

PHYS 1051 Planetary Astronomy Fall 2021

Class Home page: <https://jpastro.net/AST1051/syll-ast1051.html> (this page!)

Department: **Physics and Astronomy**

Class time and place: MWF, 9:00-9:50 am, Meyer 113

Section: 1 (CRN=20764)

Instructor: **Dr. Jason Pinkney**

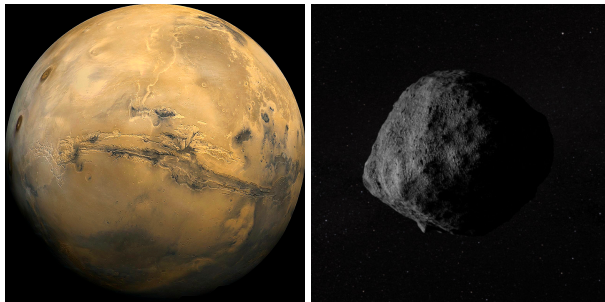
Office hours in 111 Science Annex at [these times](#): 10-noon on T, 2-4pm on W, 10-11am on R.

Email j-pinkney@onu.edu or call 419-772-2740.

Instructor's Home page: <https://jpastro.net/>

Credit hours: 3

Observatory Phone: 772-4028



NEW STUFF (Watch this spot for new links, solutions, etc.)

[This is a link about solving word problems in general.](#)

[Week 1 outline \(PDF\) \(Requires ONU Username & passwd.\)](#)

[All 4 Sky Maps. \(PDF\)](#)

Course Description:

Astronomy has so many subfields that it is impossible to cover them all in one semester. This course deals mainly with the solar system (hence "Planetary Astronomy"). Stars, galaxies and cosmology are covered in PHYS 1061. We begin historically with man's interpretation of the nighttime sky; the "naked eye universe" is that which we can see without a telescope. We then look in detail at the Sun and planets. Two natural categories of planets emerge: the terrestrials and the Jovians. We are now in a golden age of discovery with space missions like the Parker Solar Probe, InSight, and Perseverance in the news this year. Finally the comets, asteroids and Kuiper Belt Objects are small but important for understanding the early formation of the solar system. We now have data on over 3000 extrasolar planets (planets around other stars) which challenge our theories of solar system formation and evolution.

I have many goals for you in Planetary Astronomy. I want you to appreciate the way that learning facts about planets (their weather systems, surface features, etc.) allows us to better generalize about planetary processes, and thus improve our understanding of our own Earth. This is called "comparative planetology". Math has played a big role in the development of astronomy (and vice versa), so I would like to challenge you with a few problems every week. However, your math skills (or lack thereof) will not have much effect on your grade. I will make sure that you get a chance to study the sky directly, using the unaided eye and telescopes, at the [ONU Observatory](#). Try to "keep an eye on the sky" during this course. Please bring your astronomical questions and news items to class for brief discussions. A final goal is for you to see science as valuable and distinct from pseudo-sciences (like astrology) which are rejected by the scientific method.

Pre-requisites: None.

Text: [Astronomy Today, 9/E](#) (9th Edition) by Chaisson and McMillan. This 2017 edition has a "rent-only" ISBN-13 of 978-0134450278. This is what we have in the bookstore. Do NOT buy the Volume 1 or 2 versions ("The Solar System" and "Stars and Galaxies"). I don't require you to bring the text to class.

Lab: The lab for this class, PHYS 1081 (1 hr), is mainly intended for astronomy minors and physics majors with astronomy concentration. I may make exceptions for interested students. You may need instructor's approval to register so please contact me. If you are registered for the lab, expect an email during the first week for scheduling our meeting times.

The Astronomy Minor: You might consider being an [astronomy minor](#) if a good familiarity with astronomy would complement your current major. Consider entering an exciting field like astrobiology, astrochemistry, archaeoastronomy, cosmochemistry, science education, science illustration, or science journalism.

Observatory: Your visits to the [ONU Observatory](#) will weigh into the "Observing" portion of your grade (see below). You should try to visit at least 3 times for "A" work. There is a legal pad in the control room that you must sign for credit. I plan to be at the observatory for 1 hour on Friday nights (if < 50% cloudcover) so that I can help you fulfill your observing duties. Another time to visit is during meetings of the ONU Astronomy Club every other Wednesday night at 9 pm. I will resume "Public Events" (usually Friday nights) if/when the covid-19 surge declines. When you visit, bring along your **constellation sheets** (see below). I will help you get started on these. You can bring a friend (not necessarily enrolled in the class) for the long, dark walk to the Observatory. While there, follow these rules: 1) don't shine lights in other people's eyes, 2) keep lines spread out, and 3) don't push on the telescopes or touch their optics. I will try to display live views on the TVs to reduce the spread of germs/virus's, through eyepiece contact.

Week of	Topic	Chapter(s)	Tests	Celestial Events
8/23,25,27	Syllabus. Survey of Universe. Powers of 10.	1	Survey	Welcomefest (8/22)
8/30,9/1,3	Naked Eye Universe - the Celestial Sphere	1	quiz 1	Oppositions of Sat & Jup
9/6	LABOR DAY BREAK			
9/8,10	Daily, monthly, yearly cycles	1	quiz 1	
9/13,15,17	Moon and eclipses	1,2	quiz 2	
9/20,22,24	Copernican Revolution	2	quiz 3	Autumnal Equinox
9/27,29,10/1	Copernican Rev., Solar system physics	2	Exam I	
10/4,6,8	Light and spectroscopy	3,4	quiz 4	Draconids 10/7
10/11-12	FALL BREAK			
10/13,15	The Sun	16	quiz 5	
10/18,22,24	Solar System Overview	6	quiz 6	Orionid Meteors
10/25,27,29	Earth	7		Venus GEE
11/1,3,5	Moon, Mercury, Venus	8,9	Exam II	Taurid Meteors
11/8,10,12	Venus, Mars	9,10	quiz 7	Oppos. of Uranus (11/5)
11/15,17,19	Jovian planet atmospheres	11-13	quiz 8	Partial Lunar Eclipse 11/19
11/22-26	THANKSGIVING BREAK			
11/29,12/1,3	Jovian planet atmospheres / Moons	11-13		New Moon (12/4)
12/6,8,10	Jovian Moons and Rings	11-13		
12/13 (Mon)	Comprehensive FINAL at 9:15-11:15 AM, usual classroom.	—	Final exam.	Geminid meteors

Grading:

Component		Percent
Observing	Constellation sheets, 3+ visits to Observatory	5%
In-class	Homework, in-class worksheets, participation	20%
Quizzes	Quizzes (drop lowest grade)	25%
Exams	There will be two exams and a final.	50%

Your final letter grade is assigned roughly as follows:

< 55	55-70	70-80	80-90	90-100
F	D	C	B	A

I will not grade any "harder" than the above. However, if the class mean drops below about 75, I usually grade more leniently.

Other Course Policies

Moodle will only be used sparingly for this class unless we have to go online. Read how I will use Moodle in the Introduction Section [here](#).

Attendance is important for doing well in this course. Absence can directly lower your grade if you miss a quiz or in-class activity. Also, I record attendance on many days and then form a score out of your attendance which factors into the "In-class" part of your grade. Let me know in advance (e-mail is good) if you plan to miss for a **valid reason** (e.g. your team is on the road, you are sick, you have a family emergency). If you miss a quiz or exam because of an emergency, let me know as soon as possible, and provide proof of the emergency. "Proof" may consist of the name and phone number of some parent or authority figure who knows your situation. If you miss an in-class worksheet activity, you should get a copy of the worksheet but you won't receive credit for that work.

Homework will consist mainly of reading the textbook and writing answers to review questions from the textbook. Some math problems

will also be assigned from the textbook. Homework will receive 50% credit if turned in late. It will be scored on completeness and correctness, but not every problem will be checked. You can discuss homework with your classmates, but don't copy their work verbatim. After a warning, you'll be docked points. Look for keys posted after the homework is due.

Turning in Assignments. This semester I will resume accepting only hardcopies of homework (as opposed to scanning and uploading). These can be written out by hand if you can write neatly, but printouts of Word documents are preferred. Do not email the assignments to me without special permission. I'll usually bring a plastic bin for you to drop it into at the end of class.

Quizzes will be given on some non-exam weeks. They will consist of about 10 multiple choice or short answer questions. They cover the assigned reading and especially the material discussed in class. You can only make up a quiz that was missed because of an excused conflict or emergency. Also, you can only make up the quiz before the answers are revealed (usually the next class). For this reason, I will drop your lowest quiz score. Expect a total of 6-7 quizzes.

Exams will be given roughly every 4-5 weeks. These will weigh most heavily towards your class grade. The final exam will be comprehensive, but will emphasize the last 3-4 weeks of material.

Review Questions will be provided to help you prepare for *Quizzes* and *Exams*. They will appear under "NEW STUFF" on this web page. Many of these questions will appear on the *Quizzes* and *Exams* and so it is strongly recommended that you use them to prepare. More than half of the questions on a given test will be found in the review.

Observing consists of filling out **constellation sheets** and visiting the ONU Observatory. The "[constellation sheets](#)" include 2 maps for 2 dates during the semester (4 sheets total). Your job is to 1) write the names of the constellations within the constellation boundaries, and 2) Fill out this [Observing Form](#) on two different occasions in which you actually viewed the sky. #1 can be done on your laptop using a planetarium program. #2 must be done under open skies, but not necessarily at the ONU Observatory. Label all of the constellations on the maps, and the 6 brightest stars on each map. For full observing credit, you must visit the observatory at least 3 times. [Signing the log](#) at the observatory will get you the observing credit. The Observing Forms and constellation sheets are due on the last day of class.

Disruptions You should ask questions during class, and talk during group activities, otherwise you shouldn't talk while the professor is talking. Anything that distracts your teacher or your neighbors is hindering the teaching/learning process. This includes playing with your phones, laptops or tablets, talking with neighbors, coming to class late, and leaving class early.

Academic Misconduct In PHYS 1051 (this class), the biggest temptation will be to look at another person's work during tests. Spread out before tests. Do not wear caps during tests. Do not use phones or electronic devices to help you. A calculator (not a phone calculator) is acceptable if it isn't used to store information. The penalty for cheating is a zero score for the quiz or exam. See the link to the university code of conduct in the table below.

Calculators I encourage you to use a calculator in this class. A simple calculator will suffice.

Tutoring is available. You are welcome to drop by during my office hours, or you can make an appointment for another time. I will look for a previous astronomy student to provide tutoring. The physics department usually has tutors on Thursday evenings (TBA) in Science Annex 116.

ONU Health & Safety ONU wrote this [Safety Plan for 2021-2022](#) on 8/9/21. The key point is that all students must wear masks in class. During the delta surge, it is wise to wear a mask indoors even if vaccinated. We are not requiring social distancing, but it is still a good idea to be spread out in our seating. Let me know if you have to quarantine or isolate so that I can help you keep up with the class.

Other Mandatory Syllabus Information:

Disability services	Academic Honesty (Append. F, p. 100)	Title IX
Astronomy Links of all kinds	Pinkney's Homepage	The ONU Physics Homepage