UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE OUTLINE

1. **Course:** ASTR 209, Introduction to Astronomy II: The Cosmos Spring 2017

Instructor: Dr. Jeffrey Bailey | (403) 220.3041 | E: jeffrey.bailey@ucalgary.ca | Office: SB 130
Office Hours: T: 10:00 am – 11:30 am
R: 3:00 pm – 4:30 pm

Lecture Sections: TR | 12:00 pm – 2:45 pm | SB 103

Course website: d2l.ucalgary.ca

Departmental Office: SB 605, (403) 220.5385, phasugrd@ucalgary.ca

2. **Prerequisites:** Not open to students with credit in Astronomy 205, 213 or Astrophysics 213. Not recommended for physical science majors.

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Participation: 5%
Assignments (4): 20%
Final Project: 30% (Due: June 22)
Midterm Test: 20% (In Class: June 1)
Final Examination: 25% (3 hours: To be scheduled by the Registrar)

Percentage to letter grade conversion scale:

> = 95 %	A +	> = 80 %	B +	> = 65 %	C +	> = 50 %	D +
> = 90 %	A	> = 75 %	B	> = 60 %	C	> = 45 %	D
> = 85 %	A -	> = 70 %	B -	> = 55 %	C -	< 45 %	F

4. **Learning Tasks and Assessments**

A) Participation (5%)
During and/or after the lectures, a series of questions will be posed to students using TopHat and/or D2L Discussion boards. The purpose of these questions will be to facilitate participation during the lectures and to provide formative assessments and feedback on key concepts. The correctness of one's response will not be marked, but rather I am looking for information to inform the course trajectory. There will be a total of 13 classes during the Spring 2017 term, two of which

will be used for the midterm and final examinations. A total of 11 lectures will be given throughout the term. Participation in each class will be weighted equally and graded based on answering all questions posed during a lecture. One class may be missed and full credit (5%) can still be achieved, assuming students participate in 10 of the 11 lectures throughout the term.

B) Assignments (20%)
There will be a total of 4 assignments to be completed using Mastering Astronomy. Instructions on how to register for the course on Mastering Astronomy will be posted on D2L. Assignments will be due on Tuesdays before the start of class: May 23, May 30, June 13 and June 20.

C) Final Project (30%)
This project will involve students working in groups of 3 or 4 towards the completion of an end of term project. Specific information will be posted on D2L. The project will be due via D2L Dropbox by 11:59:59 pm on Thursday, June 22, 2017.

D) Midterm Test (20%)
An in-class midterm will be held on June 1, 2017. It will be 3 hours and consist of multiple choice questions.

E) Final Exam (25%)
The final examination is cumulative and will be scheduled by the Registrar sometime between Wednesday, June 28, 2017 and Friday, June 30, 2017. The exam will be 3 hours in duration and consist of multiple choice questions.

5. Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in Section 3.6. It is the student's responsibility to familiarize himself/herself with these regulations. See also Section E.6 of the University Calendar

6. Scheduled out-of-class activities: None

7. Course Materials: *"Astronomy Today"*, 7th or 8th ed. Volume II: Stars & Galaxies by Chaisson & McMillan

   Online Course Component: Course notes and materials will be available on the course website. Assignments will be done on the online assessment system called "Mastering Astronomy." See course website on how to sign into the system.
   The intent is to use TopHat during the lectures to facilitate in-class discussions. Students will be expected to have access to TopHat on a device during the lecture. D2L discussion boards will also be used.

8. Examination Policy: All exams will be closed book exams. Formulae sheets will be provided as part of the exam material (if required). Any kind of calculator is allowed (even programmable ones). However, calculator apps on cell phones are not allowed (since all cell phones should be turned off and put away). Students should also read the Calendar, Section G, on Examinations.

9. Course fees: none

10. Writing across the curriculum: In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also Section E.2 of the University Calendar.

11. **Human studies statement:** Students in this course are not expected to participate as subjects or researchers. See also Section E.5 of the University Calendar.

12. **Other Important Information for Students:**

(a) **Academic Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties.

(b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

(c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Physics and Astronomy, Dr. David Feder, by email (dfeder@ucalgary.ca) or by phone (403.220.3638).

(d) **Safewalk:** Campus Security will escort individuals day or night (http://www.ucalgary.ca/security/safewalk/). Call 2205333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, 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 also http://www.ucalgary.ca/secretariat/privacy.

(f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucagary.ca.
SU Faculty Rep: Phone: 220-3913
Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca
Student Ombuds Office: 403 220-6420
Email: ombuds@ucalgary.ca; http://ucalgary.ca/provost/students/ombuds

(g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

12. OTHER COURSE RELATED INFORMATION:

(a) Course Description

A comprehensive, descriptive overview of the universe outside the solar system. The electromagnetic spectrum; stellar spectra; distance determinations. Origin and evolution of stars; white dwarfs, neutron stars and black holes. The interstellar medium & star formation.

(b) Syllabus

Part 1 – Fundamentals of Astronomy & Physics (e.g. History, Parallax, Kepler's Laws, Newton's laws, Orbital Motion)
Part 2 – Light, the Electromagnetic Spectrum, & Telescopes (e.g. Wavelength vs Frequency, Black Body Radiation, Hydrogen Atom, Spectral Lines, Kirchoff's Laws, Doppler Shift, Telescopes, Radio Astronomy, Interferometry)
Part 3 – Stars (e.g. the Sun, Proton-Proton Chain, Stellar Classification & the HR Diagram, Distance Determination Methods, Binary Stars)
Part 4 – The Interstellar Medium and Star Formation (e.g. the Atomic & Molecular ISM, Reflection & Emission Nebulae, Star Formation, Planet Formation, Extrasolar Planets)
Part 5 – Stellar Evolution (e.g. Post Main Sequence Evolution, Giant stars, Planetary Nebulae, White Dwarfs, Novae, Supernovae)
Part 6 – The Deaths of Stars and General Relativity (e.g. Neutron Stars, Pulsars, Black Holes, General Relativity and Space-time)