UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Physics & Astronomy
Science B 605
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COURSE OUTLINE

1. **Course:** ASTR 209, Introduction to Astronomy II - The Cosmos - Summer 2023

   Lecture 01 : MWF 12:00 - 13:50 - Online

Instructor	Email	Phone	Office	Hours
Jason Nishiyama	jason.nishiyama1@ucalgary.ca	N/A	N/A	MWF 14:00-15:00

   In this course we will be studying deep space, that is the astrophysics of stars, nebulae, and galaxies. We will look at what objects exist in the universe outside the solar system, how those things form, and how we know what we know. Since much of what we know exists in the universe is invisible to the unaided human eye, we will look at how physics allows us to learn about things we cannot see or touch. The course will challenge you with the diversity of the universe and the level of abstract thinking required for studying the vastness of the universe.

   To account for any necessary transition to remote learning for the current 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).

   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.

   This course will be delivered primarily by synchronous virtual classes in Zoom. This means that we will generally meet at the appointed class times of MWF at 12:00 to 13:50. There may be times when classes are delivered asynchronously. You will be notified in advance in the announcements on D2L when these will happen.

   We will attempt to record the synchronous classes so that students who are unable to attend may view them at a later time. Please note that participants in a recorded class will have their voice and text chat also recorded by Zoom.

   Course Site:

   D2L: ASTR 209 L01-(Summer 2023)-Introduction to Astronomy II - 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 Associate Head EDI, Claudia Gomes da Rocha (claudia.gomesdarocha@ucalgary.ca)

2. **Requisites:**

See section 3.5.C in the Faculty of Science section of the online Calendar.

Math is the language in which we formulate the laws of physics on which our understanding of the cosmos is built. Math is used in this course to illustrate how we find out 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
Bi-Weekly Assignments (on D2L) (3)[1]	25%	Ongoing		
Bi-Weekely Lab Assignments (3)[2]	25%	Ongoing		
Mid Term Exam[3]	25%	Jul 19 2023 at 12:00 pm (110 Minutes)	online	On D2L
Registrar Scheduled Final Exam[4]	25%	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] Alternating with Lab assignments;Tuesday July 4 (12:00); Tuesday July 18 (12:00); Tuesday August 8 (12:00);

[2] Alternating with assignments; Tuesday July 11 (12:00); Tuesday July 18 (12:00); Tuesday July 25 (12:00);

[3] To compensate for writing on line there will be 50% more time than stated.

[4] To compensate for writing on line there will be 50% more time than stated.

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	93 %	85 %	80 %	75%	70%	65 %	60 %	55%	50%	45 %	40 %

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 12:00 (Noon) on the due date (see later in this course outline). After this due-time, the maximum attainable grade decreases gradually to zero over a 24 hour period.

Assignments are on D2L.

Any missed component of course work receives a grade of zero.

This course has a registrar scheduled final exam.

The mid term exam will be 110 minutes (plus 55 additional minutes to compensate for writing on line) and will be on D2L.

The final exam will be 2 hours (plus 60 minutes to compensate for writing on line) and will be on D2L. The final exam will be scheduled by the Registrar.

NOTE: Additional time will be granted to SAS students that require it, and other accommodation to students will be done on a case-by-case basis.

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.

The University of Calgary offers a flexible grade option, 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 or in-person 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.

Nominally missed components of term work will receive a grade of zero; this includes late assignments. If an illness or other emergency prevents the completion of work before a deadline, it is imperative that you contact the instructor as soon as possible so that alternative arrangements, if possible, can be discussed. The earlier you can contact the instructor, the easier it will be to make alternate arrangements.

5. **Scheduled Out-of-Class Activities:**

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

6. **Course Materials:**

Required Textbook(s):

> Bennett, J., Donahue, M., Schneider, N., Voit, M, *The Cosmic Perspective (9th Edition) (Electronic on line version)*: Pearson.

The electronic textbook also provides access to Mastering Astronomy, which can be used as a study tool. Assignments are on D2L, so a Mastering Astronomy account is not required.

Lecture notes will be posted on D2L prior to the lecture. You are encouraged to download these for the lecture to aid in your note taking. Exams can contain information from the textbook, the assignments/labs, and the lectures. It is therefore advisable not to rely on only the textbook or the lecture notes for study purposes.

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:**

   Exams will be held on D2L. Due to the on-line nature of the exams, the instructor will generate the exams as take-home exams. This means the questions on the exam will mostly test insight and application of the material. The exams will be a mix of multiple choice and short and long answer questions. Some questions on the exams will require the use of math. A formula sheet will be provided.

   The use of a scientific calculator is allowed and highly recommended for exams!

   All exams are cumulative.

   As an on-line take-home exam, accessing reference material is assumed, so few questions will test base knowledge. The test is time-limited, so an understanding of the material without the use of reference materials will ensure a higher level of success.

   You are **NOT** permitted to collaborate with classmates on test questions. Direct copying of material from either classmates or other sources will be considered plagiarism and may lead to disciplinary action. All answers on assessment material (exams, assignments, etc.) must be your own work. For further information on misconduct, you are directed to read section 12 paragraph d of this course outline.

   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.

    a. **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

    b. **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:**

    a. **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).

    b. **SU Wellness Services:** For more information, see their website or call 403-210-9355.

    c. **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. The complete University of Calgary policy on sexual violence can be viewed here.

d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

e. **Student Union Information:** SU contact, Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca,

f. **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.

g. **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
Faculty of Science Academic Misconduct Process
Research Integrity Policy

Additional information is available on the Student Success Centre Academic Integrity page

h. **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.

i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). 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.

j. **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.

If you need assistance.

ASTR 209 covers a lot of material in a very short time. Lecture notes are posted prior to the lecture so that you can use them for note taking. More detailed course information will be posted on D2L. Due to the nature of the

course material, it may be difficult to answer questions over email. Email with the instructor is most effectively used to deal with course organizational issues or to book an appointment if you cannot make office hours. Office hours have been set to be the hour after class which is the ideal time to answer questions related to course outcomes.

Homework assignments

Assignments/assignment labs will primarily be web based and in Mastering Astronomy. Access is provided with the electronic textbook, and information on how to log in will be posted on D2L. Lab activities will be handed in on D2L.

Syllabus

Observing the Cosmos. Structure of the Sun and other stars. Properties of stars. Parallax, luminosity, Stephan-Boltzmann law, Hertzsprung-Russell diagram. Stellar evolution and nucleosynthesis. End stages of stellar evolution. Black holes and gravitational waves. Structure of the Milky Way. Interstellar matter. Galaxies and clusters of galaxies. Cosmology. Galaxy evolution.

A detailed list of learner objectives will be posted on D2L.

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 - Jun 23 2023 14:12

Department Approval