

Fall 2018 Physics 101 Elementary Astronomy CRN 24307

Professor

Dr. Jared Workman

Class Location

WS 131

Class Hours

Section 001: Mon Wed Fri 11:00-11:50

Text Book

Cosmic Perspective, 8th Edition With Mastering Astronomy, Bennet et al.

Class Website

<http://org.coloradomesa.edu/~jworkman/teaching/fall19/101/index101.php>

If you ever forget the link to this site go to www.jaredworkman.com and scroll down to the “My Colorado Mesa University Webpage” link.

READ THIS – I will not respond to emails asking me for information which can found in this syllabus or on the course website. Such emails will be deleted immediately.

Welcome to Physics 101, Elementary Astronomy

This syllabus is your guide to class policies and procedures as well as a tool for planning. Each student is encouraged to work with the instructor and their peers. My own background is in theoretical/computational astrophysics which means I did my work on a computer and not in front of a telescope. My goal for this course is to introduce you to astronomy and much of the fascinating material it contains. We will take a tour through the history of astronomy, our skies, our solar system and planetary atmospheres, stars, galaxies, cosmology, and astrobiology. I am particularly fascinated by astrobiology. We are living in an era of unprecedented advances in astronomy driven by advances in observational techniques, computing power, and the great orbiting observatories. One thing you may not be aware of is that we have found close to 1000 planets orbiting other stars. As we speak there is an observatory trailing the earth in our orbit looking at 145,000 stars in the Cygnus constellation looking for potentially habitable planets.

This course will be mostly non-quantitative however there WILL be some math in the form of simple power laws and ratios. I want you to experience some of the wonder I do when my mind and eyes drift out into the night sky. I want this course to be fun for you so I am not going to give you particularly onerous homework assignments or exams but you will be doing a lot of reading. You need to keep up with the reading to pass this course.

If you have a topic you find particularly interesting come to me and I'll try to cover it. This course deals with huge stars dying and exploding, some of them outshining their host galaxies, others synthesizing every element heavier than iron. We will talk about black holes, the beginning of our universe, possible life in the universe, and much more. I only ask that you keep up with the reading and come along on an introductory journey into the universe beyond our little pale blue dot.

Course objectives

Learn (Topical Course Outline)

- The History of Astronomy

- How We Observe The Universe & The Nature Of Light
- A Bit of Physics, Gravity, Newton, Angular Momentum, & More
- The Day & Night Sky
- The Tides, The Seasons, Eclipses, & Phases of the Moon
- Our Solar System, Its Origins and Constituents and Planetary Atmospheres
- Stars - From Birth to Death and how we tell them apart and what their properties are
- The Cosmic Distance Ladder
- Galaxies - How they formed, what they are
- Cosmology and large scale structure
- Extrasolar Planets & The Possibility Of Life Elsewhere In Our Galaxy (Astrobiology)

Goal

The main objective of this course is to gain deeper understanding of the universe around us, its origins, fate, and constituents, and gain an understanding of the scientific method.

CMU Catalog Description

Introduction to astronomy. Survey of topics such as observational astronomy, the solar system, stellar astronomy, galaxies and cosmology. Emphasis on basic conceptual aspects of astronomy.

Minimal use of elementary mathematics such as basic arithmetic, fractions, square roots and powers. The course is designed for students in all majors.

What to look for in this syllabus

- How to contact me
- Course Structure
- Evaluation (grades)
- Mastering Astronomy & Homework
- Quizzes
- Final Exam
- Attendance
- Resources for student assistance
- Student Success at CMU
- Student Conduct
- Important Dates
- Course Learning Objectives
- Student Learning Objectives
- Work Load
- Guaranteed Transfer

How to Contact Your Instructor

Visit my office: WS 230C

Office Hours: mon/Wed/Fri 11:00-12:00, Thu 1:30-3:30

Leave me a message at: (970)-248-1327

Email me at: jworkman@coloradomesa.edu

Course Structure

This will be a reading, lecture, and online based course. I will post all assignments under the announcement section of my website. The entirety of your grade comes from the online component, it is entirely possible to get an A and never come to the lectures. The material covered in homework will be drawn mainly from the readings. The real learning takes place in the classroom though. I have an extensive history in the field of astronomy and astrophysics and will regularly discuss past, present, and future space based missions. I will also regularly highlight current research in the fields of astronomy and astrophysics. Students who attend lectures generally walk away with a much broader understanding of both the material and the nature of science than do those who simply complete the online homework.

I encourage you to come to class and participate in discussions. I also encourage you to do so respectfully. If you are going to come be considerate of your fellow students. I have a severely limited tolerance for disruptive behavior in this class.

Evaluation

Homework 75%

Final Exam 25% 1:00, Wednesday, December 12th

Attendance – see below

Grading

Grades will be assigned as follows:

Excellent	A	> 90%
Good	B	80%-90%
Average	C	70%-80%
Deficient	D	60%-70%
Failing	F	< 60%

A curve may be used at the end of the semester. This is at my discretion. I can be contacted at any time to give you an update of your current grade.

Mastering Astronomy and Homework

The grades for this course are entirely based on online work. You are registered for mastering astronomy as part of your tuition. The homework will be updated regularly on both Mastering Astronomy and the course website. It is your responsibility to keep up to date with assignments. Any semester end requests for leniency concerning missed assignments will be ignored.

Homework will be assigned roughly every week. Check the course website's announcement section to check if new homework is posted after each class. You will generally have 3-7 days to complete an assignment. The due date will be posted on the Mastering Astronomy website. It is your responsibility to keep up with this. If you miss an assignment you get zero credit for it. Please note – I can see exactly how long you spend on homework. If you spend 2 hours don't email me telling me you spent 6 hours.

Please note – I reserve the right to disenroll any student who has a failing homework grade for more than two consecutive weeks.

Final Exam

The final exam will be cumulative and is worth 25% of your total grade. The Final Exam is open note and online. The Final is due by 11:50 on Wednesday, December 11th

Attendance

I do not keep attendance as part of the grade but I may keep an attendance sheet to sort out the students who are frequently absent. If you choose to miss class on a regular basis it is likely that you will fail the course and I do not want to be approached after several absences and asked what you can do to pass the course.

Resources for Students

Your instructor: I am here to help you learn; please let me know if you are having trouble with anything! My contact information is at the top of the syllabus, or you can talk to me after class or during my office hours.

The Course Website: Contains all class information and several helpful (and some just fun) links.

Tutorial Learning Center: HH113 <http://www.coloradomesa.edu/tutoring/index.html>

Students With Disabilities: Students with disabilities have certain privileges extended to them including but not limited to extended exam time. It is your responsibility to contact the EAS (Educational Access Services) At Houston Hall, Room 108, 1-970.248.1856 <http://www.coloradomesa.edu/eas/links.html> and bring me the necessary forms for any special dispensations received.

Student Success at CMU

http://www.coloradomesa.edu/academics/documents/StudentSuccessatCMU_WCCC.pdf

Class Policies

All students expected to follow the Student Code of Conduct. Violations of the Student Code of Conduct may result in disciplinary action. The code of conduct is here here

http://www.coloradomesa.edu/academics/policies/academic_integrity.html. Some specific items that are important in this class are:

1. Don't call me mister, it's Dr. Workman.
2. Show up on time, if you are going to be late, do not enter the class.
3. Create and sustain a respectful and quiet learning environment. Allow your fellow students to learn and the instructor to teach. Disrespectful, disruptive or abusive behavior toward an individual or group is unacceptable. If you disrupt your classmates I will dis-enroll you from the course.
4. Due to the rapid pace of this course, late work is not accepted. In the event of illness, family emergency or other special circumstances, you must contact me BEFORE the deadline to make arrangements for late work or early tests. At the instructor's discretion, you may then turn in the work within 1 week of the deadline.
5. I encourage participation, ask questions, email me, ask for reading material for your own edification after the course is over, provide me with feedback. I am not directly grading you on participation but it will play a factor in the end of the semester grade. This is an interesting topic and I want you to be involved in learning it.

6. Turn off your cell phone.
7. No smart phones, ipads, earphones, etc during class time, no texting or web browsing. You all get one freebie phone ring then I may ask you to leave. I reserve the right to temporarily or permanently remove (disenroll) a student for the continued disruptive use of electronic equipment.
8. Laptops are fine for note taking but please do not web surf during class. If I find you surfing the web you forfeit your laptop privileges. Students using laptops are required to sit at the front of the class.
9. I will turn any students I find cheating, copying each other's work, or plagiarizing material over to the department chair, no exceptions. If you are unsure if something is prohibited, ask me. You are encouraged to work together but please do not hand in identical assignments, they will not be accepted.
10. Please arrive to class on time and wait until class is over to leave. I will remove students who regularly arrive late from the course.
11. It is your responsibility to learn of any missed work from a class mate or my web site.
12. Don't talk during class, raise your hand whenever you want to but don't talk. I reserve the right to require you to leave the class for the day or completely dis-enroll you from the course for talking during lecture.

Important dates:

<http://www.coloradomesa.edu/registrar/dates.html>

Course Learning Objectives:

1. describe and classify various celestial objects,
2. explain qualitatively phenomena that can be observed with the naked eye such as seasons and eclipses,
3. describe major historical developments from ancient astronomy to those of Newton,
4. explain qualitatively astronomical phenomena and observations in terms of the underlying physics,
5. explain qualitatively the operation and limitations of telescopes,
6. describe and explain qualitatively the properties of the solar system, its planets and its moons,
7. describe and explain qualitatively the properties the sun,
8. explain qualitatively the properties of stars, stellar evolution,
9. describe and explain qualitatively the properties of galaxies, and
10. describe the tenants of modern cosmology and the history and possible fates of the universe.

Essential Learning Outcomes

The physics program has several learning outcomes that will be attained by graduates of the program; this course contributes to the attainment of these two objectives

- Demonstrate investigative and analytical thinking skills to solve problems
- Select and use appropriate information or techniques in an academic project

Work Load Expectations:

An undergraduate student should expect to spend on this course a **minimum** of two hours outside the classroom for every hour in the classroom. The outside hours may vary depending on the number of credit hours or type of course. More details are available from the faculty member or department office and in CMU's Curriculum Policies and Procedures Manual.

Guaranteed Transfer

The Colorado Commission on Higher Education has approved physics 101 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GTSC2 category. For transferring students, successful completion with a minimum C- grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to <http://highered.colorado.gov/Academics/Transfers/gtPathways/curriculum.html>.

Content Criteria:

This course should provide students with the opportunity to / Students should be able to:

- a) Develop foundational knowledge in specific field(s) of science.
- b) Develop an understanding of the nature and process of science.
- c) Demonstrate the ability to use scientific methodologies.
- d) Examine quantitative approaches to study natural phenomena.

Student Learning Outcomes:

Inquiry and Analysis Competency

Inquiry is a systematic process of exploring issues/objects/works through the collection and analysis of evidence that results in informed conclusions.

Student Learning Outcomes (SLOs): Students should be able to:

1. Select or Develop a Design Process
 - a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
2. Analyze or Interpret Evidence
 - a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
 - b. Utilize multiple representations to interpret the data.
3. Draw Conclusions
 - a. State a conclusion based on findings.

Quantitative Literacy Competency

Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).

Student Learning Outcomes (SLOs): Students should be able to:

1. Interpret Information
 - a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. Represent information
 - a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

Disclaimer:

The instructor reserves the right to modify the schedule and syllabus. It is tentative based on class progress.