Syllabus for Astronomy 2010
Modern Astronomy
Spring 2024

Instructor: Dr. Glenn Tiede
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Email: gptiede@bgsu.edu (Allow at least one business day for a reply)
Office Hours: Drop-in: Drop by and see me at my office. If my door is open, and it usually is, you are welcome. If you drop by my office and I am not in, send me an email and we can coordinated a time to meet. (Afternoons after 3:30 pm are generally best.)

Materials Required for This Course
Text: *Pathways to Astronomy*, 6th Ed., By Schneider & Arny, ISBN 978-1-260-25806-6
Calculator: Any calculator with the ability to display scientific notation
Internet Connection: This is not an online course. Some information is provided on *Canvas* that you may find useful for the course, but no graded assignments are online.
Computer/Device: Since this is not an online course, no particular device is necessary to fully participate in this course.

Course Description
This semester we will start by discussing what the Universe looks like from our own backyard, and then will quickly move our discussion outside the Solar System and examine the origin and evolution of the stars, galaxies, and the Universe as a whole. While learning about these astronomical objects, we will discuss what science is and is not, the scientific process, and how astronomers have determined what we currently know about the Universe.

Course Objectives
There are three primary objectives of this course. First, and most obvious, students fully participating in this course will gain an understanding of the Universe (objects and processes) and our place within it (scale, in both space and time). Generally this is what you think you will learn when you enroll in an introductory astronomy course. However, unless you plan to become an astronomer or science educator, the second and third objectives are likely more important. The second objective is that students will gain an understanding of what science is (and is not) and how it is done (how we can *know* about things so much more vast than us in size and age). The third objective is that students will gain skill at rational, scientific thinking and understanding the scientific process.

Meeting the Schedule Requirements
The last page of this document presents the schedule for this course. Before the end of the first week of the course check this schedule against your schedule for the semester and be sure they are compatible. If you are a member of a sports team, military organization, performance group, or have any other co-curricular, extra curricular, or family commitments or obligations that preclude you from being available for exams or to regularly attend class, drop this course immediately and sign up for a course that is compatible with your schedule. Failure to complete exams or activities will result in a zero score without regard to other commitments or obligations you may have. Unforeseen military deployment, long term acute sickness, or family emergency are not previous commitments or obligations and will be dealt with on an individual basis if they occur.

Instructional Strategies / Educational Resources
This course will generally be taught in lecture format. To do well in the course you should do and take notes on the assigned readings before or after attending classes. You should attend every class meeting, practice active-listening and good note taking, and ask questions about material that is not made clear to you in class. If after reviewing/rewriting your notes you still have questions, you should seek out help from the professor, from the Learning Commons tutor, or from fellow students. Forming a study group for this course is an excellent learning strategy.

Approximately every 5 weeks you will take an exam (two midterm exams and one final exam) to demonstrate your mastery of the subject and earn the majority of the points upon which your grade will be determined.

If while doing the primary learning steps, including the Weekly Practice Questions, you have questions you would like answered or clarifications you would like made, you can:
- search the internet. Astronomy is a popular topic on the internet, but be careful to only use authoritative sites (NASA; universities; Wikipedia; main stream science media & magazines). Unfortunately, the current AI systems that are generally available are not authoritative because they base what they provide on non-authoritative sources. Therefore, do not depend on answers provided by AI unless you do follow-up investigations to check that what the AI has provided is true.
- contact the Learning Commons. The Learning Commons usually has an astronomy tutor. As of the writing of this syllabus details have not yet been announced, so if you are interested, call the Learning Commons at 419-372-2823 or check their web page https://www.bgsu.edu/learning-commons.html ,
- drop by the instructor's office (114 Overman Hall) and discuss,
- contact the instructor at the phone number or email address listed at the top of this syllabus,
- or, if you know other people taking this course you are welcome to work together on anything except the exams. Forming a study group for this course is an excellent study strategy.

Grading
Your final grade in this course is based on your performance on the following:

In Class Activities	35% of overall grade
2 Midterm Exams	35% of overall grade
Comprehensive Final Exam	30% of overall grade

Exams: The two midterm exams are not comprehensive and will only cover the topics that we have discussed in lecture between the previous exam (or the beginning of the class for the first exam) and the date they are given as listed below in the Schedule below. The final exam will cover material from the entire course. The dates of the exams are fixed, so be sure to attend class on these days. There are no make up exams after the date of the exam except in the case of an extreme emergency/event. If you are in a performance group, sports team, etc. that gives you a university excused absence, you may take the exam on the preceding Friday, at a mutually agreed upon time that is after the class meeting time. It is your responsibility to contact the instructor the week before the exam to make such arrangements.

If the exam dates and make-up Fridays do not fit in your schedule, then it is strongly suggested that you drop this course in the first week of the semester and select a course that will meet your schedule.

If you plan to take your exams at Accessibility Services or the Jerome Library Testing Center, get the paperwork to me as soon as possible and be sure to schedule your appointments during our normal exam time. See **Students with University Recognized Disabilities** below.

Activities: Some class meetings will have in class activities. These activities will provide a chance for you to assess your understanding of the material and to practice answering questions similar to what will be on the exams. Collectively, these activities contribute 35% to your final course grade – that's three and a half letter grades! so be sure to attend class and not miss these easy points. By their nature these activities can only be done in class. To receive the points for these activities, be sure to attend class regularly. If you miss a class, whether excused or not, there are no make-ups available for in class activities. However, your lowest three activity grades will automatically be dropped.

The University requires that all BGP courses provide a BGP Assessment beyond normal assignments or exams. This requirement will be fulfilled in this course by doing an online *Canvas Quiz*. This "quiz" will count the same as an activity with the exception that you will get a perfect score, "3 out of 3" if you simply complete the "quiz". This "quiz" will be assigned toward the end of the semester and has the added benefit that it will provide a good practice for the final exam. Details will be announced in class toward the end of the semester when they become relevant.

Stargaze: Stargaze is *not* a requirement of this course. It is simply for your enjoyment, if you think looking through a telescope and talking with students knowledgeable about astronomy sounds enjoyable. A separate handout details when the stargaze opportunities are offered and where to go for them. A stargaze involves coming to our observatory, on the roof of the Physical Sciences Laboratory Building (PSLB), and looking through the telescopes. Since winter weather can be extremely cold, and it is always colder and windier on the roof of PSLB than on the ground, stargaze opportunities don't begin until the week after Spring Break.

Since attending a stargaze requires being out-and-about at night, you are welcome to bring along a friend or relative.

If you enjoy your first visit, you are welcome to attend as many stargazes as you like.

"Extra Credit": I don't believe that college is the place for "busy work" assignments, therefore there is no extra credit work available in this course. The only way to get a good, or even a passing grade, is to do the regular assignments and exams. However, I know that some people have a tougher time taking exams than others, so 35% of your grade is based on assignments that do not depend on your test-taking ability. In effect the "extra credit" work is built into the course via the in class activities.

Canvas

Canvas will be used as a repository for handouts, class notes, and Weekly Practice Question (WPQ) activities and solutions. No graded assignments will be given via *Canvas*. The Weekly Practice Questions are given to provide an opportunity for you to test your understanding and practice exam questions before the exams. They are not to be turned in and will not be graded.

Grade Reporting (Intra-semester)
Grades will not be kept on *Canvas*. *Canvas* is incapable of maintaining and weighting grades as described above and *Canvas* is prone to errors and inexactitudes that tend to confused students. Therefore if you wish to know your grade during the semester, do one of the following:

1) Keep track of your individual grades on activities and returned exams and follow the procedure detailed below under **Calculating Your Grade Yourself**.

2) Your current overall grade will be calculated for you and reported along with the results of every midterm exam. Be sure to attend class and pick up every midterm exam to see your grade.

3) Email the professor at the address at the top of this document, state your full name as you have recorded it with the University registrar, state which course you are in, and ask for your current grade.

Grade Reporting (End of the Semester)
At the end of every semester I report final course grades to the University as soon as I have finished calculating them. Therefore, you can find your final grade for the course at MyBGSU → STUDENT CENTER. Just log in to MyBGSU as normal, click STUDENT CENTER, and follow the prompts to your grades. If your grade is not listed there, I have not calculated it yet.

Final course grades and final exam grades will *not* be posted to *Canvas*.

Calculating Your Grade Yourself
Grading for this course is purely objective as explained herein, so if you keep track of the scores you earn on activities and midterm exams, you can calculate your grade at any time. If you are computer savvy, you may even want to set up a spreadsheet to keep track of your grades and your current overall score.

I grade all of my introductory courses on the following scale:

$\geq$ 90%	A
80 – 89.5%	B
70 – 79.5%	C
60 – 69.5%	D
< 60%	F

Your overall percent score is calculated by multiplying the average percent score in each category by its weight as specified in the table under **Grading** above. So at any point you can calculate your current overall percent score using the following formula:

$$\text{Overall Score} = (\text{Act} \times 0.35 + \text{MtEx} \times 0.35) / 0.70$$

where:

Overall Score = your current overall percent score; letter grade read from above scale
Act = your average activity percent score after dropping the lowest 3.
MtEx = your average midterm exam percent score

As the end of the semester approaches, you may wish to know how a particular score on the final exam will affect your overall score for the course. If so, use this equation:

Overall Score = (Act × 0.35 + MtEx × 0.35 + Final × 0.30) / 1.00 (rounded as above)

where:

Overall Score, Act, and MtEx are as defined previously
Final is the (hypothetical) percent score you will earn on the final exam.

Require Materials

Text: A copy of the text, *Pathways to Astronomy*, 6th Ed., by Schneider & Arny, ISBN 978-1-260-25806-6 is required for this course. This is not just another boring old text, but one that is quite unusual in that it delivers information in very short units, generally 3-6 pages, and so is easy to use. The 6th edition is in its third year now, so used copies should be easy to find. Feel free to purchase or rent the text, or the electronic version, where ever you find the best price, but be sure to have it available to you by the end of the first week of classes. A copy has been placed on reserve in the Jerome Library, so you can access it there for free.

Calculator: A calculator capable of using scientific notation will be required for the exams, in class activities, and Weekly Practice Questions. Calculators capable of basic functions and scientific notation are available at Walmart and Meijer as well as online for less than $15. Any calculator that has "scientific" in its name and has an EE or EXP button for scientific notation should do. Some phones with a calculator function cannot do scientific notation, so don't plan on using your phone. Additionally, you are not permitted to use devices that connect to the internet during exams (for obvious reasons) so you will need a non-internet connecting calculator by the date of the first exam at the latest.

Internet Connection: This is not an online course, and therefore no graded assignments will be found online. However, handouts, class notes, and Weekly Practice Question (WPQ) and their solutions will be provided on *Canvas* for you to use as part of your study for this course. Therefore you should have regular access to broadband internet to take full advantage of this material. Using the computer labs on campus is an acceptable option.

Computer/Device: Since this is not an online course, no particular device is necessary to fully participate in this course.

You are welcome to bring a laptop to class and take notes or record the class for your own personal use. However, do not post any recordings or videos of the course to the internet. Doing so is a copyright violation and is illegal. It is also a violation of the Code of Student Conduct and will result in disciplinary action.

Students with University Recognized Disabilities

If you are a student with a University recognized disability and you plan to take your exams at Accessibility Services or the Jerome Library Testing Center, be sure to provide me with your paperwork before the first exam. It is your responsibility to make an appointment to take each exam with Accessibility Services or the Jerome Library Testing Center. This appointment must be at the same time as the in class exam or final exam. Come to the classroom on exam day and I will provide you with a copy of the exam in a sealed envelope that you can then take to Accessibility Services or the Testing Center at Jerome Library and take. Once you finish, the

proctor will seal the results in an envelope which you must return to me immediately (either in the classroom or in my office).

In many cases I am not able to provide the accommodations that Accessibility Services may say are necessary because I simply don't have them, or have not been trained in how to equitably perform them. In these cases Accessibility Services must provide them.

University Policy Statements

It is your responsibility to know the Codes of Conduct defined in the BGSU Student Handbook, the Code of Academic Conduct, and other official policy statements or handbooks the University may choose to issue. Ignorance of such knowledge is not grounds for immunity to such responsibilities.

You may miss up to three days of this course for reasons of faith, religious, or spiritual belief system or to participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization. You are required to notify the professor in writing of specific dates requested for excused absences and alternative accommodation no later than fourteen calendar days after the first day of instruction of this course. Any such request will remain confidential.)

This is an in person course (not an online course) and therefore you are required to regularly attend class in our University assigned classroom. This course is not recorded, and no online substitute will be offered in place of attending class.

Schedule for Astronomy 2010
Spring 2024

Week of	**Topics**	**Read Textbook Units**
Jan 8	Scale of the Cosmos; What is Science?; The Sky	1, 2, 3, 4.1
Jan 15	Atomic Structure & Light (no class on M 1/15 – MLK Day)	5.1, 5.2, 4.2, 21, 22
Jan 22	Light	23, 24, 25
Jan 29	The Sun	51, 53, 54
Feb 5	Observed Properties of Stars	55, 56, 59
	Exam 1 Monday, Feb 12	
Feb 12	Gravity and Binary Stars	4.3, 14, 15, 16, 18
Feb 19	Intrinsic Properties of Stars	17, 57, 61
Feb 26	Stellar Formation & Evolution	52, 62, 60, 63
March 4	(No Classes – Spring Break)	– –
March 11	Stellar Evolution	65, 66, 67
	Exam 2 Monday, March 18	
March 18	Final Stages of Stellar Evolution	68, 69
March 25	The Milky Way Galaxy	71, 74, 79
April 1	Other Galaxies; Structure of the Universe	76, 77, 75
April 8	Structure of the Universe (no class on M 4/8 – Total Solar Eclipse Day)	80, 81
April 17	The Big Bang Model	82, 83, 84

Final Exam 10:30 Course → Tuesday, April 23rd, 9:00 to 10:30 am
11:30 Course → Monday, April 22nd, 11:30 to 1:00 am