

ASTR 250 Introduction to Astrophysics

Department of Physics & Astronomy, UVIC

Monday & Thursday, 11:30 am – 12:50 pm

Fall Term 2022

Please read the entire document, which outlines the requirements and expectations of this course.

Instructor: Prof. Kim Venn
 Email: kvenn@uvic.ca
 Office: Elliott #111
 Office hours: Wednesday, 1:00 pm – 2:30 pm (virtual: <https://uvic.zoom.us/j/2475878039>)

Lab TAs: TBD

Grading TA: Aram Lee: poke@uvic.ca

Prerequisites

MATH101, PHYS110 or PHYS120.

Course Description

This course will provide some of the physical background required to study astrophysics. By studying the physical processes that operate in stars and stellar systems, we will develop tools for learning about the properties and formation of stars and planets, the origins of the elements and stellar remnants (white dwarfs, neutron stars, black holes), and the properties of our Galaxy and the Local Group. The course is intended for second-year physics, upper-division science, and engineering students, as it features quantitative analyses of data, derivations of key equations, and examples and calculations. Any tools needed beyond Calculus II will be taught as part of the course.

Course Goals

Students who complete this course successfully will be able to:

- Apply the laws of physics to a wide range of astrophysical processes.
- Know why stars live for so long, why they are so different from one another, and how they end.
- Calculate physical properties of planets, stars, and stellar systems with confidence.
- Discuss the origin of the elements, including the ingredients necessary for the emergence of life.
- Name some hot research topics and experiments in astronomy.

Required Texts, Materials, or Equipment

Course Notes: Topics and reading materials will be posted on Brightspace. Important terminology, derivations, and calculations from the textbook will be highlighted for each unit. You are expected to do the readings, and to be familiar with the materials, by taking your own notes and bringing questions to the class and/or office hours.

Required Textbook: Foundations of Astrophysics, by Ryden & Peterson (2010)
(Amazon, used available at the UVic Book Store, copies held in the library)

Lab Manual: Astronomy 250 Laboratory Manual

Additional Texts, Materials, or Equipment

- Other useful textbooks:
1. An Introduction to Modern Astrophysics (2nd edition), by Carroll & Ostlie
 2. Astronomy Today (recent editions), by Chaisson & McMillian
 3. Universe (recent editions), by Freedman & Kaufmann

Course Grading

This course will be graded as follows:	<u>Total %</u>
• Midterm test (Thursday, Oct 20 th , 1 hour, in class)	20%
• Final Exam (Exam Week, TBD, 2 hours)	35%
• Lab exercises (you should be registered in a lab section)	25%
• Assignments (6 total, posted on Brightspaces)	15%
• News item (between Sept 7 th to Dec 1 st , 2022)*	5%

Please note that you cannot pass this course without a passing grade in the labs.

News Item*

Astronomy is a science field that is active with new discoveries, and as such there will be interesting newsworthy articles published throughout the semester. As part of this course, you are asked to keep an eye on the news and post an article relevant to our course that is published *during this semester*. This could include the latest JWST discoveries, new exoplanets, water discovered on Mars, variable stars in a nearby galaxy, etc. As the course is organized through Brightspaces, then we will use the Discussions option for this activity. When posting your article, please include a few sentences as an introduction on how/why it relates to our class. Once an article has been posted, please do not “repost” it (for full credit) – there will be plenty of newsworthy articles published this semester!

Course Structure & Attendance

Each class is 80 minutes and will be organized as follows:

- 5-10 min Start-up & Questions
- 20-30 min Lecture
- 10 min Break (with Posted Questions)
- 5-10 min Regroup & Answer Questions
- 20-30 min Lecture
- 5 minutes Final Questions

Each unit has background reading from the textbook, posted on Brightspaces, which you are expected to do. Each unit will also have a list of relevant terms, derivations, and calculations in the textbook that you are expected to know and should study. There should be plenty of time for Questions during class, but you are also welcome to bring questions to regular office hours, or send them via email.

Course Policies and Information for Students

1. **INCLUSIVE LEARNING ENVIRONMENT.** The best learning environment is one in which all members feel respected while being productively challenged. At UVic, we are dedicated to fostering an inclusive atmosphere, in which all participants can contribute, explore, and challenge their own ideas as well as those of others. Every participant has an active responsibility to foster a climate of intellectual stimulation, openness, and respect for diverse perspectives, questions, personal backgrounds, abilities, and experiences, and instructors bear the primary responsibility for its maintenance. A range of resources are available if you perceive an issue related to our learning environment. If possible, UVic encourages students to speak directly with the instructor (and/or lab TAs) about any concerns regarding a particular situation or instructional space. Alternatively, students may bring concerns to another trusted advisor or administrator (such as an academic advisor, mentor, department chair, or dean).
2. **ATTENDANCE POLICY.** All classes will be held synchronously, and you are expected to attend. If you have an unavoidable conflict at the time of a specific class or are ill, let the instructor or TAs know before the class. In extenuating circumstances, valid excuses will be accepted after class. As the course is organized through Brightspaces, it is possible to keep up with the course material and readings.
3. **PENALTIES FOR LATE WORK and REQUESTS FOR EXTENSIONS.** If a valid excuse is communicated to the instructor or TA before the deadline, then late assignments will be accepted with no penalty. After the deadline, assignments will be accepted with a 20% deduction per day after the deadline.
4. **POLICIES ON MISSED EXAMS, MAKE-UP EXAMS OR QUIZZES.** If a valid excuse is communicated to the instructor or TA before the deadline, then exams can be rescheduled to a mutually convenient time. Without prior communication or extenuating circumstances, then missed exams will receive 0%.
5. **POLICIES FOR WORKING TOGETHER ON ASSIGNMENTS & LABS.** Students are encouraged to discuss assignments and labs together, which builds your scientific communication and collaborative skills. However, all assignments and labs should be completed and handed-in on your own.
6. **REGRADING POLICY.** You may submit a request to regrade an assignment, by providing the original assignment, identifying which question requires attention, and detailing your concerns. Submit your request within one week of the return of the assignment for consideration.
7. **ETHICS/VIOLATIONS OF ACADEMIC INTEGRITY:** Ethical behavior is an essential component of learning and scholarship. Students are expected to understand and adhere to UVic's academic integrity policy: <https://www.uvic.ca/students/academics/academic-integrity/>. If you have any doubts about what constitutes a violation of the Academic Integrity policy, or any other issue related to academic integrity, please ask your instructor. Some examples of appropriate ethical scholarship include;
 - Always citing your sources when you present ideas and/or language that you have not developed yourself, including material from class lectures and discussions.
 - Not using online or unapproved resources for assignment answers (Chegg, Course Hero, etc.).
 - Not using your phone to check course materials or talk with other students *during* tests.
 - Being civil, respectful, and supportive of an inclusive learning environment for all students.
 - Bringing issues of ethical or inclusivity concerns, for yourself or another student, to the instructor, TAs, department chair, or a trusted advisor.