete this course, you will need regular access to a computer from which you can get to the Internet and use email. In order to ensure that your course functions properly, you must run the System Check. This is a CRITICAL STEP, and taking the time to do it now will eliminate a tremendous amount of frustration for you later. To run the System Check, click Tools in the course NavBar and then click System Check.

REQUIRED eTEXT


DIGITAL MATERIALS ACCESS AND SETUP

This course uses MyLabsPlus (MLP) which contains the eText in addition to interactive media content to help you remember what you learn.

- Visit the Pearson MyLabsPlus Course Start page for details on first access of the materials.

To make sure your computer is set up correctly to access the eText and other digital content, review the Pearson Technical Support page, also linked in the Technical Support Module.

LAB KIT

You do not need to purchase a lab kit for this course. All the materials needed should be found easily around your home or purchased very cheaply.

ADDITIONAL MATERIALS THE STUDENT MUST PROVIDE:

- Either a scanner or a camera/cell phone to photograph specific documents you will be required to insert/attach to specific assignments. Photos submitted for assignments will be required to be .jpg, .tif or .bmp format. Please note that the scanner should only be used to scan your drawings. All lab reports need to be typed and submitted as text-based documents.

- Access to a printer to print out observations sheets. Labs that you will need to access a printer for are:
  1. The Spectroscopy Lab (Module 1) (nice but not totally necessary)
  2. The HR-Diagram Lab (Module 2)
• The Sun & Sunspots Lab (Module 2)
• The Stellar Evolution Lab (Module 2) (or drawing software)
• The X-Ray Spectroscopy of Supernova Remnants (SNR's) (Module 2)
• The Milky Way Galaxy Lab (Module 3)
• The Galaxies and the Expanding Universe Lab (Module 4)
• Midterm Project

• Some labs might require general household items like a round object (ball, globe), string, tacks/pins, colored pencils, graph paper, a ruler, etc.
  • A protractor, if you don't have one on hand: Protractor
  • Calculator: Web 2.0
  • Printable graph paper: Free Graph Paper

**PHOTO AND CAMERA REQUIREMENTS**

This course requires access to a digital camera (cell phones cameras are acceptable). Students will be required to submit photos as part of specified assignments within this course. Photos submitted for assignments will be required to be .jpg, .tif or .bmp format. Assignments without required photos and proper formatting may result in a zero grade.

**OFFICE 365**

You have access to and can download a free version of the Microsoft Office suite through 365. It will be vital that you submit the correct type of files to the Assignment folders in this course. Please reference these instructions.

**PLUG-INS AND EXTRAS**

• Adobe Flash
• Adobe Reader
• QuickTime
COURSE COMPETENCIES AND OUTCOMES

STUDENT COMPETENCIES

The competencies you will demonstrate in this course are as follows:

A. Recognize the distinctions between science, pseudoscience and non-science
B. Describe the scientific method in detail
C. Collect, organize, interpret and present data in a systematic manner, using charts, graphs, tables
D. Analyze scientific data evidence and sources to support a theory/data critically
E. Set up and solve problems using geometry, algebra, trigonometry and the metric system as required
F. Describe the physical scale and timescale of the universe
G. Apply the physics of gravity and motion as they apply to astronomy
H. Discuss the basic properties of light and its uses in astronomy and cosmology
I. Identify objects and classify types of objects visible in the night sky
J. Relate principles from relativity and quantum mechanics to topics from astronomy and cosmology
K. Summarize stellar life cycles for different mass stars
L. Classify galaxies and explain current theories of galaxy formation and evolution
M. Outline the origin, evolution and fate of the Universe as described by current theories in cosmology
N. Describe how the expansion of the universe was discovered and what it tells us about the past and future
O. Explain the significance of Hubble's Law in modern cosmology
P. Demonstrate understanding of the basic ideas of the Big Bang and inflation
Q. List and explain the evidence of the Big Bang, including the cosmic microwave background, expansion of the universe and Big Bang nucleosynthesis
R. Assess the evidence for dark matter and dark energy and explain their importance to the structure and fate of the universe

The module outcomes that will permit you to demonstrate course competencies are:
### Module 1

**Outcomes**

1. Estimate a rough approximation of the scale of the universe in both space and time  
   **Competencies**: A, F, J
2. Describe the motion of the astronomical bodies and explain how those motions appear from a specific point of view on Earth  
   **Competencies**: F, N
3. Outline and employ the steps of the Scientific Method and describe the effects of Plagiarism  
   **Competencies**: A, B
4. Distinguish what can be found on the Celestial Sphere and relate that to motions of the sky  
   **Competencies**: I
   **Competencies**: B, C, D, E, G
6. Identify the basic properties of light, properties of matter, learning from light and Spectroscopy  
   **Competencies**: E, H, I
7. Research and be able to describe the basic ideas of spacetime & special relativity, gravity and general relativity  
   **Competencies**: D, E, J, M
8. Research and be able to describe the basic ideas of of quantum mechanics  
   **Competencies**: D, E, J

### Module 2

**Outcomes**

1. Describe the structure of the Sun, nuclear fusion in the Sun, & the interactions of the Sun with the Earth  
   **Competencies**: C, D, E, H
2. Compare and contrast the properties of stars and identify patterns of stars revealed by the Hertzsprung-Russell (HR) Diagram  
   **Competencies**: C, H, I, K
3. Identify the stages of star formation for stars of various masses  
   **Competencies**: G, H, K
4. Describe how the death of a star varies based on initial mass of the star: white dwarfs, neutron stars, and black holes  
   **Competencies**: C, D, K, J

### Module 3

**Outcomes**

1. Describe the structure, composition, and history of the Milky Way galaxy  
   **Competencies**: C, D, L
2. Identify the different types and properties of galaxies, what techniques are used when measuring the distances to galaxies, and the techniques used in determining the age of the Universe  
   **Competencies**: C, D, M, M, N, O, R
3. Describe how galaxies form and evolve

### Module 4

**Outcomes**

1. Describe Hubble's law, including its significance and implications for the age and evolution of the universe  
   **Competencies**: N, O
2. Describe dark matter and dark energy and give the evidence for its existence  
   **Competencies**: R, Q
3. Discuss the possible fate of the universe  
   **Competencies**: N, R
4. Explain the proof of the Big Bang, including cosmic microwave background radiation; include its characteristics, what it is, where it came from, what it means  
   **Competencies**: Q
GRADING AND EVALUATION

METHODS
Evaluation includes a combination of discussion participation, assignments, and other evaluations. Rubrics are provided for assignments and discussions.

GRADING POLICIES
Mark all Module due dates on your calendar for this class. You may submit assignments AHEAD of schedule. Late assignments will not be accepted without prior approval.

No late work is accepted in this course (except in the case of documented extreme personal emergencies, e.g. a Doctor’s note, hospital papers, etc.). All military students need to contact your instructor well before any absences/deployments are known about. Due dates will be enforced.

- Due dates are outlined in your Schedule.
- If you have a technical problem of any kind ...your server goes down, your computer melts, etc. or if your online course gets bogged down (this happens very infrequently and only for a few hours at a time), you are still responsible for the work.
- Get your work done on time and well before the deadline.
- Plan ahead. Discussion postings are time-sensitive within each module and cannot be made up.
- Quizzes, Homework and Labs will only be available during the assigned times as specified in the Schedule.
- Do not attempt to send labs through the D2L e-mail as attachments as they are larger than the E-mail capacity.

PLAGIARISM
Plagiarism is the act of using words and/or ideas from another person or source without acknowledgment or attribution of that person or source. Plagiarism, cheating, or helping someone else violate reasonable standards of academic behavior will not be tolerated.

- The instructor may, in any such instances, render a failing grade (zero) for any plagiarized assignment on the first offense and an F for the entire course on the second offense.
- ALL work submitted by a student should be in their own words. This includes Discussion Posts, Lab reports and Quiz answers.
• Any quotes or information used from an outside source must be clearly referenced. Self-plagiarism also falls under this category. Work from a previous semester may not be used. Your instructor has the expectation that all work completed will be unique to the current semester.

• You may confer with other students about the labs or other assignments in this course, but all work submitted must be your own and unique. If you do work with a classmate on an assignment please alert your instructor before turning in your work.

See Course Success Without Plagiarism in the Syllabus Module for more information.

SUMMARY OF GRADING

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Discussions (15 @ 13 points each)</td>
<td>195</td>
<td>19%</td>
</tr>
<tr>
<td>Homework (Intro to Mastering Astronomy and Chapters assignments)</td>
<td>106</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes (16 @ 13 points each)</td>
<td>208</td>
<td>20%</td>
</tr>
<tr>
<td>Lab Reports (10 @30)</td>
<td>300</td>
<td>29%</td>
</tr>
<tr>
<td>Midterm Project (100 points) and Final Project (125 points)</td>
<td>225</td>
<td>22%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1034</td>
<td>100%</td>
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Grading Scale

A = 90 to 100%   B = 80 to 89%   C = 70 to 79%   D = 60 to 69%   F = 59% and below

FINAL GRADES

Final grades will be determined by the number of points you earn divided by the total number of points available x 100, as a percent.

For example:

If your total points are 873, your final grade will be determined from 873/1034 x 100 = 84.4%, which will result in a "B" in this course.

• In order to receive an A in this course, your score needs to be 925.5 or higher.

• The grades are final and non-negotiable. They are a measure of your own aptitude and effort. It is expected for you to accept your own performance as an integral part of yourself.

DISCUSSIONS

GENERAL INFORMATION

Due dates for each Discussion Topic is posted in the Course Schedule. Please note that the due dates will not correspond to the open/close dates you see in the Topic. This is due to the student needing time to complete the activity. Expect to check the discussion Topic throughout that time period in order to check for posts posed to you or additional required instructor posts.
The discussion area is our classroom and your means of participating in the classroom interaction. In this course, there will be at least one graded discussion topic per chapter covered allowing you to research, ponder and write/debate about with your classmates and instructor. References to relevant outside sources or real life that relate to the discussion questions may be included in your discussions. You will be graded on your participation in this Discussion. Unlike Exams, Labs and MLP Assignments which you may wait until the deadline to submit, these discussions are not a self-paced activity. These discussions do not work if you are only posting a summary or initial response and not interacting with your classmates and myself. They also do not work if you are posting late in the discussion period (see below). Imagine going to a debate/discussion meeting after everyone has left and you are trying to deliver a speech to and get an interaction from an empty room.

Student evaluations of CCCOnline courses reflect the importance of the discussion area to successful online classes. Students tell us "I felt that the class discussions were interesting"; "kept all the students engaged"; and "I really liked the interaction between the people in the discussions. I thought that each person's input really helped give a broad perspective of the subject and helped me learn." Current research in online education has arrived at a similar conclusion. From Quality in Distance Education: Focus on Online Learning by Katrina Meyer: "Quality learning is largely the result of ample interaction with the faculty, other students, and content" (page vii). (Quality in Distance Education - Focus On Online Learning- ASHE Higher Education Report Volume 29, Number 4 (02) by Meyer, Katrina A [Paperback (2002)])

**HOW YOU WILL BE GRADED**

Points earned will be based on the Discussion Rubric found under the Syllabus Module. The Student Introductory topic will not be graded. NOTE: All of the types of posts listed below are equally important. Make sure you are contributing to the discussion in all aspects listed below or points will be lost.

**POSTING TO YOUR COURSE DISCUSSION TOPICS**

**YOUR FIRST POST IN A TOPIC:**

When a topic opens, plan to write 150 words minimum in your initial required post (called your "First Post"). Make sure to read and follow the instructions for each topic carefully. You may write about something from the reading material, a relevant experience, or other appropriate topics that add to the knowledge of the class. This first post must also include a minimum of one reference cited, even if it is only your textbook. Also, if you use outside material to help you formulate any of your posts, you must cite that source. In addition, any facts or quotations obtained from any other source should be referenced and cited properly. If you get your material from a webpage please provide it as a hyperlink so that the site may be directly accessed along with your citation. [APA Reference Guide](#)

**YOUR POSTS TO CLASSMATES AND INSTRUCTOR:**

You are also expected to post to a minimum of 2 other students' First Posts (called your "Response Posts"). A first response discussion posting by you on the response due date will not be counted. This means that you should post at least one Response posts BEFORE the due date stated in the course Schedule. These posts should always be substantive and meaningful posts, for which you will be graded on. "I agree" or "I really liked your post" is not a meaningful response; explain WHY you agree or disagree, for example and perhaps add some additional information (always making sure to cite any information taken from another source), or ask a direct question along with your general comments. Encouragement of others is a good thing, but don't make that your only input to the discussion. As stated above, if you use outside material to help you formulate your post it must be referenced by using a hotlink, otherwise, a reference is not needed for response posts.

There will be times when your instructor posts additional questions/information for the entire class during the Topic period. When this happens you will be notified by the Subject Line and possibly by email. Part of your response points will go toward answering these additional posts.
ANSWERING YOUR OWN POSTS:

You will be graded on answering all substantial posts posed to you under your First Post up until noon the day before the Topic closes (called your "Reaction Posts"). As long as a post is more than a "pat on the back" (adding information, asking a question, etc.) please expect to respond to these. Although there isn't a stated deadline, 48 hours after a post is up is a good goal. This means, not waiting until the end of the Topic to respond.

HELPFUL ADVICE:

Since this is an asynchronous activity, everyone will be "on" at different times, although we will be on the same timeline. For maximum benefit, and to greatly enhance your learning experience, make your posts early to allow other students to read and respond. Check into the discussion area as often as possible to keep current with the discussions. You do not have to spend hours, but spend quality time for both you and the other members of the group.

See the document: Research, Writing & Instructor Feedback for helpful writing information.

MYLABS PLUS HOMEWORK

The MyLabsPlus (MLP) Homework assignments are generally open and available from the start of the semester but must be completed by the due date stated in the Schedule. The homework and eText, are found by clicking the MyLabsPlus link on the Course Home page under External Links. For the homework:

- The MyLabsPlus assignments should be done by the due date stated in the Schedule.
- You will only receive one attempt per question.
- While completing your homework you will not have access to the "Hints" until after the assignment is due. Even though you might have a message in the problem that says "see hints for help" (this is standard in the publisher's software).
- After the due date has passed you may go back and rework all the problems for practice. You will not have access to the assignment content between the completion and due date.
- Even if you have a paper textbook, it is highly recommended that you also go through the e-Text that covers the same chapter.
- Items that are assigned in MyLabsPlus count toward your course grade.
- Grades will transfer to D2L after a 48hr period.

LAB REPORTS (ASSIGNMENTS)

You will be performing labs using the instructions found within each Module under Content, Assignments/Labs. Review the Laboratory Instructions page in the Syllabus module for general information and helpful advice. Information on the due date for each report is provided in the Course Schedule.
• All Laboratory work will be submitted in the Assignment folder and will be checked by originality software.
  
  o Your typed assignment will not be graded unless an Originality report has been generated. (This excludes photos submitted as per lab instructions.)

Begin working on your laboratories early. Some may be lengthy and require extended effort or supplies that you need to gather.

**QUizzes**

Chapter Quizzes will be taken using the MyLabsPlus link on the Course Home Page. These will consist of Multiple Choice and True/False type questions. It is essential that you allow yourself one hour minimum before 11:59pm MT on the due date to complete every Chapter Quiz. Quizzes in general will last for 30 minutes, but may vary slightly in time.

Exam settings:

• All quizzes are timed and once you start you need to complete it in one sitting.
• All quizzes will be accessible 1 week before the due date.
• You will only receive one attempt per question.
• You will only see the correct answers after the due date has passed.
• After the due date has passed you may go back and rework all the problems for practice. You will not have access to the quiz content between completion and due dates.
• While completing the quiz you will not have access to the "Hints" until after the due date. Even though you might have a message in the problem that says "see hints for help"(this is standard in the publisher's software).
• **NOTE:** while completing quizzes, once you hit "submit" on your answer it cannot be changed. See this helpful information on skipping questions document.
• To be prepared, read the required chapters, go over the end of chapter material in your eText, go through the Tutorials in MyLabsPlus (which are non-graded and available throughout the semester).
• Grades will transfer to D2L after a 48hr period.

**Midterm & Final Projects (Assignments)**

You will have a Midterm project that will involve observing the moon in the night sky along with writing a short report. Your Final Project will be a research paper. These will both be submitted to the appropriate assignment folder, similar to your lab reports, and will be checked by originality checking software.

**Extra Credit**

There is no extra credit available in this course.
RESEARCH, WRITING & INSTRUCTOR FEEDBACK

The below information will help you with writing in discussion topics and your labs, along with how you can find your instructor feedback for items submitted to the assignment folder.

**TurnItIn**

TurnItIn is an automatic tool that is used on all of your lab assignment submissions. It allows each student to know that they are using and citing research appropriately, along with your instructor being able to give you feedback within your lab document. It also allows the instructor to see all material that has been used from another/outside source (internet or student submissions). Below are some tips on how to view your originality reports and instructor feedback in GradeMark on your assignment submissions.

Types of documents that can be read are: .doc, .docx, most .rtf, and .pdf as long as it is text based and not an image or scan

**Originality Reports:** After you submit your assignment, please allow time for your submission to go through the TurnItIn software, this may take one hour at the most (you may need to refresh your screen as well). From the Assignment tab click on the number you see under the Submissions column. On the Submission History page click on the icon that has a % and colored box under the TurnItIn Similarity column. The % tells you how much of your work is not unique. (Please note that quoted material along with lab questions will be included in this percentage because it has been used in another source, which will be taken into account and does not count against your grade.)

**Instructor Feedback (GradeMark):** Once a grade and feedback has been posted for your submission - go back to that assignment folder, click on the (speech bubble + “view”) icon under the Feedback column. On the View Feedback page click on the icon that has a % and colored box under the TurnItIn Similarity column and follow the instructions here. Click on the various comments in the submission to view your instructor’s feedback. When you are finished viewing the marked up document, close the window.

HELPFUL ADVICE FOR WRITING

Sometimes you may be asked to summarize scientific articles or other information. Please see the below links for when it comes to paraphrasing and writing your summary. Any form of plagiarizing may result in a zero score on the entire assignment and multiple infractions could lead to an F in the course. In any other post to your instructor or classmates, if you use outside material to help you formulate your response then you should cite that source. Otherwise, a reference is not needed for response posts.

- When to [quote or paraphrase](#)
- Writing advice
- Example of [paraphrasing](#)

Remember:

Any facts or quotations obtained from any other source should be referenced and cited properly according to APA guidelines. Here are some websites that will aid you in creating proper citations: [Guide to Using References in the Sciences](#) and [CCCOnline Library](#).

More citation examples at [Citing Your Sources Tutorial: APA Style](#)
**NOTE:** Wikipedia is NOT considered a primary or secondary source. If you find information in Wikipedia, locate the sources used by the author and pull information from them, if they are primary (original documents) or secondary (peer-reviewed publications) sources.

**LIBRARY AND CITATION HELP**

In any college-level course, it is essential that you properly reference and cite source material that you use to participate in Discussions, write lab reports, and so forth. The CCCOnline Astronomy Research Guide holds essential citation, research and other information you will need to complete your lab reports.

**ONLINE SOURCES**

People today commonly locate source material for their work on the Internet. It is vital that you use a reliable site to gather your information. In order to check this you may perform the CRAP test. If your site passes this test then make sure to gather all of the needed information that should be included in your citation along with including the exact URL, which points to the exact page you used to gather your information.
# Course Schedule

The Schedule is subject to change as needed.

This page summarizes all of the graded assignments, exams, and reading assignments for the course. If you want, you can print it out and post it somewhere handy.

All assignments are described in detail on the Module assignment pages. If you have questions check there and/or send me an e-mail.

This course is not self-paced and is not open-exit. All assignments, papers, quizzes, discussions, etc., are to be completed by no later than 11:59 pm MST/MDT of the due date. **PLEASE NOTE:** on most all of the assignments, you can work ahead BEFORE the due date stated below. This allows you to cater to your own personal Schedule. Please take advantage of this. Also be aware that this course will continue through any break you may have in your face2face courses and it is possible that a due date may fall on a holiday.

NOTE: Important CCCOnline semester dates (e.g., drop/withdraw/term end) appear on the CCCOnline calendar.

## Module 1

### Reading/Assignments/Exams

| Discussion: Student Introduction |  
| Discussion: The Scientific Method and Plagiarism (Initial Post) |  
| MLP: MA (Mastering Astronomy) Introduction | Due Dates  
| Discussion: Exploration of Astronomers (Initial Post) | end week 1  
| Discussion: The Scientific Method and Plagiarism (Response Posts) |  
| MLP: MA Chapter 1 & 4 Homework |  
| Discussion: Exploration of Astronomers (Response Post) |  
| MLP: MA Chapter 1 & 4 Quiz | end week 2  
| Discussion: Electromagnetic Spectrum (Initial Post) |  
| MLP: MA Chapter 5 Homework |  
| Assignment: Spectroscopy Lab |  
| Discussion: Electromagnetic Spectrum (Response Posts) |  
| MLP: MA Chapter 5 Quiz | end week 3  
| Begin working on Midterm Project |  
| Discussion: Space Missions and Programs (Initial Post) |  
| MLP: MA Chapter S2 & S3 Homework |  
| Assignment: Curvature of Space and Time Lab |  
| Discussion: Space Missions and Programs (Response Posts) |  
| MLP: MA Chapter S2 & S3 Quiz | end week 4  
| Discussion: Choose a Constellation (Initial Post) |  
| MLP: MA Chapter S4 Homework |  
| Assignment: Quantum Mechanics Lab |  
| Discussion: Choose a Constellation (Response Posts) |  
| MLP: MA Chapter S4 Quiz | end week 5  
| Begin working on Midterm Project |  

**Note:** Exact due dates for assignments and exams will be provided on the CCCOnline calendar.
MODULE 2

**Reading/Assignments/Exams**
- Continue working on Midterm Project
- Discussion: New Findings About our Sun (Initial Post)
- MLP: MA Chapter 14 Homework
- Assignment: Sun and Sunspots Lab
- Discussion: New Findings About our Sun (Response Posts)
- MLP: MA Chapter 14 Quiz
- Discussion: Stars and the HR Diagram (Initial Post)
- MLP: MA Chapter 15 Homework
- Assignment: HR Diagram Lab
- Discussion: Stars and the HR Diagram (Response Posts)
- MLP: MA Chapter 15 Quiz
- Discussion: Star Birth and Telescopes (Initial Post)
- MLP: MA Chapter 16 Homework
- Discussion: Star Birth and Telescopes (Response Posts)
- MLP: MA Chapter 16 Quiz
- Begin working on Part I of Final Project
- Discussion: Messier Objects (Initial Post)
- MLP: MA Chapter 17 Homework
- Assignment: X-ray Spectroscopy of Supernova Lab
- Discussion: Messier Objects (Response Posts)
- MLP: MA Chapter 17 Quiz
- Assignment: Part I of Final Project due
- Begin working on Part II of Final Project
- Discussion: Bad Astronomy (Initial Post)
- MLP: MA Chapter 18 Homework
- Assignment: Stellar Evolution Lab
- Discussion: Bad Astronomy (Response Posts)
- MLP: MA Chapter 18 Quiz
- Assignment: Midterm Project

**Due Dates**
- end week 6
- end week 7
- end week 8
- end week 9
- end week 10

MODULE 3

**Reading/Assignments/Exams**
- Discussion: Galaxy Stuff (Initial Post)
- MLP: MA Chapter 19 Homework
- Assignment: Milky Way Galaxy Lab
- Discussion: Galaxy Stuff (Response Post)
- MLP: MA Chapter 19 Quiz
- Assignment: Part II of Final Project due
- Begin working on Part III of Final Project
- Discussion: Hubble's Revolution (Initial Post)
- MLP: MA Chapter 20 Homework
- Assignment: Galaxy Classification Lab
- Discussion: Hubble's Revolution (Response Posts)
- MLP: MA Chapter 20 Quiz
- Discussion: Black Holes (Initial Post)
- MLP: MA Chapter 21 Homework
- Discussion: Black Holes (Response Posts)
- MLP: MA Chapter 21 Quiz

**Due Dates**
- end week 11
- end week 12
- end week 13
**MODULE 4**

**Reading/Assignments/Exams**

<table>
<thead>
<tr>
<th>Discussion: The Big Bang (Initial Post)</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLP: MA Chapter 22 Homework</td>
<td></td>
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<tr>
<td>Assignment: Galaxies and the Expanding Universe Lab</td>
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<tr>
<td>Discussion: The Big Bang (Response Post)</td>
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<tr>
<td>MLP: MA Chapter 22 Quiz</td>
<td>end week 14</td>
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<tr>
<td>Discussion: Dark Matter &amp; Energy (Initial Post)</td>
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<td>MLP: MA Chapter 23 Homework</td>
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<td>MLP: MA Chapter 23 Quiz</td>
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<tr>
<td>Discussion: Course Feedback</td>
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<tr>
<td>Assignment: Final Project Part III due</td>
<td>end week 15</td>
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