



COURSE OUTLINE

1. **Course:** ASTR 209, Introduction to Astronomy II - The Cosmos - Winter 2022

Lecture 01 : TR 15:30 - 16:45 in ST 140

Instructor	Email	Phone	Office	Hours
Dr Philip Langill	pplangil@ucalgary.ca	403 220-5402	SA 101B	Office Hours will be held Wednesdays from 1 to 3 pm via zoom. It may be necessary to change this occasionally due to scheduling conflicts. If any changes are eminent, new office hours will be communicated via D2L and/or during lecture.

In this course you will learn about the vastness of space and time, the astrophysics of stars and nebulae, and the characteristics and motion of the galaxies.

Most of the universe is not visible to the human eye, and the conditions that exist in space defy our intuition. We will discover how the laws of physics allow us to learn about things that we cannot see and cannot touch.

To account for any necessary transition to remote learning in the winter 2022 semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Lectures will be delivered on main campus in the classroom designated by the Registrar's Office.

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#). **Online Delivery Details:**

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

Assignments will be administered via the publishers website using their platform called Mastering Astronomy.

The TopHat interaction platform will be utilized for both classroom participation and to administer the midterm and final exams.

Office hour interaction will occur via zoom. The zoomroom link will be communicated at the start of the semester via D2L and/or during lecture.

Course Site:

D2L: ASTR209L01W22 - Intro to the Cosmos

Note: Students must use their U of C account for all course correspondence.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Physics and Astronomy EDI Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Acting Associate Head EDI, Jo-Anne Brown (jocat@ucalgary.ca)

2. Requisites:

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Math is the language by which we formulate the laws of physics and on which our understanding of the cosmos is built. Math will be used in this course to illustrate how we discover details about the universe.

The exams will contain questions that test knowledge and insight. The exams will also include some math questions.

3. Grading:

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Mastering Astronomy Assignments (7)	35%	Ongoing		
In-Class TopHat questions	4%	Ongoing		
Midterm Exam ¹	25%	Mar 03 2022 at 11:59 pm (60 Minutes)	online	via zoom
Galaxy Activity	6%	Apr 12 2022		
Registrar Scheduled Final Exam	30%	Will be available when the final exam schedule is released by the Registrar	online	Will be available when the final exam schedule is released by the Registrar

¹ Actual start time TBA

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

The percentage grades required to earn a particular letter grade for the course are strict minimum thresholds applied to the weighted mean percentage course grade. There is no rounding. For example, a mean percentage grade of 79.99% for the course translates into a letter grade B+.

Assignments are due at 23:59 on the due date. After this due-time, the maximum attainable grade decreases gradually to zero over a 24 hour period.

This course will have a Registrar Scheduled Final exam that will be delivered on-line. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

Per section [G.5](#) of the online Academic Calendar, timed final exams administered using an on-line platform, such

as D2L, will be available on the platform. Due to the scheduling of the final exams, the additional time will be added to **the end** of the registrar scheduled **synchronous** exam to support students. This way, your exam schedule accurately reflects the **start time** of the exam for any **synchronous** exams. E.g. If a **synchronous** exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the **end** time of the **synchronous** exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm.

Each student shall register only one single account in Mastering Astronomy and one single account in TopHat. Duplicate accounts associated with the same student ID will be removed, and this may result in loss of credit for one or more course components.

Any missed component of course work receives a zero grade .

All students are required to participate in the TopHat interactive questions presented in class.

The University of Calgary offers a [flexible grade option](https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

Required Textbook(s):

Bennett, Donahue, Schneider, Voit, *The Cosmic Perspective: Stars, Galaxies, and Cosmology, 9th edition* Pearson.

Be sure to get the correct text book. This is part 2 of a larger text book. You only need the Stars, Galaxies, and Cosmology section for ASTR 209.

Lecture notes will be posted on D2L after the lecture. Exams can include material from the text book and the assignments that is not included in the lecture notes. It is therefore not advisable to study only from the lecture notes. Lecture notes can also add material that is not covered by the text book.

Homework assignments are done online through the Mastering Astronomy tool provided by the textbook publisher. You may already have access to Mastering Astronomy from a previous course. Check if an access code is included when you purchase a new copy of the text.

Details about gaining access to Mastering Astronomy will be discussed in lecture.

We will use the TopHat in-class participation technology. Details of this are provided elsewhere in this outline and on D2L, and will be discussed in lecture.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);

- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

7. Examination Policy:

The midterm and final exams are 'open-resource' exams meaning students can use the **sanctioned resources** that will help them to complete the exams **INDIVIDUALLY**. Collaboration is not permitted.

By entering into the online exams in this course, students are making a declaration that they are working by themselves, with only the aid of the course textbook, lecture notes, and other course approved online resources, AND with NO third party tools such as file sharing websites, texting and other communication apps and modes, and services that are not affiliated with the University of Calgary.

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. Other Important Information For Students:

- Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual

violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)

- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)
Student Academic Misconduct [Policy](#) and [Procedure](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- e. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Dr. David Feder by email phas.ahugrd@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Concepts students will encounter in this course include;

How we measure aspects of the Cosmos, such as parallax, angular size, apparent brightness, gravitational waves.

The rules of Nature astronomers employ, such as the Stefan-Boltzmann Law, Wein's Law, Newton's Laws

The structure and properties of the Sun and stars. The Hertzsprung-Russell diagram.

Star formation, the interstellar medium, stellar evolution and nucleosynthesis.

The end stages of stellar evolution; White Dwarf stars, Neutron Stars, Black holes.

The structure of the Milky Way and other Galaxies. Clusters of galaxies. Galaxy evolution. Cosmology.

Course Outcomes:

- Students will know how observations of radiation across the electromagnetic spectrum contribute to our knowledge of the cosmos.
- Students will learn to apply physical principles such as black body radiation, spectral analysis, the Doppler effect, parallax, and the force of gravity to objects in the cosmos.
- Students will demonstrate critical judgment about applicable media reports, scientific methods and theories.
- Students will be able to identify the building blocks of the cosmos and their interrelations.

Electronically Approved - Jan 07 2022 11:20

Department Approval

Electronically Approved - Jan 10 2022 13:58

Associate Dean's Approval